Draft Environmental Impact Report/ Environmental Assessment California Central Coast Veterans Cemetery

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California Department of Veterans Affairs

NEPA Lead Agency

U.S. Department of Veterans Affairs

U.S. Department of Veterans Affairs

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California Central Coast Veterans Cemetery

Draft Environmental Impact Report/ Environmental Assessment

SCH #2018111930

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LIST OF ACRONYMS

2008 Master Plan	California Central Coast Veterans Cemetery 2008 Development Master Plan
2015 Master Plan	California Central Coast Veterans Cemetery 2015 Master Plan
AAM	Annual Arithmetic Mean
AAQS	Ambient Air Quality Standards
AAR	After Action Report
AB	Assembly Bill
ACM	Asbestos Containing Material
ADA	Americans with Disabilities Act
AES	Aesthetics
afy	acre-feet/year
AIRFA	American Indian Religious Freedom Act
AMBAG	Association of Monterey Bay Area Governments
Ambient	Ambient Air Quality and Noise Consulting
APE	Area of Potential Effects
APN	Assessor Parcel Numbers
APS	Alternative Planning Strategy
AQ	Air Quality
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
Army	U.S. Department of the Army
AWSC	All-Way Stop-Controlled
BA	Biological Assessment
Basin	Basin Research Associates
BI	Beneficial Impact
BIO	Biological Resources
BLM	Bureau of Land Management
BMPs	Best Management Practices
BO	Biological Opinion
BRA	Baseline Risk Assessment
BRAC	Defense Base Closure and Realignment Act of 1990
BSC	Building Standards Commission

Btu	British thermal unit
C_2F_6	Perfluoroethane
C_3F_8	Perfluoropropane
CF_4	Perfluoromethane
C_4F_8	Perfluorocyclobutane
C_4F_{10}	Perfluorobutane
C_5F_{12}	Perfluoropentane
C_6F1_4	Perfluorohexane
CAAQS	California ambient air quality standards
CAC	Monterey County Veterans' Citizen Advisory Committee
Cal-Am	California American Water Company
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Prevention
CalGreen	California Green Building Standards Code
California State Parks	California Department of Parks and Recreation
Cal-IPC	California Invasive Plant Council
Cal-OSHA	California Occupational Health and Safety Administration
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CalVet	California Department of Veterans Affairs
CBC	California Building Code (Title 24)
CCAA	California Clean Air Act
CCCVC	California Central Coast Veterans Cemetery
CCLEAN	Central Coast Long-term Environmental Assessment Network
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)

CESA	California Endangered Species Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CH_4	Methane
CHRIS	California Historic Resources Information System
City	City of Seaside
CIWMB	California Integrated Waste Management Board
CNEL	Community Equivalent Noise Level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
County	County of Monterey
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CSUMB	California State University Monterey Bay
CTR	Cultural and Tribal Resources
CTS	California Tiger Salamander
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
DAHRO	Development Area with Habitat Restoration Opportunity
dB	decibels
dBA	A-weighted decibels
DD&A	Denise Duffy & Associates, Inc.
DDT	Dichloro-Diphenyl-Trichloroethane
DGS	California Department of General Services – Real Estate Services Division
DMM	Discarded Military Munitions
DPM	Diesel Particulate Matter
Draft EIR/EA	Draft Environmental Impact Report/Environmental Assessment
DRPP	Diesel Risk Reduction Plan
DSA	Division of the State Architect

DTSC	California Department of Toxic Substance Control
ECORP	ECORP Consulting, Inc.
EDAW	EDAW, Inc.
EIS	Environmental Impact Statement
EMC	EMC Planning Group, Inc.
ENG	Energy
EO	Executive Order
ERA	Ecological Risk Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FCAA	Federal Clean Air Act
FIMA	Flood Insurance and Mitigation Administration
FIRM	Flood Insurance Rate Map
FONM	Fort Ord National Monument
FONSI	Finding of No Significant Impact
FORA	Fort Ord Reuse Authority
FORA SWMP	Fort Ord Reuse Authority Storm Water Master Plan
FOSET	Findings of Suitability of Early Transfer
FOST	Findings of Suitability to Transfer
FS	Feasibility Study
FTA	U.S. Department of Transportation, Federal Transit Administration
GEO	Geology, Soils, and Seismicity
GHG	Greenhouse Gas Emissions
GIS	Geographic Information System
GWh	gigawatt-hours
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
HAPs	Hazardous Air Pollutants
HAZ	Hazards and Hazardous Materials
HCM 2010	Highway Capacity Manual 2010
HCP	Draft Fort Ord Habitat Conservation Plan
HFCs	Hydrofluorocarbons

HMP	Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord California
HYD	Hydrology/Water Quality
Hz	Hertz
IFC	International Fire Code
in/sec ppv	inches per second peak particle velocity
IS/EA	Initial Study/Environmental Assessment
ITE	The Institute of Transportation Engineers
kW	kilowatts
kWh	kilowatt hour
L_{dn}	Day-night Average Noise Level (also DNL)
L_{eq}	Energy Equivalent Noise Level
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
lbs/day	pounds per day
LID	Low Impact Design
LOMR	Letter of Map Revision
LOS	Level of Service
LRA	Local Responsibility Areas
LS	Less Than Significant
LSM	Less Than Significant with Mitigation
LU	Land Use/Planning
LUCs	Land Use Controls
µg/L	microgram per liter
$\mu g/m^3$	micrograms per cubic meter
M1 Water	Monterey One Water
MBARD	Monterey Bay Air Resources District
MBCP	Monterey Bay Community Power
MBTA	Migratory Bird Treaty Act
MCAQMD	Mendocino County Air Quality Management District
MCRFD	Monterey County Regional Fire District
MCWD	Marina Coast Water District
MPWMD	Monterey Peninsula Water Management District

MCWRA	Monterey County Water Resources Agency
MEC	Munitions and Explosives of Concern
mg/L	milligrams per liter
MLD	Most Likely Descendent
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
mpg	miles per gallon
mph	miles per hour
MPOs	Metropolitan Planning Organizations
MPWMD	Monterey Peninsula Water Management District
MRA	Munitions Response Area
MRS	Munitions Response Sites
MRSWMP	Monterey Regional Stormwater Management Program
MRS-50 EXP	Munitions Response Site-50 expansion
MRWMD	Monterey Regional Waste Management District
MS4s	Municipal Separate Storm Sewer Systems
MST	Monterey-Salinas Transit
MTP/SCS	Metropolitan Transportation Plan/Sustainable Communities Strategy
MUTCD	Manual of Uniform Traffic Control Devices
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCA	National Cemetery Administration
NCCAB	North Central Coast Air Basin
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NF_3	Nitrogen trifluoride
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NI	No Impact
NOD	Notice of Determination

NOI	Noise
NOP	Notice of Preparation
NO_2	Nitrogen dioxide
NO_X	Oxides of Nitrogen
NPS	U.S. National Park Service
NPDES	National Pollutant Discharge Elimination System Permit
NCRS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTAC	Nitrate Technical Advisory Committee
O_3	Ozone
O&M	Operations and Maintenance
OCEN	Ohlone/Costanoan-Esselen Nation
OHP	Office of History Preservation
OSHA	Occupational Safety and Health Administration
OSR	Open Space-Recreation
PAHs	Polynuclear Aromatic Hydrocarbons
PCAPCD	Placer County Air Pollution Control District
PCBs	Polychlorinated biphenyls
PFCs	Perfluorocarbons
Pb	Lead
PG&E	Pacific Gas and Electric
PM	Particulate Matter
$PM_{2.5-10}$	Inhalable Coarse Particles
$PM_{2.5}$	Fine Particles
Porter-Cologne	Porter-Cologne Water Quality Control Act of 1969
POS	Parks and Open Space
Ppb	parts per billion
ppm	parts per million
PQP-D-S	Public/Quasi-Public
PRC	Public Resource Code
PS	Public Services
PVC	Polyvinyl chloride
QS	Dune Sand

RCRA	Reauthorization Act, the Conservation and Recovery Act
RDIF	Regional Development Impact Fee
Reuse Plan	Fort Ord Reuse Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIDES	MST ADA Paratransit
ROD	Record of Decision
ROG	Reactive Organic Gases
ROW	Right-of-way
RPS	Renewables Portfolio Standard
RWD	Reports of Waste Discharge
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCGP	State Cemetery Grants Program
SCH	State Clearinghouse
SCS	Sustainable Communities Strategy
SDC	Seismic Design Category
SEJ	Socioeconomics and Environmental Justice
SEL	Sound Exposure Level
Seaside Basin	Seaside Groundwater Basin
SF_6	Sulfur hexafluoride
SHPO	California State Historic Preservation Officer
SIP	State Implementation Plan
SLF	Sacred Lands File
SLCPs	Short-lived Climate Pollutants
SLCP Strategy	Short-Lived Climate Pollutant Reduction Strategy
SLOAPCD	San Luis Obispo Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	Sulfur dioxide
SO_4^{2-}	Sulfates
SOD	Sudden Oak Death
SR	State Route
SSSC	Side-Street Stop-Controlled

State	State of California
State Board	State Water Resources Control Board
Staub	Staub Forestry & Environmental Consulting
SU	Significant Unavoidable
SVGB	Salinas Valley Groundwater Basin
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminants
TAMC	Transportation Agency for Monterey County
TCZ	Temporary Construction Zone
TOG	Total Organic Cases
TR	Transportation
TWSC	Two-Way Stop-Controlled
UFP	Ultrafine Particles
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
USACE	U.S. Army Corps of Engineers
USA North	Underground Service Alert North
USC	United States Code
USDI/BIA	U.S. Department of Interior Bureau of Indian Affairs
USDVA	U.S. Department of Veterans Affairs
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tanks
UT	Utilities and Service Systems
UXO	Unexploded Ordnance
VCM	Vinyl chloride (also C_2H_3Cl)
VHFHSZ	Very High Fire Hazard Severity Zones
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds
WDR	Waste Discharge Requirement

DEFINITIONS

Columbarium: a place for the respectful and usually public storage of cinerary urns (urns holding a deceased's cremated remains); usually a structure of vaults lined with niches for cinerary urns. The function of a Columbarium is to provide an above-grade structure designed for the interment of the cremated remains of a veteran and a dependent.

Committal Service Shelter: a location for interment services away from the specific gravesite. In a veterans cemetery, where specific gravesites are not reserved for individuals, the burial area is usually not a suitable location for the committal service.

Cortege Assembly Area: a public reception, waiting and information area for visitors and funeral parties.

In-Ground Cremain Burial: the act of burying cremated remains in the ground. An In-Ground Cremain Burial site is usually square and half the size of a full casket site (e.g. 5 feet x 5 feet). Size depends upon the type of marker and the grid layout chosen.

In-Ground Crypt Burial (Casket Burial): a crypt is a chambered burial vault used to store the deceased. Lawn crypts are double-depth type pre-placed concrete containers with removable concrete lids. They are installed at the time of land development. Crypts are installed by excavating the burial area.

Interment Service:p a burial ceremony.

EXECUTIVE SUMMARY

ES.1 OVERVIEW OF PROPOSED PROJECT

This Draft Environmental Impact Report/Environmental Assessment (Draft EIR/EA) for the California Central Coast Veteran Cemetery (CCCVC) (proposed project) addresses the environmental impacts, environmental issues, and alternatives associated with implementation of the 2015 CCCVC Master Plan. The CCCVC is necessary to provide burial facilities for deceased veterans and their families in the Monterey Bay Region of California, given the number of veterans in this region. An overview of the proposed project is provided below in **Section 1.2, Proposed Project Overview**, and a full description of the project is presented in **Chapter 2, Proposed Project and Alternatives**, of this document.

On behalf of the State of California (State), the California Department of General Services – Real Estate Services Division (DGS), and the California Department of Veterans Affairs (CalVet) have prepared this Draft EIR/EA in accordance with the requirements of the California Environmental Quality Act (CEQA) and the CEQA Guidelines (14 California Code of Regulations Section 15000 et seq.); the document integrates National Environmental Policy Act (NEPA) requirements (40 Code of Federal Regulations 1501), as applicable, to satisfy the U.S. Department of Veterans Affairs (USDVA) regulatory requirements.

CalVet, with the assistance from DGS, is the lead State agency responsible for the preparation of an EIR under CEQA for the proposed project. The CCCVC would be constructed with funds awarded through the Veterans Cemetery Grants Service offered by the USDVA, which requires the proposed project to comply with NEPA. Therefore, a joint CEQA and NEPA document is being prepared, consisting of an EIR in satisfaction of CEQA and an EA in satisfaction of NEPA. The USDVA is acting as lead Federal agency in accordance with the requirements of NEPA and to ensure that the Draft EIR/EA and underlying administrative record support the USDVA decision-making and disclosure process.

This Draft EIR/EA discloses relevant information concerning the proposed project and alternatives to the proposed project and invites all interested parties to play a role in both the decision-making process and the implementation of the decision. It also provides Federal, State, and local decision-makers with detailed information concerning the potentially significant environmental, social, economic, cultural, and other impacts associated with the proposed project and the alternatives for the proposed project.

ES.1.1 Project Summary

As part of the Defense Base Closure and Realignment Act of 1990 (BRAC), Fort Ord was downsized and realigned in 1991 and officially closed in 1994. An initiative to develop a veterans cemetery at the former Fort Ord began a few weeks after announcement in 1991 of the BRAC. The CCCVC 2008 Development Master Plan (2008 Master Plan) was prepared in support of this effort. Phase 1 of the CCCVC was approved and constructed in 2015. After the approval of Phase 1, an updated master plan, the CCCVC 2015 Master Plan (2015 Master Plan), was prepared.

The proposed project would involve implementing the CCCVC 2015 Master Plan. Since Phase 1 has already been constructed, the proposed project involves implementing the remaining phases of the 2015 Master Plan – Phases 2 through 11. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in 2020. Therefore, this EIR/EA analyzes Phase 2 at a project

level, while analyzing the build-out of the 2015 Master Plan at a programmatic level (please refer to **Section 1.3, Environmental Review Process** for more detail on the level of analysis).

The project site is located within the former Fort Ord in Monterey County, California, which is approximately 80 miles south of San Francisco and 42 miles southwest of San Jose. The project site consists of approximately 84.4 acres owned by the State of California. The City of Seaside (City)/County of Monterey (County) boundary bisects the State's property with about 32 acres, including the Phase 2 site, within the city limits. The balance of the property, approximately 52.4 acres, is located within unincorporated County land. The project site occupies a portion of two parcels identified with Monterey County Assessor Parcel Numbers (APNs) 031-052-002-000 and 031-152-005-000.

The 2015 Master Plan is a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. It outlines a process and strategy for the implementation of the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates. The 2015 Master Plan includes a phased approach to build-out that will serve the anticipated needs of veterans for the next hundred years. A joint CEQA/NEPA document (Initial Study/Environmental Assessment, or IS/EA) was prepared for the Phase 1 of the CCCVC in 2014 and approved in 2015. Phase 1 of the CCCVC has been constructed and the opening ceremony was held in October 2016. Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property. Phase 2 includes 1,000 in-ground cremains, 1,831 crypts, and supporting roads and infrastructure to provide increased burial options anticipated for the next 10 years.

ES.1.2 Project Objectives

In 2015, after the approval of Phase 1 of the CCCVC, an updated master plan was prepared (**Appendix B**). The purpose of the 2015 Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues remaining following the construction and completion of Phase 1 for the development of the cemetery. To that end, the 2015 Master Plan outlines a process and strategy for the implementation of the entire Cemetery including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates.

The purpose and objective of the 2015 Master Plan, including Phase 2, is to implement a key objective in CalVet's Strategic Plan:

> *Provide for deceased veterans and their families through the development and administration of additional State Veterans Cemeteries.*

The 2015 Master Plan objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans anticipated for the next 100 years;
- Provide a phased approach to the development of the cemetery that allows for flexibility over time to respond to demand and available funding;
- Fulfill the vision of providing a veterans cemetery at the former largest military base on the west coast, where many veterans were likely to have served;
- Create a monument to commemorate the service and sacrifice of California State Veterans; and

- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs.

The Phase 2 objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans anticipated for the next 10 years;
- Increase burial options by providing in-ground crypts and in-ground cremain burial sites; and
- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing topography and open areas with existing native vegetation as much as possible, while meeting the programmatic needs.

ES.1.3 Resource Topics Considered

The scoping process determined that the proposed project could lead to potential environmental impacts on specific natural resources and on the human environment. Based on comments received during the scoping process and preliminary review, **Chapter 3, Environmental Setting and Environmental Impacts** of this Draft EIR/EA includes a detailed evaluation of resource topics with respect to direct and indirect impacts that may result from the proposed project and alternatives; **Chapter 4, Other Statutory Considerations** provides a discussion of cumulative impacts. The resource topics evaluated includes:

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

The Draft EIR/EA also analyzes the following elements not required under CEQA but are required under NEPA. These include:

- Socioeconomics and Environmental Justice;
- Short-term Uses and Long-term Productivity;

- Unavoidable Adverse Effects; and
- Irreversible and Irretrievable Commitments of Resources.

Based on the preliminary analysis, it was determined that several elements would not be significantly affected by the proposed project or alternatives and were therefore excluded from consideration in this Draft EIR/EA. These include:

- Agricultural and Forestry Resources;
- Mineral Resources; and
- Recreation.

ES.2 OVERVIEW OF PROPOSED PROJECT AND ALTERNATIVES

Alternatives for analysis in this EIR/EA were considered in the context of the CEQA/NEPA regulations and guidelines as described in **Section 2.3, Development of Alternatives**. For the purposes of analyzing the proposed project, reasonability is based on the following criteria:

- Alternatives should fulfill the purpose and need under NEPA and the objectives under CEQA.
- Alternatives should be feasible and reasonable in terms of economic, environmental, legal, social, and technological factors.
- Alternatives should avoid or substantially reduce one or more significant impacts of the proposed project.

Two alternatives were found to generally meet purpose/need and objectives of the proposed project, be feasible or potentially feasible, and have some potential to avoid or substantially reduce one or more significant impacts of the proposed project, and, therefore, are considered for further analysis in the EIR/EA. In addition to the two action alternatives and proposed project, the No Action Alternative is analyzed in this Draft EIR/EA in accordance with CEQA and NEPA requirements. A summary of each alternative analyzed is provided below; **Section 2.4, Description of Proposed Project and Alternatives** provides a detailed description of each alternative analyzed. **Section 2.5, Alternatives Eliminated from Consideration***,* discusses the alternatives that were considered, but eliminated from further analysis in this Draft EIR/EA. **Section 4.9, Identification of the Environmentally Superior Alternative/Environmentally Preferable Alternative***,* describes the process associated with the identification of an environmentally superior alternative, as required by CEQA, and an environmentally preferable alternative, as required by NEPA.

ES.2.1 Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Proposed 2015 Master Plan

The 2015 Master Plan lays out the process and strategy for the implementation of the entire CCCVC over the next 100 years. The cemetery would be completed in phases; Phase 1 is already completed and in operation. While it is anticipated that each phase would accommodate burial needs for approximately ten years, phases would be implemented based on demand and available funding. For the purposes of this analysis, it is assumed that future phases would be implemented every ten years with build-out occurring in 2101. Through its National Cemetery Administration (NCA) State Cemetery Grants Program (SCGP), the USDVA would provide funds for the design and construction of the cemetery. The 2015 Master Plan has been developed to include the content requirements published by the NCA.

The overall design intent of the site plan is to create a monument to the service and sacrifice of California State Veterans. Part of this goal is accomplished through the inclusion of features that would make a lasting and memorable impression on veterans visiting the cemetery. The cemetery would have a combination of burial facilities to meet veterans' needs, including columbaria, standard burial plots, over-sized plots, and a scatter garden.

At full build-out, the cemetery would supply 105,560 gravesites with 81,040 columbaria and 25,450 casket burial sites – enough to serve the anticipated needs of veterans for the next 100 years. For cremated remains, burial would be in niches in freestanding double columbarium walls arranged in courts. In addition to burial sites, the 2015 Master Plan includes memorials walls for those who do not desire burial on-site but want to be memorialized as a veteran. Each wall would consist of 40 plaques in five rows mounted on a stucco wall. Wall sections would be added as demand increased.

The cemetery layout is designed to enhance the visitor experience by preserving much of the oak woodland and yet maintain an intuitive layout pattern. The main visitor facilities are easily found near the entrance within the Phase 1 development area. In the 2015 Master Plan, a loop road organizes the spaces within the cemetery, with smaller loops and cul-de-sacs branching off the main loop. The burial sections and columbaria are organized around these smaller loops. The landscape design incorporates the USDVA mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. These plants reflect the character of Seaside and the surrounding region of the County and meet the necessary demand of low water usage. Oak trees would be preserved wherever possible, including locating columbaria within the oak woodland and preserving oak woodland between burial sections to reduce potential impacts. Where major grading is proposed, new oaks would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery.

Phase 1 provided the majority of the upfront improvements and established a foundation and structure for future cemetery phases. Water, sewer, electric, and telephone infrastructure was constructed as part of Phase 1 and minimal connections would be required in future phases of the 2015 Master Plan. Nearly all the existing site runoff and a small amount of off-site runoff currently collect in the existing retention basin constructed as part of Phase 1; however, future phases would be required to capture and accommodate runoff on-site. Future roadway improvements consist of loops and cul-de-sacs to provide access to the additional columbaria, flag plaza, and burial sites. Future roadways would generally be 24-feet wide (face of curb to face of curb), which is the NCA standard. In some cases, roadways may be larger (29-feet wide) to provide emergency access and access compliance.

Operations and maintenance (O&M) would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1). Maintenance activities would include: landscaping such as trimming and replanting of trees, shrubs, groundcover, or perennials, as needed; trash and debris removal; cleaning and repainting buildings and structures as needed; irrigation repair (until landscaping is established by phase); cleaning and repairing storm drainage facilities, including the existing retention basin, and maintenance of oil water separator; maintenance of roads, parking, and fencing. Each State cemetery is managed by CalVet personnel in conformance with national, state, and regional policies, goals, and objectives. Typical operation activities include burial or inurnment of veterans and eligible family members and the placement and maintenance of a grave marker or niche cover.

Proposed Phase 2

Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property owned by the State. Based on demand and available funding, the burial facilities and site location proposed for Phase 2 differ from that described in the Proposed 2015 Master Plan. Based on demand and funding, the facilities in Phase 2 were revised to accommodate 2,000 crypts and 1,700 in-ground cremains, as compared to a combination of 2,875 casket burials and 9,800 columbaria proposed in the 2015 Master Plan. During the preliminary design and planning process, a preference for certain design features and desire to reduce impacts to the natural landscape resulted in further revision to the proposed combination of burial facilities and site layout, as described herein.

The proposed Phase 2 project description is based primarily on the 35% Schematic Design Plans for Phase 2 and the 35% Schematic Design – Design Narrative and Program Information prepared by Huitt-Zollars, Inc. and RHAA Landscape Architects. The proposed Phase 2 facilities have been designed in a manner that takes advantage of the topography and open areas within the existing native vegetation to reduce costs and minimize impacts to the site. Phase 2 of the CCCVC would include the following on-site improvements:

- 1,000 In-Ground Cremains;
- 1,791 Standard Crypts;
- 40 Oversize Crypts;
- Supporting roads and infrastructure; and
- Two memorial walls.

No new structures or mechanical systems are proposed in Phase 2.

The 35% Schematic Design Plans include a minimum of 111 coast live oak trees to be planted on-site. The plan includes various tree and shrub plantings, including species that are either native to the site or have proven successful in the Phase 1 planting areas. The design strategy employs primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials that require no irrigation once established. These plants reflect the character of Seaside and the County, and would meet the necessary requirement for low water usage. Phase 2 irrigation would tie into the existing irrigation mainline. New irrigation valves would be installed and controlled by the site's existing Rainbird ESP-LXD Controller, which can be expanded for use with up to 200 stations. The current irrigation system makes use of 71 stations.

All runoff from Phase 2 development would drain into the existing retention basin located along Parker Flats Cut-Off Road. The existing retention basin was converted from a natural depression during Phase 1 to serve as an earth borrow site and was not designed as a flood control basin for any specific event. Therefore, Phase 2 includes improvements to the retention basin to contain the 100-year flood volume from Phases 1 and 2 with a 100-year maximum water surface elevation of 283 feet.

Construction of Phase 2 is anticipated to begin in later 2019 or early 2020 and would take approximately 13 months. Construction activities would require various equipment including, but not limited to, chipper/grinder, dump truck, loader, water truck, bulldozer, compactor, excavator, paving machine, delivery trucks, steel wheel compactor, backhoes, trenchers, golf carts or "gators," and concrete truck and related paving equipment. Approximately 4.4 acres would be temporarily impacted during construction to provide staging areas for equipment and supplies, access, and stockpiling. The existing

maintenance complex would be used for staging and stockpiling to reduce temporary impacts to existing vegetation.

O&M during Phase 2 would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1) and as described above for the 2015 Master Plan.

ES.2.2 Alternative 2: Reduced CCCVC 2015 Master Plan

The final burial count in the Proposed CCCVC 2015 Master Plan exceeds the recommended 100-year count by approximately 36,000 burials, as set forth by the USDVA (2015 Master Plan, page 42; 2008 Master Plan, page 1-1 of Volume I and page 6.0-A3 of Volume II). Therefore, Alternative 2 was developed to accommodate the recommended 100-year count, which would be approximately 69,560 burials. As a result, Alternative 2 would reduce the number of phases and overall footprint of the 2015 Master Plan. Phases 8 and 9 would be reduced, and Phases 10 and 11 would be eliminated; however, the completion of the Flag Plaza on top of Artillery Hill and its access road would remain in the plan.

ES.2.3 Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 was developed to accommodate CalVet and USDVA's original request that Phase 2 provide 2,000 crypts and 1,700 in-ground cremains, an increase of 869 burials from the proposed project. The plots sizes would be the same and this alternative would be located in the same general area as the proposed project. However, this alternative incorporates smaller groupings of in-ground cremains to in-fill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. Therefore, this alternative would have a larger disturbance footprint compared to the proposed project. The grading quantities would be similar to the proposed project since both include a similar development footprint on the adjacent hillside, and a similar number of coast live oak trees as the proposed project would be impacted. This concept would require visitors to walk through the memorial walk in order to access the new burials and provides minimal buffer from the cortege area, memorial walk, and main entrance road.

ES.2.4. Alternative 4: No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and no physical changes to the site would occur. There would be no change in the current availability of veteran-specific burial space in the State of California. The gravesite capacity would eventually be depleted at the CCCVC and veterans and their families in the Monterey Bay Region would be underserved in the future. Furthermore, the No Action Alternative would create a hardship for the survivors of deceased veterans for attending the funeral and for grave visitation, because of the distances between homes and the burial sites. If veterans and their families must resort to private burials, they are deprived of the honor and privilege bestowed upon them by a grateful nation for their service to their country.

ES.3 AREAS OF KNOWN CONTROVERSY AND ISSUES CONSIDERED

During public scoping period in November and December of 2018 several public comments were submitted by Federal, State, and local agencies, non-governmental organizations, and other stakeholders concerning potential impacts from the project. A number of comments focused on the potential impacts on biological resources, hazardous materials (i.e., unexploded ordinance), water supply, and cultural resources. Comments also focused on the need to evaluate alternatives, and a potential alternative location was recommended. The scoping process determined that the proposed project could lead to potential environmental impacts on specific natural resources and on the human environment. **Appendix A** provides the Notice of Preparation (NOP) and all written comments received in response to the NOP. A summary of the scoping process is provided in **Section 1.5, Scoping and Public Involvement**.

ES.4 SUMMARY OF IMPACTS

Table ES-1 provides a summary of impacts by resource section, associated mitigation measures (as appropriate), and the corresponding disclosure of impacts for each alternative. As the implementing agency for the proposed project, CalVet has committed to implementing the mitigation measures identified in **Table ES-1** of the Draft EIR/EA to avoid or minimize the potential impacts associated with the action alternatives. A draft project-specific mitigation, monitoring, and reporting program (MMRP) has been developed and is provided in **Appendix J**.

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Table ES-1 Summary of Environmental Impacts and Mitigation Measures

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
KEY To ACRONYMS: *NI – No Impact; LS – Less-than-Significant; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation;* *SU = Significant Unavoidable Impact even with Mitigation; BI = Beneficial Impact*						
3.2 Aesthetics						
AES-1: Have a substantial adverse effect on a scenic vista.	LS	LS	LS	LS	NI	No mitigation measures are required.
AES-2: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings.	LS	LS	LS	LS	NI	No mitigation measures are required.
AES-3: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.3 Air Quality						
AQ-1: Conflict with or obstruct implementation of any applicable air quality plan.	LS	LS	LS	LS	NI	No mitigation measures are required.
AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation.	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
KEY To ACRONYMS: *NI – No Impact; LS – Less-than-Significant; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation;* *SU = Significant Unavoidable Impact even with Mitigation; BI = Beneficial Impact*						
AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	LS	LS	LS	LS	NI	No mitigation measures are required.
AQ-4: Expose sensitive receptors to substantial pollutant concentrations.	LS	LS	LS	LS	NI	No mitigation measures are required.
AQ-5: Create objectionable odors affecting a substantial number of people.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.4 Biological Resources						
BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.	LSM	LSM	LSM	LSM	NI	***BIO-1: HMP Species Salvage:*** Prior to each future phase of the 2015 Master Plan, including Phase 2, CalVet shall require that a biological survey of development sites be conducted by a qualified biologist to determine if the development could potentially impact HMP species or potential habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to 1) a description of the biological conditions at the site; 2) identification of the potential for HMP species to occur or HMP species

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
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						observed, if any; and 3) maps of the locations of HMP species or potential habitat, if observed. If HMP species that do not require take authorization from the USFWS or CDFW are identified within the development site, salvage efforts for these species will be evaluated by a qualified biologist in coordination with CalVet to further reduce impacts per the requirements of the HMP and Programmatic BO. Where salvage is determined feasible and proposed, seed collection should occur from plants within the development site and/or topsoil should be salvaged within occupied areas to be disturbed. Seeds should be collected during the appropriate time of year for each species by qualified biologists. The collected seeds and topsoil should be used to revegetate temporarily disturbed construction areas and reseeding and restoration efforts on- or off-site, as determined appropriate by the qualified biologist CalVet. For HMP species that require take authorization from the USFWS or CDFW, any additional salvage measures identified in the take authorization(s) shall be followed. ***BIO-2: ESA and CESA Compliance:*** If HMP or other species that require take authorization from the USFWS and/or CDFW are identified within the development site, CalVet will comply with the ESA and CESA and obtain necessary authorizations prior to construction of each phase of the 2015 Master Plan, including Phase 2. Due to the presence and potential presence of Federally listed species on the 2015 Master Plan site and Federal nexus (i.e., Federal funding), the USDVA, acting as the NEPA lead agency for the proposed project, shall be required to

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
KEY To ACRONYMS: *NI – No Impact; LS – Less-than-Significant; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation;* *SU = Significant Unavoidable Impact even with Mitigation; BI = Beneficial Impact*						
						initiate a Section 7 consultation with the USFWS and prepare a written analysis in the form of a Biological Assessment (BA) to determine whether their actions may affect a listed or proposed species and designated and proposed critical habitat for each future phase. Based on the BA, the USFWS will issue a BO regarding likely impacts as a result of implementing the proposed future phase. Any further avoidance and minimization measures that may be required as a component of the BA will be implemented. For potential impacts to State listed species, CalVet will comply with the CESA and consult with the CDFW to determine whether authorization for the incidental take of the species is required prior to construction. If it is determined that authorization for incidental take is required from the CDFW, CalVet will obtain an incidental take permit at the project-level prior to ground-disturbing activities. Permit requirements typically involve preparation and implementation of a mitigation plan and mitigating impacted habitat at a 3:1 ratio through preservation and/or restoration, as described above. CalVet would be required to retain a qualified biologist to prepare a mitigation plan, which will include, but is not limited to, identifying avoidance and minimization measures; mitigation strategy, including a take assessment, compensatory mitigation lands, and success criteria; and funding assurances. CalVet would be required to implement the approved plan and any additional permit requirements. Alternatively, if the State listed species is covered under the Fort Ord HCP, CalVet can wait to implement the phase, including any ground-disturbing activities, until the Fort Ord HCP is approved and base-wide state incidental take permits are issued. If CalVet chooses the base-wide permit alternative, project-specific,

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
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						project-specific incidental take permits will not be necessary; however, all applicable requirements of the HCP will be implemented. ***BIO-3: Construction Best Management Practices:*** The following best management practices will be implemented during all identified phases of construction (i.e., pre-, during, and post-) to reduce impacts to special-status plant and wildlife species for each phase of the 2015 Master Plan, including Phase 2: • prior to any construction activities. The qualified biologist will meet with the construction crew at the onset of construction at the project site to educate the construction crew on the following: 1) the appropriate access route(s) in and out of the construction area and review project boundaries; 2) how a biological monitor will examine the area and agree upon a method which will ensure the safety of the monitor during such activities, 3) the special-status species that may be present; 4) the specific mitigation measures that will be incorporated into the construction effort; 5) the general provisions and protections afforded by USFWS and CDFW; and 6) the proper procedures if a special-status species is encountered within the project site. • Trees and vegetation not planned for removal or trimming will be protected prior to and during construction to the maximum possible through the use of exclusionary fencing, such as hay bales for herbaceous and shrubby vegetation, and protective wood barriers for trees. Only certified weed-free straw will be used to avoid the introduction of non-native, invasive species. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the

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						protective fencing remains intact. • Protective fencing will be placed prior to and during construction to stop construction equipment and personnel from impacting vegetation outside of work limits. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact. • Following construction, disturbed areas will be restored to pre-project contours to the maximum extent possible and revegetated using locally-occurring native species and native erosion control seed mix, per the recommendations of a qualified biologist. • Grading, excavating, and other activities that involve substantial soil disturbance will be planned and implemented in consultation with a qualified hydrologist, engineer, or erosion control specialist, and will utilize standard erosion control techniques to minimize erosion and sedimentation to native vegetation (pre-, during, and post-construction). • No firearms will be allowed on the project site at any time. • All food-related and other trash will be disposed of in closed containers and removed from the project area at least once a week during the construction period, or more often if trash is attracting avian or mammalian predators. Construction personnel will not feed or otherwise attract wildlife to the area. ***BIO-4: Construction-Phase Monitoring:*** The applicant will retain a qualified biologist to monitor all ground disturbing construction activities (i.e., vegetation removal, grading, excavation, or similar

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						activities) to protect any special-status species encountered for each phase of the 2015 Master Plan, including Phase 2. Any handling and relocation protocols of special-status wildlife species will be determined in coordination with CDFW prior to any ground disturbing activities, and will be conducted by a qualified biologist with appropriate scientific collection permit. After ground disturbing project activities are complete, the qualified biologist will train an individual from the construction crew to act as the on-site construction biological monitor. The construction biological monitor will be the contact for any special-status wildlife species encounters, will conduct daily inspections of equipment and materials stored on site and any holes or trenches prior to the commencement of work, and will ensure that all installed fencing stays in place throughout the construction period. The qualified biologist will then conduct regular scheduled and unscheduled visits to ensure the construction biological monitor is satisfactorily implementing all appropriate mitigation protocols. Both the qualified biologist and the construction biological monitor must work through the State Inspector to cease construction contractor work and/or redirect project activities to ensure protection of resources and compliance with all environmental permits and conditions of the project. The qualified biologist and the construction monitor shall complete a daily log summarizing activities and environmental compliance throughout the duration of the project. The log will also include any special-status wildlife species observed and relocated.

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						BIO-5: Non-Native, Invasive Species Controls: The following measures will be implemented for each phase of the 2015 Master Plan, including Phase 2, to reduce the introduction and spread of non-native, invasive species: • Any landscaping or replanting required for the project will not use species listed as noxious by the California Department of Food and Agriculture (CDFA) or invasive by the California Invasive Plant Council (Cal-IPC). • Bare and disturbed soil will be landscaped with CDFA recommended seed mix or plantings from locally adopted species to preclude the invasion on noxious weeds in the project site. • Construction equipment will be cleaned of mud or other debris that may contain invasive plants and/or seeds and inspected to reduce the potential of spreading noxious weeds, before mobilizing to arrive at the construction site and before leaving the construction site. • All non-native, invasive plant species will be removed from disturbed areas prior to replanting. ***BIO-6: Project-Specific Biological Resources Studies (Non-HMP Species):*** CalVet shall require that a biological survey of each future phase of the 2015 Master Plan be conducted by a qualified biologist to determine if the development could potentially impact a special-status species or their habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to: 1) a description of the biological conditions at the site; 2) identification of the

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						potential for special-status species to occur or special-status species observed, if any; 3) maps of the locations of special-status species or potential habitat, if observed; and 4) recommended mitigation measures, if applicable. • If special-status species are determined not to occur at the development site, no additional mitigation is necessary. • If special-status species are observed or determined to have the potential to occur, the project biologist shall recommend measures necessary to avoid, minimize, and/or compensate for identified impacts. Measures may include, but are not limited to, revisions to the project design and project modifications, pre-construction surveys, construction buffers, construction best management practices, monitoring, non-native species control, restoration and preservation, and salvage and relocation. ***BIO-7: Pre-Construction Surveys for Protected Avian Species:*** Construction activities that may directly (e.g., vegetation removal) or indirectly (e.g., noise/ground disturbance) affect protected nesting avian species will be timed to avoid the breeding and nesting season. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Specifically, vegetation and/or tree removal can be scheduled after September 16 and before January 31. Alternatively, a qualified biologist will be retained by the project applicant to conduct pre-construction surveys for nesting raptors and other protected avian species within 500 feet of proposed construction activities if construction occurs between February 1 and September 15. Pre-construction surveys will be conducted no more than 14 days prior to the start of construction

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						activities during the early part of the breeding season (February through April) and no more than 30 days prior to the initiation of these activities during the late part of the breeding season (May through August). Because some bird species nest early in spring and others nest later in summer, surveys for nesting birds may be required to continue during construction to address new arrivals, and because some species breed multiple times in a season. The necessity and timing of these continued surveys will be determined by the qualified biologist based on review of the final construction plans and in coordination with the CDFW, as needed. If raptors or other protected avian species nests are identified during the pre-construction surveys, the qualified biologist will notify the project applicant and an appropriate no-disturbance buffer will be imposed within which no construction activities or disturbance should take place (generally 500 feet in all directions for raptors; other avian species may have species-specific requirements) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist. ***BIO-8: Pre-Construction Special-Status Plant Surveys:*** A qualified biologist shall be retained to conduct special-status plant survey(s) according to USFWS, CDFW, and CNPS protocols for during the appropriate identification period(s) to determine their presence within the Phase 2 site. The biologist shall prepare a report that provides the results of the survey, and, if found the number and locations of individuals/populations identified within the site. If no special-status plant species are found, no further mitigation is

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						necessary. If special-status plant species are found, the following measures shall be implemented: • Individuals shall be avoided to the maximum extent possible. • For impacts to the HMP species within the development site that do not require take authorization from USFWS or CDFW, salvage efforts for these species will be evaluated by a qualified biologist in coordination with the contractor to further reduce impacts per the requirements of the HMP and BO, in accordance with Mitigation Measure BIO-1. • If non-HMP special-status plant species are observed and if avoidance is not feasible, species shall be replaced at a 1:1 success ratio for the acreage or individuals impacted (depending on species impacted) and a Rare Plant Restoration Plan shall be prepared by a qualified biologist and implemented. The plan shall include, but is not limited to, the following: – A description of the baseline conditions of the habitats within the work site, including the presence of any special-status species, their locations, and densities; – Procedures to control and/or eliminate non-native invasive species within the work site; – Provisions for ongoing training of facility maintenance personnel to ensure compliance with the requirements of the plan; – A detailed description of on-site and/or off-site restoration areas, salvage of seed and/or soil bank, plant salvage, seeding and planting specifications, including, if required by the CDFW, increased planting ratio

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						to ensure the 1:1 success ratio; and – A monitoring program that describes annual monitoring efforts which incorporate success criteria and contingency plans if success criteria are not met. ***BIO-9: Pre-Construction Surveys for Special-Status Bats:*** To avoid and reduce impacts to hoary bat and Townsend's big-eared bat, CalVet will retain a qualified bat specialist or wildlife biologist to conduct site surveys during the reproductive season (May 1 through September 15) to characterize bat utilization of the site and potential species present (techniques utilized to be determined by the biologist) prior to any vegetation removal. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Based on the results of these initial surveys, one or more of the following will occur: • If it is determined that bats are not present at the site, no additional mitigation is required. • If it is determined that bats are utilizing the site and may be impacted by the proposed project, pre-construction surveys will be conducted within 100 feet of construction limits no more than 30 days prior to any tree removal. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, tree removal may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night).

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						• If a single bat and/or only adult bats are roosting, removal of trees may proceed after the bats have been safely excluded from the roost. Exclusion techniques will be determined by the biologist and depend on the roost type; the biologist will prepare a mitigation plan for provision of alternative habitat to be approved by CDFW. • If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) will be postponed until the biologist monitoring the roost(s) determines that the young have fledged and are no longer dependent on the roost. The monitor will ensure that all bats have left the area of disturbance prior to initiation of limbing and/or removal of trees. If avoidance is not possible and a maternity roost must be disrupted, a depredation permit would be required prior to removal of the roost. ***BIO-10: Pre-Construction Surveys for Monterey Dusky-Footed Woodrat:*** Not more than thirty (30) days prior to the start of construction (including vegetation removal), a qualified biologist shall conduct a survey of the project sites to locate existing Monterey dusky-footed woodrat nests. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. All Monterey dusky-footed woodrat nests shall be mapped and flagged for avoidance. Graphics depicting all Monterey dusky-footed woodrat nests shall be provided to the construction contractor. Any Monterey dusky-footed woodrat nests that cannot be avoided shall be relocated according to the following procedures:

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						Each active nest shall be disturbed by the qualified biologist to the degree that the woodrats leave the nest and seek refuge elsewhere. After the nests have been disturbed, the nest sticks shall be removed from the impact areas and placed outside of areas planned for impacts. Nests shall be dismantled during the non-breeding season (between October 1 and December 31), if possible. If a litter of young is found or suspected, nest material shall be replaced and the nest left alone for 2-3 weeks, after this time the nest will be rechecked to verify that young are capable of independent survival before proceeding with nest dismantling.
BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.	LS	NI	LS	NI	NI	No mitigation measures are required.
BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites.	LS	LS	LS	LS	NI	No mitigation measures are required.
BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LSM	LSM	LSM	LSM	NI	***BIO-6: Project-Specific Biological Resources Studies (Non-HMP Species):*** summarized above.

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						BIO-11: Oak Tree Protection and Replacement Measures: For each phase of the 2015 Master Plan, including Phase 2, impacts to coast live oak trees shall be avoided and minimized through site design and protection during construction. To maximize tree retention and protection, a forester, arborist, or other tree care professional shall be involved with early design and planning for each phase and shall be involved in the review and development of final grading and construction plants wherever trees occur within the site or at the grading margins. To avoid unintended impacts to trees outside the construction area, the following tree protection measures shall be implemented: • Temporary construction fencing shall be placed at approximately 10 feet from the trunk and no grading, trenching, or vegetative alteration shall occur within this environmental exclusion zone. Grading, vegetation removal, and other ground disturbing construction activities may not commence until the project forester has inspected and approved the protective fencing installed by the contractor. No equipment or materials, including soil, shall be stored within the established environmental exclusion zone. Prior to grading within 25 feet of retained trees, the project forester, arborist or other tree care professional shall be consulted to determine whether pruning is necessary to protect limbs from grading equipment. • To avoid soil compaction from damaging the roots, heavy equipment shall not be allowed to drive over the root area. If deemed necessary and approved by the forester, equipment may drive across one side of the tree. To reduce soil compaction, wood chips shall be spread 6-12 inches deep to disperse the weight of equipment and plywood sheets shall be placed over the wood chips

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						for added protection. • Roots exposed by excavation must be pruned and recovered as quickly as possible to promote callusing, closure, and healthy regrowth. • Retained trees shall be watered periodically in accordance with species need to promote tree health. Transplanted trees and their intended planting areas shall be pre-watered. Post planting watering shall be done as needed to assure establishment. • When phase design is completed, an estimate of the appropriate number of replacement trees shall be made based on available planting space. These replacement trees (minimum five-gallon specimens) shall be planted along boundaries and within landscape areas. Planting density for replacement trees shall be accurately detailed to allow for some unavoidable mortality over time. • Transplants are encouraged and shall be credited on a 3:1 basis. Final replanting numbers may be modified by additional tree retention and should be made part of the final landscaping plan. ***BIO-12: Coast Live Oak Tree and Woodland Protection:*** **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. During the implementation of **Mitigation Measure BIO-6**, a qualified biologist shall determine whether coast live oak trees/woodland would be impacted by each proposed phase. If coast live oak trees/woodland have the

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						potential to be impacted, a qualified biologist will provide a description of the conditions of the trees and habitat that may be impacted and quantify the individuals and/or acreage that may be impacted for inclusion in the Project-Specific Biological Resources Study required by **Mitigation Measure BIO-6**. The impact analysis shall take into consideration tree retention, relocation, and replacement proposed for each phase. A qualified biologist will include a summary of coast live oak trees/woodland impacted by phase to date in the study and verify that the impacts that the oak mitigation continues to meet a 1:1 mitigation ratio. If impacts to coast live oak trees/woodland in a future phase would exceed a 1:1 mitigation ratio based on the available oak woodland that would be preserved on-site, the phase may either be redesigned to avoid or reduce impacts to meet a 1:1 mitigation ratio, or additional mitigation (e.g., including off-site preservation, on-site or off-site restoration, or payment of in-lieu fees) would be required. A qualified biologist will identify potential mitigation strategies to meet a 1:1 mitigation ratio in the study, and the appropriate mitigation strategy shall be determined and initiated prior to construction of the subject phase. Potential mitigation strategies may include, but are not limited to: 1. Off-site oak woodland preservation areas: opportunities may include coast live oak woodland habitat within or adjacent to the former Fort Ord. However, off-site preservation areas shall not include any lands conserved as part of the Fort Ord Oak Woodland Conservation Area, once approved. In addition, authorization to utilize the site by the land owner would be required and the mitigation area must be preserved in perpetuity through a conservation easement or other appropriate land use restriction.

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						2. On-site or off-site restoration: opportunities may include restoration of coast live oak woodland habitat within or adjacent to the former Fort Ord. Off-site mitigation areas would be subject to the same conditions listed in mitigation strategy #1. 3. Payment of in-lieu fees to the County and/or Seaside to fund a "fair share" of the cost to manage and monitor the Fort Ord Oak Woodland Conservation Area, once approved. The fair share cost shall be based on the acreage required to meet the 1:1 mitigation ratio exceed in the phase.
BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.5 Cultural and Tribal Resources						
CTR-1: Cause a substantial adverse change in the significance of a historical or archaeological resource.	LSM	LSM	LSM	LSM	NI	***CTR-1: Unanticipated Discovery:*** A. If subsurface deposits believed to be cultural or human in origin are discovered during construction, then all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgement. A Native American monitor,

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						following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, shall be required if the nature of the unanticipated discovery is prehistoric. Work cannot continue within the no-work radius until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either: 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR. B. If a potentially-eligible resource is encountered, then the archaeologist and lead agency shall arrange for either: 1) total avoidance of the resource, if possible; or 2) test excavations to evaluate eligibility. If found to be eligible for either the NRHP or CRHR, then adverse effects (under Section 106) and significant impacts (under CEQA) would be resolved/mitigated through data recovery excavations to the extent of obtaining enough information to address applicable research questions. If data recovery is necessary, a data recovery plan will be prepared, reviewed by the lead agency, and implemented. Determinations of eligibility and completion of data recovery (if necessary) shall be formally documented in writing and submitted to the lead agency as verification that the provisions in CEQA/NEPA for managing unanticipated discoveries have been met. ***CTR-2: Cultural Sensitivity Training:*** A *Worker Awareness Training* will be developed and conducted prior to any construction operations for future phases, including Phase 2. The training

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						program will inform crew members of the potential for archaeological finds and the protocols to be followed in the event of the discovery of archaeological materials. The program will be presented by a Professional Archaeologist and include an ALERT Sheet with visual aids with a focus on archaeological objects and other cultural materials that could be present within the project site. The training will also provide protocols in the event of an unexpected discovery and points of contact in the event of an unexpected find including Native American burials. The training will include a briefing to supervisory construction personnel and "tailgate" training to field personnel.
CTR-2: Disturb any human remains, including those interred outside of dedicated cemeteries.	LSM	LSM	LSM	LSM	NI	***CTR-3: Discovery of Human Remains:*** In the event that evidence of human remains is discovered, construction activities within 100 meters of the discovery shall be halted or diverted and the requirements of Mitigation Measure CTR-1 will be implemented. In addition, the County Coroner shall be notified in accordance with provisions of PRC Sections 5097.98-99. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four hours of the determination, as required by California Health and Safety Code Section 7050.5(c) and PRC 5097. The NAHC shall identify the person or persons it believes to be most likely descended (MLD) from the deceased Native American (PRC Section 5097.98). The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can

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						mediate (Section 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a document with the county in which the property is located (AB 2641).
CTR-3: Cause a substantial adverse change in the significance of a tribal cultural resource.	LSM	LSM	LSM	LSM	NI	***CTR-1: Unanticipated Discovery:*** summarized above. ***CTR-2: Cultural Sensitivity Training:*** summarized above.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.6 Energy						
ENG-1: Result in Wasteful, Inefficient, or Unnecessary Consumption of Energy.	LS	LS	LS	LS	NI	No mitigation measures are required.
ENG-2: Conflict with State or Local Plans.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.

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3.7 Geology and Soils						
GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. ii. Strong seismic ground shaking. iii. Seismic-related ground failure, including liquefaction. iv. Landslides.	LS	LS	LS	LS	NI	No mitigation measures are required.
GEO-2: Result in substantial soil erosion or the loss of topsoil.	LS	LS	LS	LS	NI	No mitigation measures are required.

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GEO-3: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LS	LS	LS	LS	NI	No mitigation measures are required.
GEO-4: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LSM	LSM	LSM	LSM	NI	***CTR-1: Unanticipated Discovery:*** summarized above.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.8 Greenhouse Gas Emissions						
GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, and conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
KEY To ACRONYMS: *NI – No Impact; LS – Less-than-Significant; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation;* *SU = Significant Unavoidable Impact even with Mitigation; BI = Beneficial Impact*						
3.9 Hazards and Hazardous Materials						
HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	LS	LS	LS	NI	No mitigation measures are required.
HAZ -2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LS	LS	LS	LS	NI	No mitigation measures are required.
HAZ -3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	LS	LS	LS	NI	No mitigation measures are required.
HAZ -4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
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HAZ-5: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.10 Hydrology and Water Quality						
HYD-1: Impact water quality due to earthmoving or alteration of drainage patterns.	LS	LS	LS	LS	NI	No mitigation measures are required.
HYD-2: Result in groundwater depletion or interfere substantially with recharge.	LS	LS	LS	LS	NI	No mitigation measures are required.
HYD-3: Risks due to location within a 100-year flood hazard area.	LSM	LSM	LSM	LSM	LSM	***HYD-1: Drainage Basin Analysis:*** Prior to construction of Phase 3 or subsequent phases of the 2015 Master Plan, further analysis shall be completed by CalVet to confirm that the retention basin has the capacity to contain runoff from a 100-year storm event. If it is determined that the size of the retention basin is not adequate, design of that phase shall include modifications to the retention basin design to increase its capacity to the adequate size. In addition, the project proponent shall consult with the City of Seaside to submit a Letter of Map Revision (LOMR) request to FEMA to revise flood elevation included in FIRM Map #06053C0195H, based on the findings of the analysis.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
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3.11 Land Use and Planning						
LU-1: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.12 Noise						
NOI-1: Expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies and/or have substantial temporary, periodic, or permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	LSM	LSM	LSM	LSM	NI	***NOI-1: Construction Noise Reduction Measures*** The following measures shall be implemented to reduce construction-generated noise levels: • Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between the hours of 9:00 a.m. and 7:00 p.m. on weekends and legal holidays. • Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
KEY To ACRONYMS: *NI – No Impact; LS – Less-than-Significant; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation;* *SU = Significant Unavoidable Impact even with Mitigation; BI = Beneficial Impact*						
						• When not in use, all construction equipment and haul trucks shall be turned off and shall not be allowed to idle. Clear signage that posts this requirement shall be provided for workers at the entrances to the site. • Construction equipment and material staging areas shall be located at the furthest distance possible from nearby residential land uses. • To the extent possible, heavy-duty haul truck trips required for project construction should be scheduled during the non-peak hours of the day.
NOI-2: Expose persons to or generation of excessive groundborne vibration or groundborne noise levels.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.13 Public Services						
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any public services, including:						
PS-1: Emergency Services.	LS	LS	LS	LS	NI	No mitigation measures are required.
PS-2: Schools and Libraries.	LS	LS	LS	LS	NI	No mitigation measures are required.
PS-3: Parks and Recreation.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
	2015 Master Plan	Phase 2				
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3.14 Socioeconomics and Environmental Justice						
SEJ-1: Affect employment, industry, or commerce, including requiring the displacement of business or farms.	BI	BI	BI	BI	NI	No mitigation measures are required.
SEJ-2: Substantially affect property values or the local tax base.	LS	LS	LS	LS	NI	No mitigation measures are required.
SEJ-3: Cause a disproportionate effect on minority, low-income, elderly, disabled, transit-dependent, or other specific interest group(s).	LS	LS	LS	LS	LS	No mitigation measures are required.
SEJ-4: Cause an adverse effect on a minority or low-income area as defined by the EPA.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	LS	No mitigation measures are required.
3.15 Transportation						
TR-1: Conflict with program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LSM	LSM	LSM	LSM	NI	***TR-1: Construction Traffic Management Plan:*** Prior to the commencement of construction activities for Phase 2 and future phases, CalVet or designated representative shall prepare a Construction Traffic Management Plan and submit plan to the City of Seaside and/or County Engineer. The plan shall: • Designate construction vehicle access routes to the project site that avoid roads with potential sensitive receptors (Normandy Road). The preferred

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						designated access route to the project site should be via Gigling Road to Parker Flats Road. • Identify proper safety precautions to avoid safety impacts to sensitive receptors if access to the project site via Normandy Road is unavoidable. Access to the project site shall not occur directly before or directly after school hours. ***TR-2: Operational Traffic Management:*** To reduce potential safety impacts during the operation of Phase 2 and future phases of the CCCVC: • Identify preferred routes to the CCCVC site which do not make use of Normandy Road between General Jim Moore Boulevard and Parker Flats Road. • Publicize and encourage the use of the identified alternative routes on the CCCVC facility information (i.e., website, pamphlet, and brochures). ***TR-3: Signal Timings and Phasing Adjustments:*** If the Northeast Southwest Arterial Connector Roadway is in operation at the time the construction of Phase 4 of the CCCVC is proposed, CalVet will coordinate with the City of Seaside to adjust signal timing and signal phasing to improve intersection operations at General Jim Boulevard & Coe Avenue and reduce AM peak hour delay. The signal timings and signal phasing will be adjusted prior to operation of Phase 4 of the CCCVC. ***TR-4: Pedestrian and Bicycle Facility Improvements:*** ADA compliant sidewalks and crosswalks, as well as bicycle parking, shall be designed and constructed as part of Phase 3 development of the CCCVC to

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
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						address the gap in the sidewalk network along the project frontage and just west of the Normandy Road & Parker Flats Cut-Off Road intersection. The improvements will be constructed in compliance with adopted City of Seaside and County standards. ***TR-5: Special Event Management Plan:*** CalVet shall prepare and implement a Special Event Transportation Management Plan during special events at the cemetery. The plan shall be submitted to the City of Seaside and/or County Engineer for review and approval for issuance of a Special Event Permit. The plan shall include: • Designated off-site parking facilities; • A traffic flow plan to direct motorists from access roads to identified off-site parking facilities; and • A description of the shuttle service system to transport special event attendees to and from established parking areas.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.
3.16 Utilities and Service Systems						
UT-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the	LS	LS	LS	LS	NI	No mitigation measures are required.

Impact Statement	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative	Mitigation Measure(s)
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construction or relocation of which could cause significant environmental effects.						
UT-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LS	LS	LS	LS	NI	No mitigation measures are required.
UT-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LS	LS	LS	LS	NI	No mitigation measures are required.
UT-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS	LS	LS	LS	NI	No mitigation measures are required.
Cumulative	LS	LS	LS	LS	NI	No mitigation measures are required.

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Chapter 1.0 INTRODUCTION

1.1 INTRODUCTION

This Draft Environmental Impact Report/Environmental Assessment (Draft EIR/EA) for the California Central Coast Veteran Cemetery (CCCVC) (proposed project) addresses the environmental impacts, environmental issues, and alternatives associated with implementation of the 2015 CCCVC Master Plan. The CCCVC is necessary to provide burial facilities for deceased veterans and their families in the Monterey Bay Region of California, given the number of veterans in this region. An overview of the proposed project is provided below in **Section 1.2, Proposed Project Overview**, and a full description of the project is presented in **Chapter 2, Proposed Project and Alternatives**, of this document.

On behalf of the State of California (State), the California Department of General Services – Real Estate Services Division (DGS), and the California Department of Veterans Affairs (CalVet) have prepared this Draft EIR/EA in accordance with the requirements of the California Environmental Quality Act (CEQA) and the CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.); the document integrates National Environmental Policy Act (NEPA) requirements (40 Code of Federal Regulations [CFR] 1501), as applicable, to satisfy the U.S. Department of Veterans Affairs (USDVA) regulatory requirements.

CalVet, with the assistance from DGS, is the lead State agency responsible for the preparation of an EIR under CEQA for the proposed project. The CCCVC would be constructed with funds awarded through the Veterans Cemetery Grants Service offered by the USDVA, which requires the proposed project to comply with NEPA. Therefore, a joint CEQA and NEPA document is being prepared, consisting of an EIR in satisfaction of CEQA and an EA in satisfaction of NEPA. The USDVA is acting as lead Federal agency in accordance with the requirements of NEPA and to ensure that the Draft EIR/EA and underlying administrative record support the USDVA decision-making and disclosure process.

This Draft EIR/EA discloses relevant information concerning the proposed project and alternatives to the proposed project and invites all interested parties to play a role in both the decision-making process and the implementation of the decision. It also provides Federal, State, and local decision-makers with detailed information concerning the potentially significant environmental, social, economic, cultural, and other impacts associated with the proposed project and the alternatives for the proposed project.

1.2 PROPOSED PROJECT OVERVIEW

As part of the Defense Base Closure and Realignment Act of 1990 (BRAC), Fort Ord was downsized and realigned in 1991 and officially closed in 1994. An initiative to develop a veterans cemetery at the former Fort Ord began a few weeks after announcement in 1991 of the BRAC (RHAA and Whitson Engineers, 2008). The CCCVC 2008 Development Master Plan (2008 Master Plan) was prepared in support of this effort (RHAA and Whitson Engineers, 2008). Phase 1 of the CCCVC was approved and constructed in 2015. After the approval of Phase 1, an updated master plan, the CCCVC 2015 Master Plan (2015 Master Plan), was prepared (Wood Rodgers, 2015).

The proposed project would involve implementing the CCCVC 2015 Master Plan. Since Phase 1 has already been constructed, the proposed project involves implementing the remaining phases of the 2015 Master Plan – Phases 2 through 11. Phase 2 of the 2015 Master Plan is currently under design, and construction is anticipated to commence in late 2019 or early 2020. Therefore, this EIR/EA analyzes Phase 2 at a project level, while analyzing the build-out of the 2015 Master Plan at a programmatic level (please refer to **Section 1.3** below for more detail on the level of analysis).

The project site is located within the former Fort Ord in Monterey County, California, which is approximately 80 miles south of San Francisco and 42 miles southwest of San Jose (**Figure 1-1, Regional Map**). The project site consists of approximately 84.4 acres owned by the State of California. The City of Seaside/County of Monterey (County) boundary bisects the State's property with about 32 acres, including the Phase 2 site, within the city limits (**Figure 1-2, Vicinity Map**). The balance of the property, approximately 52.4 acres, is located within unincorporated County land. The project site occupies a portion of two parcels identified with Monterey County Assessor Parcel Numbers (APNs) 031-052-002-000 and 031-152-005-000 (**Figure 1-3, Proposed Project Boundary and Topography**).

The 2015 Master Plan is a comprehensive, long-term development plan that identifies and addresses all issues related to the development of the CCCVC. It outlines a process and strategy for the implementation of the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates. The 2015 Master Plan includes a phased approach to build-out that will serve the anticipated needs of veterans for the next hundred years. A joint CEQA/NEPA document (Initial Study/Environmental Assessment, or IS/EA) was prepared for the Phase 1 of the CCCVC in 2014 and approved in 2015 (ECORP Consulting, Inc [ECORP], 2014a). Phase 1 of the CCCVC has been constructed and the opening ceremony was held in October 2016. Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property. Phase 2 includes 1,000 in-ground cremains, 1,831 crypts, and supporting roads and infrastructure to provide increased burial options anticipated for the next 10 years.

The project site is bound by Parker Flats Road to the north, Parker Flats Cut-Off to the west, and natural lands to the east (**Figure 1-3, Proposed Project Boundary and Topography**). The land uses in the project vicinity include the City of Seaside (City or Seaside) to the west, California State University Monterey Bay (CSUMB) to the north, and the Fort Ord National Monument (FONM) to the east. The existing land uses surrounding the project site include residential to the northwest and undeveloped lands to the east, south, and west. Access to the project site is from Parker Flats Road located approximately 1.25 miles east of the Highway 1 and Lightfighter Drive exit (**Figure 1-2, Vicinity Map**).



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Regional Map

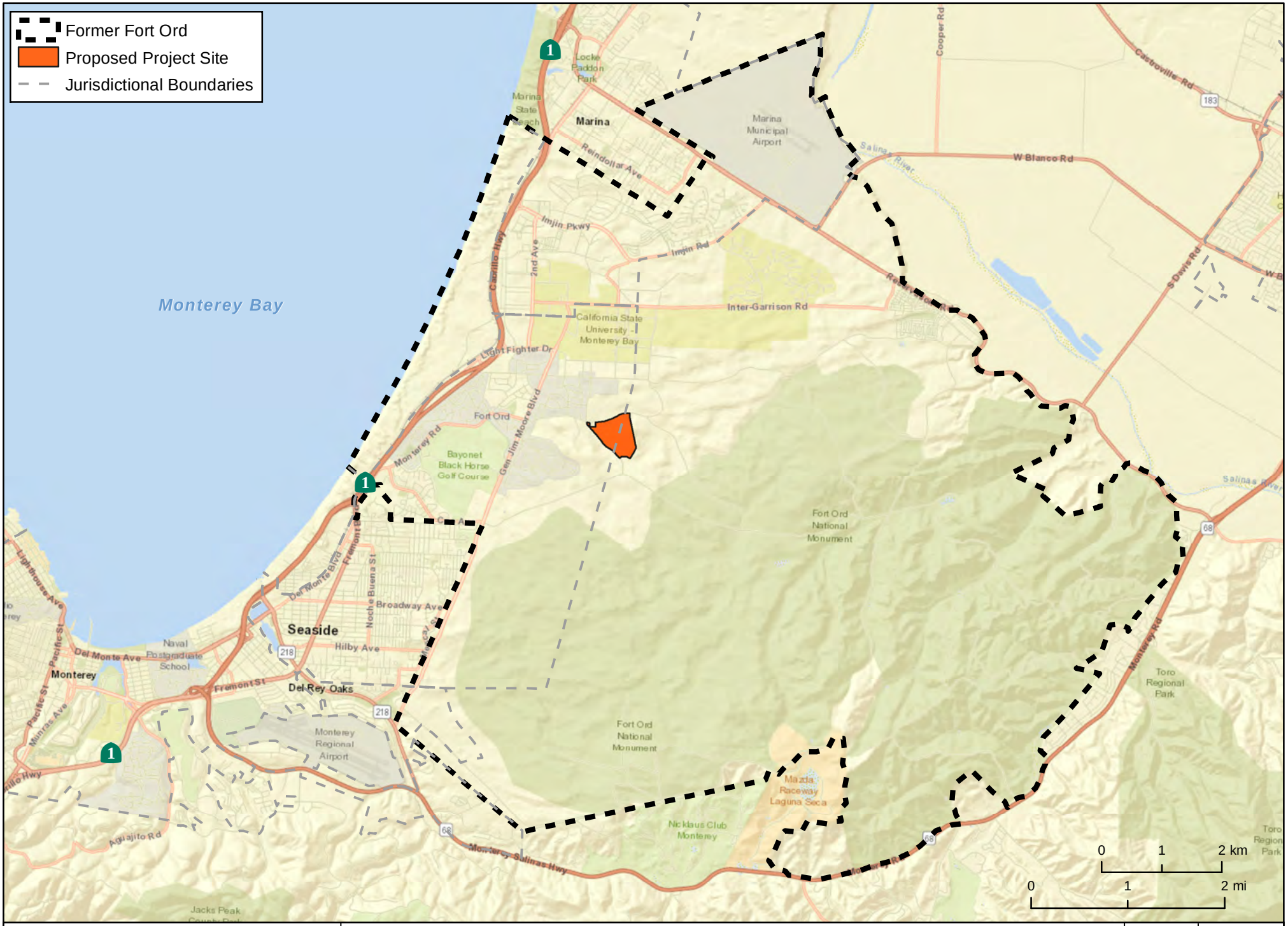
N

Date
03-14-2019

Scale
1 in=33.9 mi

Figure
1-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 1-1 Regional Map.mxd



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Vicinity Map

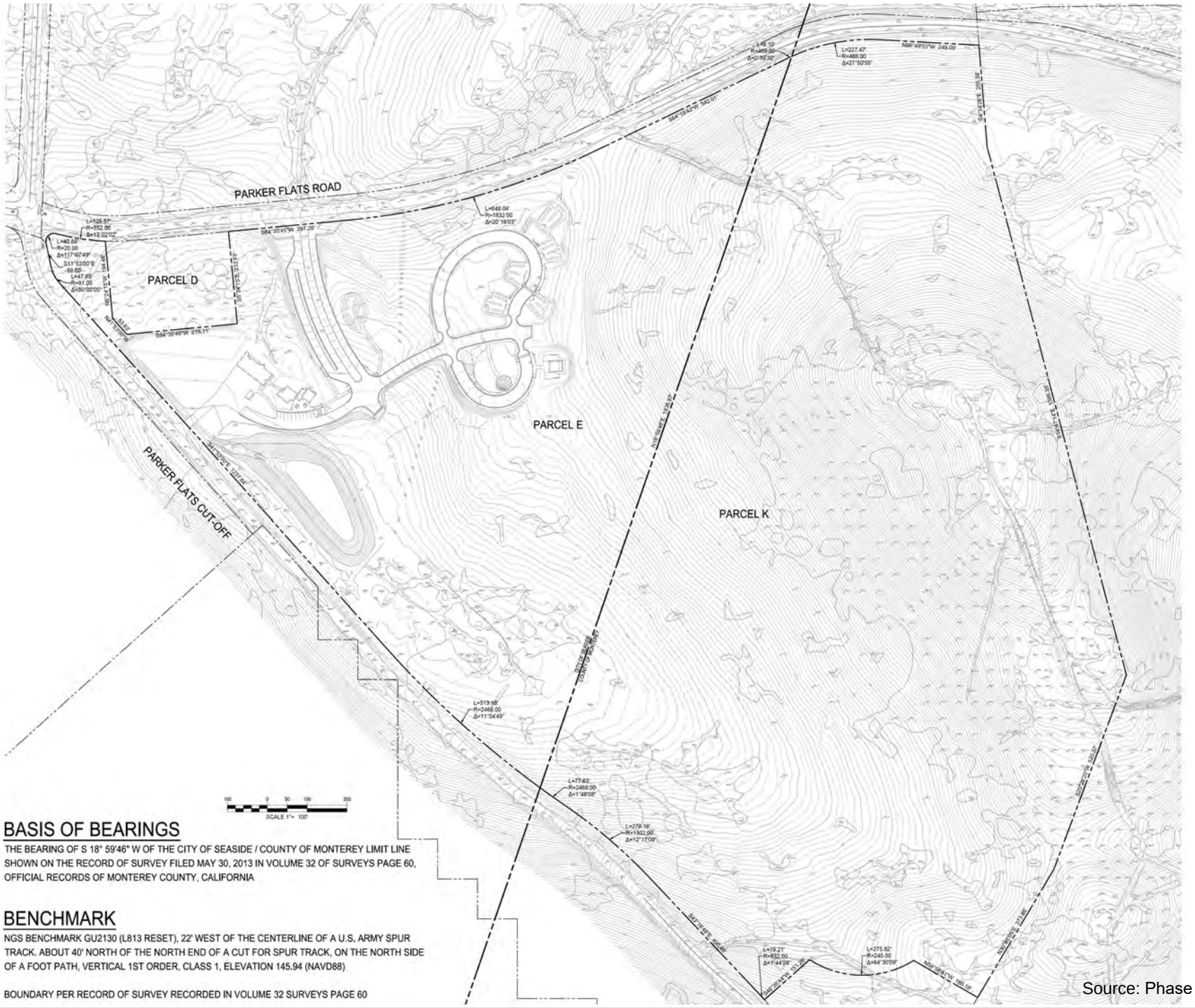
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03-08-2019

Scale
1 in=1.3 mi

Figure
1-2

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BASIS OF BEARINGS

THE BEARING OF S 18° 59'46" W OF THE CITY OF SEASIDE / COUNTY OF MONTEREY LIMIT LINE SHOWN ON THE RECORD OF SURVEY FILED MAY 30, 2013 IN VOLUME 32 OF SURVEYS PAGE 60, OFFICIAL RECORDS OF MONTEREY COUNTY, CALIFORNIA

BENCHMARK

NGS BENCHMARK GU2130 (L813 RESET), 22' WEST OF THE CENTERLINE OF A U.S. ARMY SPUR TRACK. ABOUT 40' NORTH OF THE NORTH END OF A CUT FOR SPUR TRACK, ON THE NORTH SIDE OF A FOOT PATH, VERTICAL 1ST ORDER, CLASS 1, ELEVATION 145.94 (NAVD88)

BOUNDARY PER RECORD OF SURVEY RECORDED IN VOLUME 32 SURVEYS PAGE 60

Source: Phase 2 Schematic

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Proposed Project Boundary and Topography

N

Date: 03-07-2019

Figure: 1-3

1.3 ENVIRONMENTAL REVIEW PROCESS

1.3.1 Lead Agencies

CalVet, with the assistance of DGS, is the State lead agency under CEQA and will be responsible for certifying the Final EIR, determining whether to approve the proposed project, and issuing findings for the proposed project. CalVet will be responsible for implementing the proposed project, including design measures and any required mitigation measures. DGS serves as a business manager for the State. This department helps to better serve the public by providing a variety of services to State agencies through procurement and acquisitions solutions, real estate management, facility design and construction, professional printing, environmentally friendly transportation, design and web services, administrative hearings, legal services, buildings standards, oversight of structural safety, fire/life safety and accessibility for the design and construction of K-12 schools and community colleges, and funding for school construction. DGS is responsible for the oversight of the proposed project and contract management.

The USDVA is the Federal lead agency under NEPA and will be responsible for preparing a separate decision document under NEPA for discretionary actions, such as approving grant funding. The USDVA will use this Draft EIR/EA to inform its decision-making process. In addition, the USDVA is responsible for complying with applicable Federal laws, such as the National Historic Preservation Act (NHPA) and the Federal Endangered Species Act (ESA).

1.3.2 California Environmental Quality Act

This EIR has been prepared in accordance with CEQA (Public Resource Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines, which are found in Title 14 of the CCR, commencing with Section 15000. As stated in the State CEQA Guidelines Section 15002, the basic purposes of CEQA are to:

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

Pursuant to State CEQA Guidelines Section 15121, an EIR is an informational document which will inform public agency decision-makers and the public of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency. While the information in the EIR does not control the ultimate decision on the project, the public agency must consider the information in the EIR and respond to each significant effect identified in the EIR by making findings at the time of project approval as further explained below in **Section 1.4, CEQA/NEPA Process**.

The focus of the environmental review process is upon significant environmental effects. As defined in the State CEQA Guidelines, a "significant effect on the environment" is:

> ...a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether a physical change is significant.

State CEQA Guidelines Section 15064(e) further indicates that economic and social changes resulting from a project shall not be treated as significant effects on the environment, although they may be used to determine that a physical change shall be regarded as a significant effect on the environment. Where a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project.

Level of Analysis

CEQA makes a distinction between an EIR prepared for a program or a plan, and an EIR for a specific construction project. A program EIR may be prepared for a series of actions that are related geographically, or as part of a series of actions (CEQA Guidelines Section 15168). A project EIR is typically prepared for a specific construction-level project (please refer to CEQA Guidelines Section 15161). Under CEQA, a project EIR "should focus primarily on the changes in the environment that would result from the development project ... [and] examine all phases of the project including planning, construction, and operation". (*Ibid.*) In contrast, a "program" or "first-tier" EIR is intended to focus environmental review on the environmental issues that are relevant to the approval being considered (PRC Sections 21068.5 and 21093; please also refer to CEQA Guidelines Sections 15152, 15161, 15168, 15385).

CEQA Guidelines Section 15165 requires preparation of a program EIR when an individual project is to be implemented in phases. The 2015 Master Plan is a phased plan that provides a blueprint for future development of the CCCVC for 100 years. Adoption of the plan does not constitute a commitment to any specific projects, construction schedule, or funding priority. A program EIR is the appropriate environmental document for a series of actions that can be characterized as a single project, such as is the case for the development encompassed within the proposed 2015 Master Plan. Therefore, the 2015 Master Plan is being analyzed at a "program level" in this EIR/EA. CEQA environmental review conducted for future phases that are proposed in accordance with the 2015 Master Plan will be tiered from this EIR to the extent that this program-level analysis remains adequate for such purposes in accordance with Section 15152(b) of the State CEQA Guidelines.

Some EIRs combine program- and project-level analysis of phases of a project into one EIR. In this way, the initial phase or phases of a planned series of actions can be evaluated in detail pursuant to CEQA Guidelines Section 15161 and approved for construction, while the later phase(s) encompassing the larger intentions of the lead agency can be disclosed and described. Phase 2 of the 2015 Master Plan has been sufficiently developed to a level of certainty within the 35% Schematic Design Plans that it is ready for a detailed environmental impacts analysis associated with its implementation (Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019a; Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019b). Thus, a project-level analysis can and is being performed for Phase 2 in this EIR/EA. Therefore, in addition to the program-level analysis of the 2015 Master Plan, this EIR/EA analyzes site-specific impacts associated with Phase 2 of the 2015 Master Plan.

The proposed 2015 Master Plan describes a program of potential development of the cemetery site over 100 years. Subsequent to the 2015 Master Plan approval, future phases not analyzed at a project level

in this EIR/EA (i.e., Phases 3 – 11) will be subject to individual environmental review by CalVet and USDVA in compliance with CEQA and NEPA, prior to approval of each phase. Subsequent phases would be examined in light of the program EIR to determine whether additional environmental documentation must be prepared. If, pursuant to CEQA Guidelines Section 15162, no new significant effects would result from the proposed phase, all significant effects have been adequately addressed and no new mitigation measures would be required, then subsequent phases within the scope of the approved proposed 2015 Master Plan may rely on the environmental analysis provided in this EIR/EA, and no additional environmental documentation would be required. In instances where new significant effects would result, subsequent environmental review would be conducted as necessary.

Combining the 2015 Master Plan and Phase 2 of the 2015 Master Plan in one EIR/EA provides for full disclosure of potential future actions and ensures consideration of cumulative impacts that might be significant were they taken only individually. This transparency is beneficial to those reviewing the proposed project, including responsible agencies and the public, by allowing an early overview of the concepts that future phases of the 2015 Master Plan, which will be analyzed later at the detailed project level.

1.3.3 National Environmental Policy Act

The CCCVC would be constructed with funds awarded through the Veteran Cemetery Grants Service offered by the USDVA, which requires the proposed project to comply with NEPA. NEPA requires Federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic, interdisciplinary approach. Under NEPA, Federal agencies are required to consider and publicly disclose the impacts of their actions on the human environment. NEPA applies to all Federal agencies on their actions involving implementation, authorization, regulation, or funding. With the exception of Federal actions that are categorically excluded from NEPA documentation, NEPA requires that Federal agencies prepare EAs or Environmental Impact Statements (EISs) to analyze impacts of their proposed action and a reasonable range of alternatives prior to making decisions, and to involve the public in the decision-making process. The White House Council on Environmental Quality (CEQ), which was established along with NEPA (42 United States Code [USC] 4321 et seq.), has adopted regulations and guidance that provide general procedures for Federal agencies to follow when preparing these documents.

According to NEPA legislation, an EA is used to determine whether the proposed action has the potential to significantly affect the quality of the human environment. According to the NEPA Interim Guidance for Projects prepared by the USDVA (USDVA, 2010), an EA is a concise public document that should include brief discussions of:

- The purpose and need for the proposed action;
- Reasonable alternatives for the proposed action;
- The environmental impacts of the proposed action and alternatives;
- Proposed mitigation or monitoring measures; and
- A listing of agencies and persons consulted.

This analysis is conducted in accordance with the NEPA CEQ's "Regulations Implementing the Procedural Provisions of NEPA" (40 CFR 1500-1508), the USDVA's NEPA regulations titled "Environmental Effects of the Department of Veterans Affairs Actions" (38 CFR Part 26), and the USDVA's NEPA Interim Guidance for Projects (USDVA, 2010). These requirements specify that USDVA must evaluate the potential

environmental impacts of USDVA facilities, operations, and related funding decisions prior to taking action. The USDVA must apply the NEPA review process and use the information to make an informed decision prior to undertaking a proposed action. An EA provides sufficient evidence and analysis for determining whether an action would cause significant environmental impacts (requiring an EIS) or the agency can issue a Finding of No Significant Impact (FONSI) (40 CFR 1508.9). A FONSI is a decision document that briefly presents the reasons an action would not have a significant effect on the human environment (40 CFR 1508.13). As required by NEPA and the implementing regulations from CEQ and USDVA, the alternative of taking no action is evaluated, providing a baseline for comparison of potential impacts form the action alternatives.

On December 18, 2014, the CEQ published final guidance that provides clarification on when and how Federal agencies can use programmatic NEPA reviews in accordance with NEPA and the CEQ NEPA Regulations (CEQ, 2014). Programmatic NEPA reviews add value and efficiency to the decision-making process when they inform the scope of decisions and subsequent tiered NEPA reviews. Programmatic NEPA reviews can facilitate decisions on agency actions that precede site- or project-specific decisions and actions, such as mitigation alternatives or commitments for subsequent actions, or narrowing of future alternatives. They also provide information and analyses that can be incorporated by reference in future NEPA reviews. A programmatic NEPA review may be appropriate when the action being considered is subject to NEPA requirements and falls into one of the four major categories of actions to which NEPA can apply (40 CFR Section 1508.18[b]): 1) adopting official policy; 2) adopting formal plans; 3) adopting agency programs; and 4) approving multiple actions. Agencies may prepare a single NEPA document to support both programmatic and project-specific proposals. Such an approach may be appropriate when an agency plans to make a broad program decision, as well as timely decisions to implement one or more specific projects under the program, such as the case with the 2015 Master Plan and Phase 2.

1.3.4 Similarities and Differences Between CEQA and NEPA

When a project is subject to both NEPA and CEQA review, State and local agencies are encouraged to cooperate with Federal agencies in the environmental process, including joint planning, research, hearings, and preparation of environmental documents. As the Federal lead agency, the USDVA is responsible for compliance under NEPA, and as the State lead agency, CalVet is responsible for compliance under CEQA. This document has been prepared as a joint EIR/EA in compliance with NEPA and CEQA. A joint EIR/EA must satisfy the procedural and content requirements of both NEPA and CEQA, with a goal of minimizing the need for costly duplicative environmental reviews by many agencies and streamlining the environmental review process by complying with both laws with a single document.

Generally, NEPA and CEQA contain many similar terms and concepts. For example, the term and concept of lead agency are the same under NEPA and CEQA. However, NEPA defines a Federal undertaking as a "proposal" for "action," while CEQA uses the term "project" to describe the action. Similar to CEQA's definition of a project, an action under NEPA includes policies, rules, regulations, plans, programs, and specific projects, including private undertakings requiring Federal agency permits or regulatory decisions. However, some terms may appear similar, but they have important differences in concept. One example is "cooperating agency." Under NEPA, a cooperating agency is a Federal agency other than the lead agency that is involved with the preparation of the NEPA document with jurisdiction over the project or with special expertise regarding impacts of the action. The cooperating agency under NEPA is broader than a "responsible agency" under CEQA. A responsible agency is only those State or local agencies that issue permits or provide funding for the project. A cooperating agency

is expected to participate in the NEPA process when requested by the lead agency, but a responsible agency generally participates through the commenting process.

This EIR/EA generally uses CEQA terminology; this document uses the term "proposed project" instead of "proposed action" to refer to the implementation of the 2015 Master Plan and all Federal, State, and local agency actions or approvals that would be issued or undertaken based on it, except when the context required NEPA terminology. **Table 1-1** shows the similarities in terminology between NEPA and CEQA.

Table 1-1. Similarities in Terminology between CEQA and NEPA

CEQA Term	NEPA Term
Lead Agency	Lead Agency
Responsible Agency	Cooperating Agency
Initial Study	Environmental Assessment
Environmental Impact Report	Environmental Impact Statement
Notice of Preparation	Notice of Intent
Proposed Project	Proposed Action
No Project Alternative	No Action Alternative
Environmentally Superior Alternative	Environmentally Preferable Alternative
Project Objectives	Purpose and Need
Environmental Impacts	Environmental Consequences
Environmental Setting	Affected Environment
Notice of Completion	Notice of Availability
Negative Declaration/Mitigated Negative Declaration	Finding of No Significant Impact
Findings	Record of Decision

Although there are similarities between CEQA and NEPA, the two acts are not identical. For example, CEQA is partly "substantive" in that it requires an agency to adopt "feasible" mitigation measures for any "significant effect on the environment." In contrast, NEPA is a procedural law requiring Federal agencies to evaluate a range of reasonable alternatives, disclose potential impacts, and identify feasible mitigation. In an EIS (a NEPA document), as opposed to an EIR (a CEQA document), reasonable alternatives must be rigorously and objectively evaluated at a greater level of detail. The threshold for preparing an EIR is lower than the threshold for preparing an EIS under NEPA. Therefore, it is not uncommon to have a joint CEQA/NEPA document that is not an EIS/EIR but rather an EIR/EA.

This integrated EIR/EA has been prepared because the CEQA lead agency, CalVet, and DGS determined that there may be significant impacts under CEQA that could require the development of alternatives and the need for mitigation measures to reduce impacts to a less-than-significant level. When an EA is integrated with an EIR, it is common for the EA to share many attributes typically associated with an EIS; a key difference is the distinction between CEQA and NEPA with response to the use of the term "significant."

Because of the obligation under CEQA to mitigate "significant effects on the environment" when feasible, the characterization of impacts as being either "significant" or "less than significant" is very important. For this reason, this Draft EIR/EA has been written in a manner that identifies, for CEQA purposes, "significance thresholds" for anticipated impacts. Some of these thresholds even have the force of law under CEQA. CEQA thresholds of significance for other issue areas and resources were developed using applicable regulations when they exist, or best professional judgement.

1.4 CEQA/NEPA PROCESS

CEQA and NEPA are procedural laws requiring the evaluation of environmental impacts associated with discretionary actions or approvals and the disclosure of those impacts to the public. Both laws require lead agencies to inform and involve the public during the decision-making process. The specific level of public involvement varies by project complexity and lead agency requirements. For the proposed project, the level of public involvement will be guided by the EIR requirements outlined in the CEQA Guidelines and the NEPA process requirements established by the USDVA.

The Draft EIR/EA is being circulated to responsible public resource agencies, permitting agencies, trustee agencies, the State Clearinghouse, and interested stakeholders. Written comments received in response to the Draft EIR/EA will be addressed in a final document that is anticipated to be a Final EIR/EA.

CalVet and DGS staff will review the comments on the Draft EIR/EA and respond to them in the Final EIR. The staff will then make a recommendation to the CalVet Secretary on whether to certify the Final EIR portion of the EIR/EA under CEQA. If the Secretary or designee chooses to certify the Final EIR, the lead agency must first adopt "CEQA Findings" addressing whether each potentially significant impact of the proposed project has been mitigated either through mitigation measures or through provisions in the alternatives (CEQA Guidelines Section 15091[a]). If after adopting such findings, the CEQA lead agency is still faced with unmitigated significant impacts or does not have control over the mitigation measures necessary to mitigate certain impacts, it must also adopt a "Statement of Overriding Considerations" before it can approve the proposed project. That statement must set forth the economic, social, or other benefits of the project that it believes outweigh its unmitigable significant environmental impacts (CEQA Guidelines Section 15093).

To commence the 30-day statute of limitations for any legal challenge to an EIR, CEQA requires that the lead agency file a Notice of Determination (NOD) with the County Clerk in the county where the project will occur and with the State Office of Planning and Research (when State agency approvals are required) that informs the public which alternative from the EIR has been adopted. Filing of the NOD will complete the environmental review process for CalVet. CEQA also requires lead agencies to adopt a Mitigation Monitoring and Reporting Program (MMRP) for mitigation measures the agency has adopted or made a condition of project approval in order to reduce or avoid significant effects on the environment (CEQA Guidelines 21081.6[a]). As part of approval of the project or one of the project alternatives, CalVet will adopt a MMRP pursuant to CEQA in order to monitor implementation of adopted mitigation measures and conditions of project approval. CalVet will then forward this documentation to USDVA, along with the recommendation regarding the preferred alternative.

The EA portion of the document has been prepared under NEPA to determine whether the proposed project will constitute a major Federal action that would significantly affect the human environment. The term "significant" as used under NEPA requires consideration of both context and intensity (40 CFR 1508.27). **Chapter 3** of this document discusses the intensity (i.e., severity of impact) for each resource topic.

The USDVA will determine whether to issue a FONSI based on the EA, analysis of issues and alternatives, consideration of public interest expressed, and the ability of environmental commitments and other mitigation measures (e.g., avoidance) to reduce or eliminate adverse impacts.

If, based on the analysis set forth in this document, the USDVA believes that a FONSI would be appropriate, then an EIS would not be required. However, that determination is subject to change after receipt and consideration of comments provided during the public comment period on the Draft EIR/EA. The appropriateness of a FONSI cannot be determined without a review of the information by the USDVA generated through public review. The NEPA process will be complete with the USDVA adopting of a FONSI, unless, through public review or the receipt of other information not presently available, the USDVA will decide that preparation of an EIS is required.

1.5 SCOPING AND PUBLIC INVOLVEMENT

1.5.1 Notice of Preparation and Scoping Meeting

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, CalVet, as State lead Agency, prepared a Notice of Preparation (NOP) for this EIR/EA (State Clearinghouse [SCH] Number: 2018111030; please refer to **Appendix A**). The NOP described the project and identified the key environmental issues to be addressed in the Draft EIR/EA. The NOP was circulated to local, State, and Federal agencies and other interested parties from November 14 to December 13, 2018, for a 30-day review period. Public notices were placed in local newspapers (*Salinas Californian*, *Monterey County Weekly*, and *The Monterey Herald*) informing the general public of the scoping meeting. In addition, an email inviting attendees to the public meeting was circulated to a list of 155 individuals, community members, agencies, and non-governmental organizations who may be interested in the proposed project. The email and NOP also included information on how to access the project website and comment on the proposed project. **Appendix A** provides the NOP and all written comments received in response to the NOP.

A public scoping meeting was held on Tuesday, November 27, 2018, from 6:00 to 8:00 PM at the Community Center at Soper Field located at 220 Coe Avenue, Seaside, California, to present the proposed project to the public and agencies and to solicit input as to the scope and content of the EIR/EA. The meeting was an informal, open house format that offered stations to share information and allow attendees to discuss their concerns with project staff.

1.5.2 Scoping Comments

During the public scoping period, eight public comments were submitted. A number of comments focused on the potential impacts on biological resources, hazardous materials (i.e., unexploded ordinance), water supply, and cultural resources. Comments also focused on the need to evaluate alternatives, and a potential alternative location was recommended. The scoping process determined that the proposed project could lead to potential environmental impacts on specific natural resources and on the human environment. Based on comments received during the scoping process and preliminary review, **Chapter 3, Environmental Setting and Environmental Impacts** of this Draft EIR/EA includes a detailed evaluation of the following resource topics with respect to direct and indirect impacts that may result from the proposed project and alternatives; **Chapter 4, Other Statutory Considerations** provides a discussion of cumulative impacts:

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

- Land Use and Planning;
- Noise;
- Public Services;
- Transportation; and
- Utilities and Service Systems.

The Draft EIR/EA also analyzes the following elements not required under CEQA but are required under NEPA. These include:

- Socioeconomics and Environmental Justice;
- Short-term Uses and Long-term Productivity;
- Unavoidable Adverse Effects; and
- Irreversible and Irretrievable Commitments of Resources.

1.5.3 Public Involvement and Review

This Draft EIR/EA is being circulated to local, State, and Federal agencies, and to interested organizations and individual who may wish to review and comment on the analysis provide in this document. Publication of this Draft EIR/EA initiates the beginning of a 45-day review period. To ensure proper interpretation of remarks, written comments are highly encouraged. All written comments and questions regarding the Draft EIR/EA that raise issues under CEQA and NEPA will be considered by the lead agencies.

The Draft EIR/EA will be sent to the State Clearinghouse and copies of the Draft EIR/EA will be available for review at the following locations:

Monterey County Public Library
Seaside Branch
550 Harcourt Avenue
Seaside, California 93955

California Central Coast Veterans Cemetery
Administrative Building
2900 Parker Flats Cut-Off Road
Seaside, California 93955

The Draft EIR/EA will also be available on the CCCVC Project Website:

https://www.cccvcproject.com/resources

Comments can be provided in two ways: 1) by U.S. mail, or 2) by electronic mail (email). Comments provided by email should include "**CCCVC Project Draft EIR/EA Comments**" in the subject line, and the name and physical address of the commenter should be contained in the body of the email.

Please send all comments via mail to:

Terry Ash, Senior Environmental Planner
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940

OR via email to:

cccvcproject@ddaplanning.com
(subject line: "**CCCVC Project Draft EIR/EA Comments**")

1.6 PERMITS, APPROVALS, AND OTHER REQUIREMENTS

This EIR/EA is available for the use of responsible, trustee, and other agencies that may have jurisdiction or approval authority for the proposed project. The following approvals and regulatory permits may be required for implementation of the proposed project and action alternatives:

- National Pollutant Discharge Elimination System Permit (NPDES);
- Storm Water Pollution Prevention Plan (SWPPP);
- State Architect Approval for Americans with Disabilities Act (ADA) by the Division of the State Architect (DSA);
- Office of the State Fire Marshal;
- City of Seaside Municipal Code – Chapter 15.34 for potential unexploded ordinance risk;
- Monterey County Code – Chapter 16.10 for potential unexploded ordinance risk;
- Compliance with the Installation-Wide Multispecies Habitat Management Plan (HMP) for former Fort Ord California;
- Compliance with the ESA and California Endangered Species Act (CESA).

1.7 ORGANIZATION OF THE DOCUMENT

This Draft EIR/EA contains the information required by the CEQA Guidelines (PRC Sections 15120-15131) for EIRs. It also includes the information consistent with USDVA NEPA Regulations and policies, including sections of **Chapter 4** that are specific to NEPA.

Executive Summary: Summarizes the contents of the document and includes a table that summarizes the potential impacts.

Chapter 1. Introduction: Provides an overview of the document and the proposed project, including the project background, a description of the project objectives, and a discussion of CEQA and NEPA requirements.

Chapter 2. Proposed Project and Alternatives: Describes the proposed project and alternatives.

Chapter 3. Environmental Setting and Environmental Impacts: Describes the environmental setting, analyzes the environmental impacts, and identifies environmental commitments pertinent to each resource area or topic.

Chapter 4. Other Statutory Considerations: Discusses cumulative impacts, growth-inducing effects, and significant and unavoidable impacts to comply with other requirements of CEQA and NEPA.

Chapter 5. Consultation and Coordination: Describes the consultation requirements and executive orders involved in the consultation and coordination of the EIS/EIR.

Chapter 6. References: Lists references cited in the document, organized by chapter.

Chapter 7. List of Preparers: Identifies agencies and individuals that contributed to the preparation of this document.

Appendices: Includes the NOP and public scoping comments and technical studies.

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Chapter 2.0 PROPOSED PROJECT AND ALTERNATIVES

2.1 PROJECT BACKGROUND

2.1.1 2008 Development Master Plan

As part of the BRAC, Fort Ord was downsized and realigned in 1991 and officially closed in 1994. An initiative to develop a veterans cemetery at the former Fort Ord began a few weeks after announcement in 1991 of the BRAC (RHAA and Whitson Engineers, 2008). Since the late 1990s, the Cities of Seaside and Marina and the County have been involved in the effort to develop the CCCVC, which has been partly coordinated through the County Veterans' Citizen Advisory Committee (CAC), a group of individuals from various municipal, civic, and veterans' contingents. As originally proposed in the 1993 Fort Ord Reuse Group Base Reuse Plan and later codified in the Fort Ord Reuse Authority (FORA) Base Reuse Plan (Reuse Plan) in 1997, a 178-acre area was designated in support of the construction of a CCCVC (EMC Planning Group, Inc. and EDAW, Inc. [EMC and EDAW], 1997; RHAA and Whitson Engineers, 2008). In 2008, the 2008 Master Plan was prepared in support of this effort. The 2008 Master Plan proposed five planned land use areas within the 178-acre area, as described below (**Figure 2-1, 2008 Master Plan Site Plan**):

- CCC Veterans Cemetery: It was determined that less than 79 acres (approximately 78.7 acres) was needed to meet the burial demands of for the next 100 years. Currently, 84.4 acres have been allocated for the CCCVC, which is located in the central portion of the 178-acre area.
- Ancillary Facilities: These facilities include two separate parcels for ancillary uses in support of the proposed cemetery. A 1.5-acre parcel located adjacent to the proposed cemetery on the north would include a Veterans Hall, cultural history museums, a non-denominational chapel, and facility parking. A 2-acre parcel located adjacent and south of the proposed cemetery would include construction of an amphitheater with a capacity of 300 people and additional parking.
- Development Area with Habitat Restoration Opportunity: Approximately 45 acres within the southern portion of the 178-acre area would be designated as a Development Area with Habitat Restoration Opportunity (DAHRO).
- Endowment Fund Opportunity Parcel. The most northern portion of the 178-acre area would be developed to support the finances needed for the endowment fund required for the cemetery's operations and maintenance costs, including off-site improvements.
- Anticipated Right-of-Way Dedication Areas. Right-of-way (ROW) for road improvements and other infrastructure.

2.1.2 Phase 1

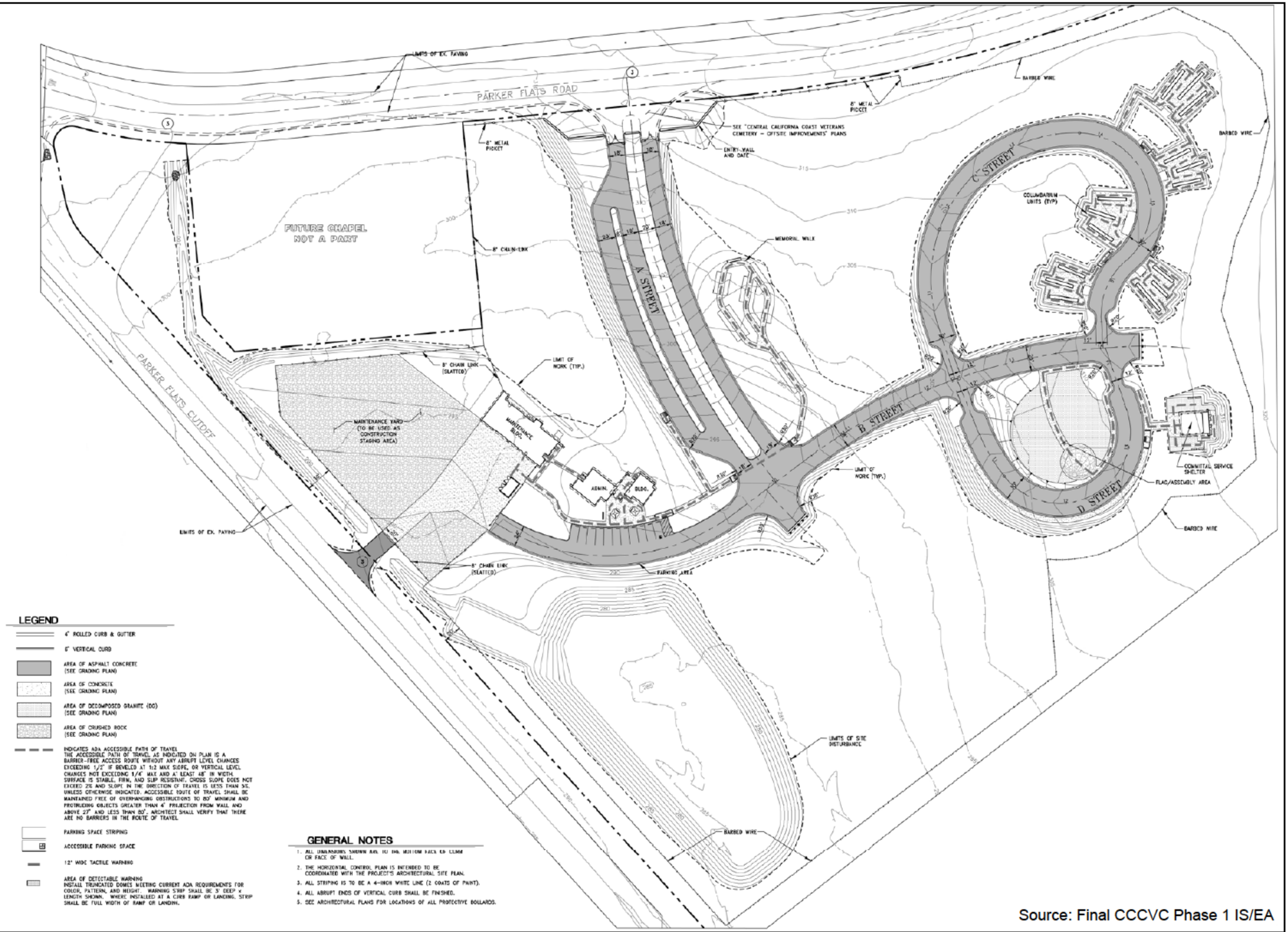
Phase 1 involved the development of approximately 16.9 acres within the northwestern corner of the larger 84.4-acre site (**Figure 2-2, Phase 1 Site Plan**). Phase 1 included burial facilities, administrative and maintenance facilities, a committal shelter for burial services, supporting roads and infrastructure (including entry roads and features, electric, telecommunications, sewer, and a storm water retention basin), and additional elements to honor veterans, including a memorial walk with one memorial wall, flag plaza, and ceremonial entry. An IS/EA was prepared for the Phase 1 project in 2014 and adopted in 2015 (ECORP, 2014a). Mitigation Measure BIO-6 from the IS/EA and MMRP requires, among other obligations, identifying an off-site oak woodland restoration area and planting 398 coast live oak trees. CalVet has identified a potential off-site restoration area on County property and is currently negotiating the use of the area with the County to implement this mitigation measure. The mitigation proposal has County support and CalVet is currently working with the County to develop the terms of the agreement. Construction of Phase 1 of the CCCVC was completed in 2016 and it is currently in operation.

Fig. 5.01



Source: 2008 Master Plan

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	2008 Master Plan Site Plan	N	Date 02-15-2019	Figure 2-1



Source: Final CCCVC Phase 1 IS/EA

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 1 Site Plan

N

Date
03-07-2019

Figure
2-2

2.2 PROJECT OBJECTIVES/PURPOSE AND NEED

In 2015, after the approval of Phase 1 of the CCCVC, an updated master plan was prepared (Wood Rodgers, 2015). The purpose of the 2015 Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues remaining following the construction and completion of Phase 1 for the development of the cemetery. To that end, the 2015 Master Plan outlines a process and strategy for the implementation of the entire Cemetery including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates.

The purpose of Phase 2 of the 2015 Master Plan is to accommodate burials anticipated for the next 10 years. Phase 2 would include burial facilities of both in-ground cremains and crypts, as well as supporting roads and infrastructure and two memorial walls.

The details of the 2015 Master Plan and Phase 2 are discussed in the following sections.

2.2.1 Need

California is home to 2.7 million military veterans, slightly more than one-third of whom are World War II and Korean Conflict veterans. For this group of citizens, the availability of veteran-specific burial space is an issue of ever-increasing significance. California is home to nine cemeteries operated by the National Cemetery Administration of the USDVA and two cemeteries operated by CalVet. Six cemeteries operated by the National Cemetery Administration and one cemetery operated by CalVet have open burial space; the Bakersfield National Cemetery, located in Arvin approximately 200 miles from the Project site, Fort Rosecrans National Cemetery, located in San Diego approximately 400 miles from the Project site, the Riverside National Cemetery, located in Riverside approximately 370 miles from the Project site, the San Joaquin Valley National Cemetery, located in Gustine (Merced County) approximately 125 miles from the Project site, the Miramar National Cemetery, located in San Diego approximately 430 miles from the Project site, the Sacramento Valley National Cemetery, located in Dixon approximately 160 miles from the Project site, and the Northern California Veterans Cemetery, located in Igo (Shasta County) approximately 320 miles from the Project site. There is a demonstrated need for a veterans cemetery to serve the Monterey Bay Region of California given the number of veterans in this region and the lack of a veterans cemetery in proximity to this region. The CCCVC is intended to serve the anticipated needs of veterans and eligible dependents for the next 100 years from counties within a 75-mile radius, ranging from the San Francisco Bay Area to San Luis Obispo, but is not limited to those areas.

2.2.2 Purpose and Project Objectives

The purpose and objective of the 2015 Master Plan, including Phase 2, is to implement a key objective in CalVet's Strategic Plan (CalVet, 2018):

> *Provide for deceased veterans and their families through the development and administration of additional State Veterans Cemeteries.*

The 2015 Master Plan objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans anticipated for the next 100 years;
- Provide a phased approach to the development of the cemetery that allows for flexibility over time to respond to demand and available funding;
- Fulfill the vision of providing a veterans cemetery at the former largest military base on the west coast, where many veterans were likely to have served;
- Create a monument to commemorate the service and sacrifice of California State Veterans; and
- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs.

The Phase 2 objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans anticipated for the next 10 years;
- Increase burial options by providing in-ground crypts and in-ground cremains burial sites; and
- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing topography and open areas with existing native vegetation as much as possible, while meeting the programmatic needs.

2.3 DEVELOPMENT OF ALTERNATIVES

2.3.1 Approach to Developing Alternatives

CEQA and NEPA

CEQA and NEPA require the evaluation of a reasonable range of alternatives to the proposed action that could accomplish the lead agencies' purpose and need, including the no action/no project alternative.

An EIR must consider a reasonable range of alternatives for analysis. The alternatives considered under CEQA must meet the basic project objectives, be feasible, and should not result in greater impacts on the environment than those of the proposed project. In the determination whether certain alternatives are feasible, the lead agency is guided by the general definition of feasibility found in CEQA Guidelines Section 15364: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." The lead agency should consider site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, jurisdictional boundaries, and the proponent's control over alternative sites in determining the range of alternatives to be considered in an EIR (CEQA Guidelines Section 15126.6[f][1]). An EIR must briefly describe the rationale for selection and rejection of alternatives and the information the lead agency relied upon in making the selection. It should also identify any alternatives that the lead agency considered but rejected as infeasible during the scoping process and briefly explain the reason for their exclusion (CEQA Guidelines Section 15126.6[c]). Under CEQA, an EIR is required to analyze the no project alternative. CEQA Guidelines Section 15126.6 (e)(2) states that the no project analysis shall discuss the existing conditions at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced. The no project conditions may also include some reasonably foreseeable changes in the existing conditions and changes that would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

Under NEPA, CEQ Regulations, and 38 CFR 26 require that all reasonable alternatives to be vigorously explored and objectively evaluated. Alternatives that are eliminated from detailed study must be identified along with a brief discussion of the reasons for eliminating them (40 CFR, Part 1502, Section 14 [40 CFR 1502.14]). NEPA allows the elimination of alternatives that are not reasonable or feasible or do not meet the purpose and need of the proposed project. For the purposes of NEPA, "reasonable" means those alternatives which may be feasibly carried out based on technical, economic, environmental, and other factors. The purpose of describing and analyzing a no action alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.

For the purposes of this EIR/EA, the term "No Action Alternative" is used as the title for an alternative that fulfills both the no project alternative of CEQA and no action alternative requirement of NEPA.

Alternatives for analysis in this EIR/EA were considered in the context of the CEQA/NEPA regulations and guidelines described above. For the purposes of analyzing the proposed project, reasonability is based on the following criteria:

- Alternatives should fulfill the objectives under CEQA and purpose and need under NEPA.
- Alternatives should be feasible and reasonable in terms of economic, environmental, legal, social, and technological factors.

- Alternatives should avoid or substantially reduce one or more significant impacts of the proposed project.

Alternatives Considered for Further Analysis

The following alternatives were found to generally meet purpose/need and objectives of the proposed project, be feasible or potentially feasible, and have some potential to avoid or substantially reduce one or more significant impacts of the proposed project, and, therefore, are considered for further analysis in the EIR/EA.

- Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2;
- Alternative 2: Reduced CCCVC 2015 Master Plan;
- Alternative 3: CCCVC 2015 Master Plan – Modified Phase 2; and
- Alternative 4: No Action Alternative

Alternatives eliminated from detailed evaluation in the EIR/EA are discussed at the end of the section.

2.4 DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES

2.4.1 Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Proposed 2015 Master Plan

As described above, the 2015 Master Plan lays out the process and strategy for the implementation of the entire CCCVC over the next 100 years (**Appendix B; Figure 2-3, 2015 Master Plan Phasing Plan)**. The 2015 Master Plan includes the 84.4-acre cemetery site; it does not include the additional land uses included in the 2008 Master Plan. At full build-out, the cemetery would supply 105,560 gravesites with 81,040 columbaria and 25,450 casket burial sites – enough to serve the anticipated needs of veterans for the next 100 years. The cemetery would be completed in phases; Phase 1 is already completed and in operation. As described above, Phase 1 included 5,000 columbaria, an administration building/public information/maintenance complex, a committal service shelter, assembly area, memorial walk/wall, and associated roads and infrastructure.

Through its National Cemetery Administration (NCA) State Cemetery Grants Program (SCGP), the USDVA would provide funds for the construction of the cemetery. The 2015 Master Plan has been developed to include the content requirements published by the NCA.

Setting

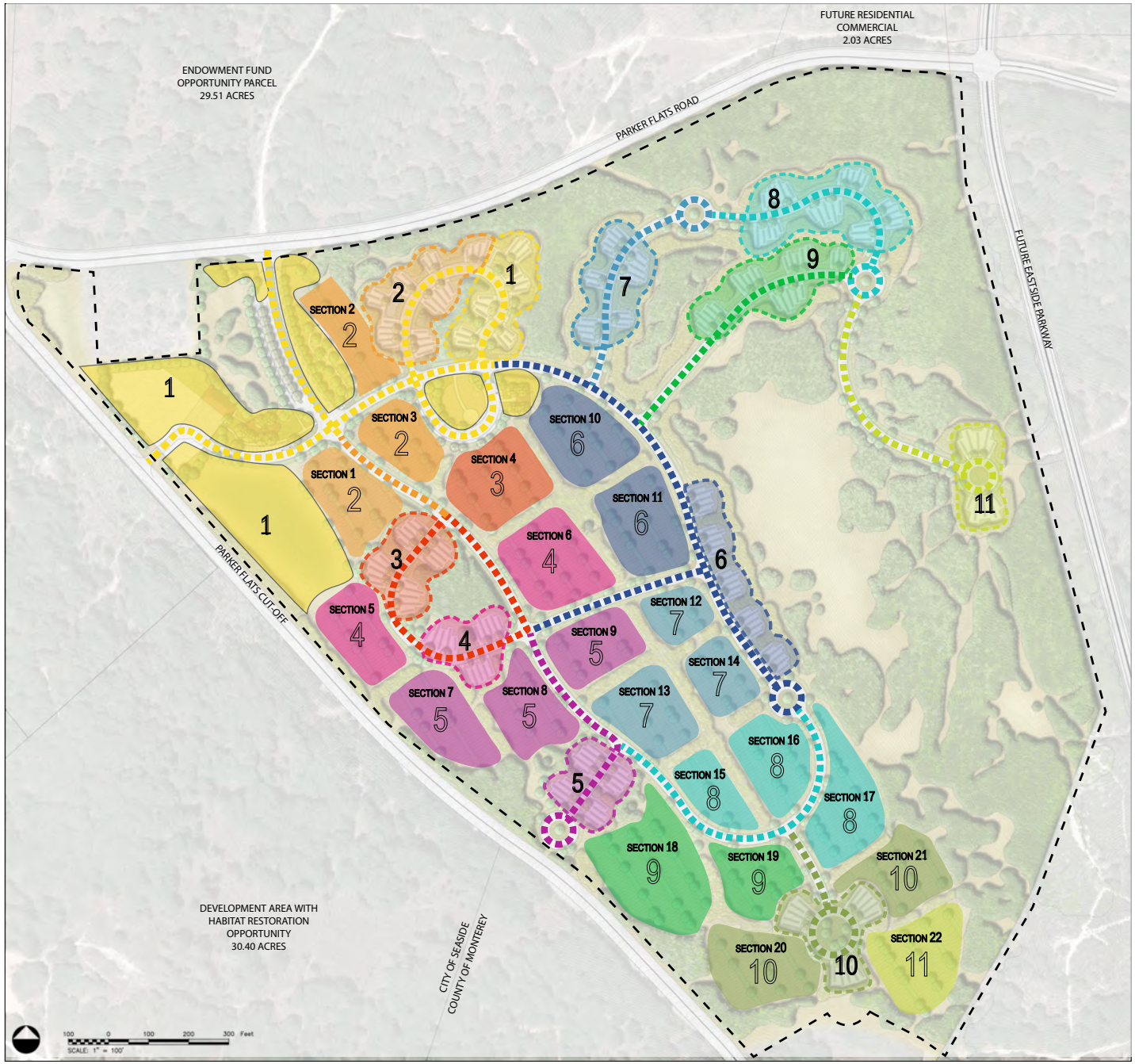
The 84.4-acre site consists of rolling topography ranging from 285-350 feet above mean sea level. A rolling, densely oak-covered ridgeline forms the site's southern and eastern boundary. The western half of the site is composed mostly of hilly topography ranging from two to seven percent slopes with oak woodland covering much of this portion of the site. Runoff from winter rains collects in the existing retention basin before percolating into the sandy soil and replenishing groundwater supplies. Overlooking the site is Artillery Hill, one of the most prominent features in the area. This shrub- and grass-covered hill is located on the eastern border of the site and provides views of the ocean to the Salinas Valley.

Layout

The cemetery layout is designed to enhance the visitor experience by preserving much of the oak woodland and yet maintain an intuitive layout pattern (**Figure 2-4, 2015 Master Plan Site Layout**). The main visitor facilities are easily found near the entrance within the Phase 1 development area. In the 2015 Master Plan, a loop road organizes the spaces within the cemetery, with smaller loops and cul-de-sacs branching off the main loop. The burial sections and columbaria are organized around these smaller loops. Oak trees would be preserved wherever possible, including locating columbaria within the oak woodland and preserving oak woodland between burial sections to reduce potential impacts. Where major grading is proposed, new oaks would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery.

Burial Options

The cemetery would provide a combination of burial facilities to meet the desires of all veterans. The proposed 105,560 burials would accommodate approximately 76 percent columbarium for cremains and 24 percent in-ground casket burials (**Figures 2-3, 2015 Master Plan Phasing Plan** and **2-4, 2015 Master Plan Site Layout**). For cremated remains, burial would be in niches in freestanding double columbarium walls arranged in courts. Many of the courts would be woven into the oak woodland providing a serene setting. Of the 25,436 full casket burials planned for the cemetery, approximately 95 percent would be standard three-foot by eight-foot plots with the remaining five percent as over-sized five-foot by ten-foot



PHASES

1
ROAD
COLUMBARIA: 5,000
BUILDING & LANDSCAPE
9.1 ACRES

2
ROAD
COLUMBARIA: 9,800
CRYPTS: 2,875 (101 OVERSIZE)
4,29 ACRES

3
ROAD
COLUMBARIA: 8,000
CRYPTS: 1,403 (74 OVERSIZE)
2.07 ACRES

4
COLUMBARIA: 6,400
CRYPTS: 2,447 (100 OVERSIZE)
2.51 ACRES

5
ROAD
COLUMBARIA: 7,440
CRYPTS: 3,283 (140 OVERSIZE)
3.77 ACRES

6
ROAD
COLUMBARIA: 8,800
CRYPTS: 2,578 (120 OVERSIZE)
4.43 ACRES

7
ROAD
COLUMBARIA: 6,800
CRYPTS: 2,406 (104 OVERSIZE)
3.17 ACRES

8
ROAD
COLUMBARIA: 9,760
CRYPTS: 3,147 (130 OVERSIZE)
4.77 ACRES

9
ROAD
COLUMBARIA: 8,240
CRYPTS: 2,856 (123 OVERSIZE)
3.77 ACRES

10
ROAD
COLUMBARIA: 6,480
CRYPTS: 2,243 (87 OVERSIZE)
2.94 ACRES

11
ROAD
COLUMBARIA: 4,320
CRYPTS: 1,282 (52 OVERSIZE)
0.83 ACRES

TOTALS

81,040	COLUMBARIA *
24,520	CASKET BURIALS
23,490	STANDARD CRYPTS
1,030	OVERSIZE PLOTS
105,560	TOTAL BURIALS
41.65	DEVELOPED ACRES
78.80	TOTAL ACRES

Source: 2015 Master Plan

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

2015 Master Plan Phasing Plan

N

Date
02-28-2019

Figure
2-3



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Proposed Project Layout

N

Date
03-07-2019

Figure
2-4

plots. Full casket burials would utilize pre-placed double-depth vaults. Burial sections would be separated by vegetated edges and slopes. Due to the limited water available for the cemetery, the cover for the burial sections would be comprised of decomposed granite (a local crushed rock) rather than turf. The sections would be benched into the existing slopes to flatten areas to no more than two percent in order to accommodate the decomposed granite. Edges along the street would be planted with a colorful significant vegetated edge.

In addition to burial sites, the 2015 Master Plan includes memorials walls for those who do not desire burial on-site or whose remains are not available but want to be memorialized as a veteran. Each wall would consist of 40 plaques in five rows mounted on a stucco wall. Wall sections would be added as demand increased.

Site Design

The overall design intent of the site plan is to create a monument to the service and sacrifice of California State Veterans. Part of this goal is accomplished through the inclusion of features that would make a lasting and memorable impression on veterans visiting the cemetery. The cemetery would have a combination of burial facilities to meet veterans' needs, including columbaria, standard burial plots, over-sized plots, and a scatter garden.

Site topography is one of the main constraints in the cemetery's site design. Areas suitable for crypt development are limited to the western half of the site. Benching would be required in most crypt areas to create the maximum two percent slopes necessary to sustain the use of decomposed granite as the ground plane cover (steeper slopes lead to migration of the decomposed granite material). The slopes in the eastern half, while not accommodating crypts, would accommodate some columbarium development (**Figure 1-3, Overall Boundary and Topography**).

The oak woodland within the site is one of the major opportunities and also constraints to development. Oak woodland has been identified as a key resource on the former Fort Ord. The 2015 Master Plan includes a preservation area on-site that would protect approximately 17 acres of oak woodland.

Phasing Plan

The cemetery layout has been developed to include flexibility through sequential phases which allows the cemetery to be completed on an as-needed basis determined by the burial demands anticipated over the next 100 years (**Figure 2-3, 2015 Master Plan Phasing Plan**[1]). While it is anticipated that each phase would accommodate burial needs for approximately ten years, phases would be implemented based on demand and available funding. For the purposes of this analysis, it is assumed that future phases would be implemented every ten years with build-out occurring in 2101.

The layout and design of the burial areas have been arranged and sized for flexibility in phased expansion segments. The cemetery proposes a combination of burial facilities (i.e., crypts for caskets, oversize plots, and columbaria) anticipated to meet the needs of all veterans. The phased build-out is based on existing site conditions and topography, utilities, construction costs, plot burial size, layout, and overall site organization. A total of 11 phases complete the full cemetery build-out. The final burial count exceeds the recommended 100-year count set forth by the USDVA by approximately 36,000 burial sites (2015 Master Plan, page 42; 2008 Master Plan, page 1-1 of Volume I and page 6.0-A3 of Volume II).

[1] For consistency purposes, Phase 2 is shown as proposed in the 2015 Master Plan. However, as described in Proposed Phase 2 project description, Phase 2 consists of 1,000 in-ground cremains and 2,831 crypts. The Phase 2 facilities were determined based on demand and funding, consistent with the intent of the 2015 Master Plan.

Phase 1 provided the majority of the upfront improvements and established a foundation and structure for future cemetery phases. **Tables 2-1** and **2-2** enumerate the number of crypts, oversized graves, and columbaria to be constructed with each section and phase. Subsequent phases provide for additional capacity (both columbaria and crypts) with the final phase, Phase 11, completing the Flag Plaza on top of Artillery Hill.

Table 2-1. Summary of Casket Burials

Section Number	Number of Crypts	Number of Oversized Graves	Total Per Section	Phase	Phase Total
1	855	31	886	2	
2	837	43	880	2	
3	1,082	27	1,109	2	2,875
4	1,329	74	1,403	3	1,403
5	1,046	29	1,075	4	
6	1,301	71	1,372	4	2,447
7	1,164	31	1196	5	
8	1,117	29	1,146	5	
9	862	79	941	5	3,283
10	1,188	70	1,258	6	
11	1,270	50	1,320	6	2,578
12	545	31	576	7	
13	1,034	49	1,083	7	
14	723	24	747	7	2,406
15	641	50	691	8	
16	1,094	42	1,136	8	
17	1,282	38	1,320	8	3,147
18	1,906	85	1,991	9	
19	827	38	865	9	2,856
20	1,265	57	1,322	10	
21	891	30	921	10	2,243
22	1,230	52	1,282	11	1,282
Total	**23,490**	**1,030**	**24,520**		**24,520**

Table 2-2. Summary of Columbaria

Columbaria Number	Number of Niches	Phase Number
1	5,000	1
2	9,800	2
3	8,000	3
4	6,400	4
5	7,440	5
6	8,800	6
7	6,800	7
8	9,760	8
9	8,240	9
10	6,480	10
11	4,320	11
TOTAL	**81,040**	

Landscaping and Irrigation

The landscape design incorporates the USDVA and CalVet mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. The design strategy includes primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials, that require no irrigation once established (**Figure 2-5, 2015 Master Plan Planting Plan**). These plants reflect the character of Seaside and the surrounding region of the County and meet the necessary demand of low water usage. The cemetery has minimal water allocation (see below) that would not support the traditional lawns of most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and season variation. Hardscape complements plant materials in areas where vehicular or heavy foot traffic is anticipated.

Irrigation would be temporary and is intended only for the establishment of new plants due to the limited water resources available for the project (**Figure 2-6, 2015 Master Plan Irrigation Plan**). Landscape irrigation would maximize efficiency while delivering water in the most appropriate method for the planting area, including drip emitters and tree bubblers. Future burial areas would not be planted and irrigated, but would be covered with decomposed granite; however, burial areas would have aisles set aside for potential future irrigation and planted where necessary to provide slope stabilization. The irrigation system incorporates several strategies to maximize irrigation efficiency and water reduction:

- Use of smart controllers, which are tied to local weather conditions and programmed for maximum efficiency;
- Rain sensors to prevent unnecessary watering;
- Moisture sensors to stop over-watering;
- Plants grouped in hydrozones with similar watering requirements;
- Trees on separate valves;
- Hydrozones isolated by use of gate valves to permit shut-off during repairs or once plants are established;

PLANTING + GROUNDCOVER TYPOLOGY LEGEND

- EXISTING OAK WOODLAND
- NEW OAK WOODLAND
- ACCENT TREES (ROADSIDE + COLUMBARIUM AREAS)
- CRYPT FIELD BANK TREES
- HERITAGE OAKS (QTY: 4)
- CRYPT FIELD BANK PLANTING
- SIGNIFICANT VEGETATED EDGE
- NATURALIZED ZONES
- NATIVE GRASSES
- DECOMPOSED GRANITE (CRYPT FIELDS)



PLANT LIST (SEE SHEET L4.01 FOR PHOTOS)

TREES

BOTANICAL NAME	COMMON NAME
ARBUTUS 'MARINA'	STRAWBERRY TREE
CUPRESSUS MACROCARPA	MONTEREY CYPRESS
OLEA EUROPAEA 'SWAN HILL'	SWAN HILL FRUITLESS OLIVE
PITTOSPORUM UNDULATUM	VICTORIAN BOX
QUERCUS AGRIFOLIA	COAST LIVE OAK
SAMBUCUS MEXICANA	MEXICAN ELDERBERRY

HYDROSEED MIX FOR EROSION CONTROL

PLANT TYPE	BOTANICAL NAME	COMMON NAME
PERENNIALS	ACHILLEA MILLEFOLIUM	WHITE YARROW
	ESCHSCHOLZIA CALIFORNICA	CALIFORNIA POPPY
	LOBULARIA MARITIMA	SWEET ALYSSUM
	LUPINUS BICOLOR	PYGMY-LEAF LUPINE
GRASSES	BROMUS CARINATUS	CALIFORNIA BROME
	ELYMUS GLAUCUS	BLUE WILDRYE
	TRIFOLIUM OBTUSIFLORUM	CLOVER
	VULPIA MICROSTACHYS	THREE-WEEKS FESCUE

SHRUBS + PERENNIALS

BOTANICAL NAME	COMMON NAME
ACHILLEA 'MOONSHINE'	FERN LEAF YARROW
ARCTOSTAPHYLOS EDMUNDSII 'BIG SUR'	BIG SUR MANZANITA
ARCTOSTAPHYLOS UVA-URSI 'POINT REYES'	POINT REYES MANZANITA
CEANOTHUS GLORIOSUS 'HEART'S DESIRE'	MOUNTAIN LILAC
ERIOGONUM FASCICULATUM FOLIOLOSUM	CALIFORNIA BUCKWHEAT
ESCHSCHOLZIA CALIFORNICA VAR. MARITIMA	COASTAL CALIFORNIA POPPY
FESTUCA MAIREI	ATLAS FESCUE
LAVANDULA STOECHAS	SPANISH LAVENDER
PENNISETUM SPATHIOLATUM	SLENDER VELDT GRASS
RHAMNUS CALIFORNICA 'SALT POINT'	COASTAL COFFEEBERRY
ROSMARINUS OFFICINALIS 'PROSTRATUS'	CREEPING ROSEMARY
SALVIA CLEVELANDII	CLEVELAND SAGE
SALVIA MELLIFERA	BLACK SAGE

Source: 2015 Master Plan

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

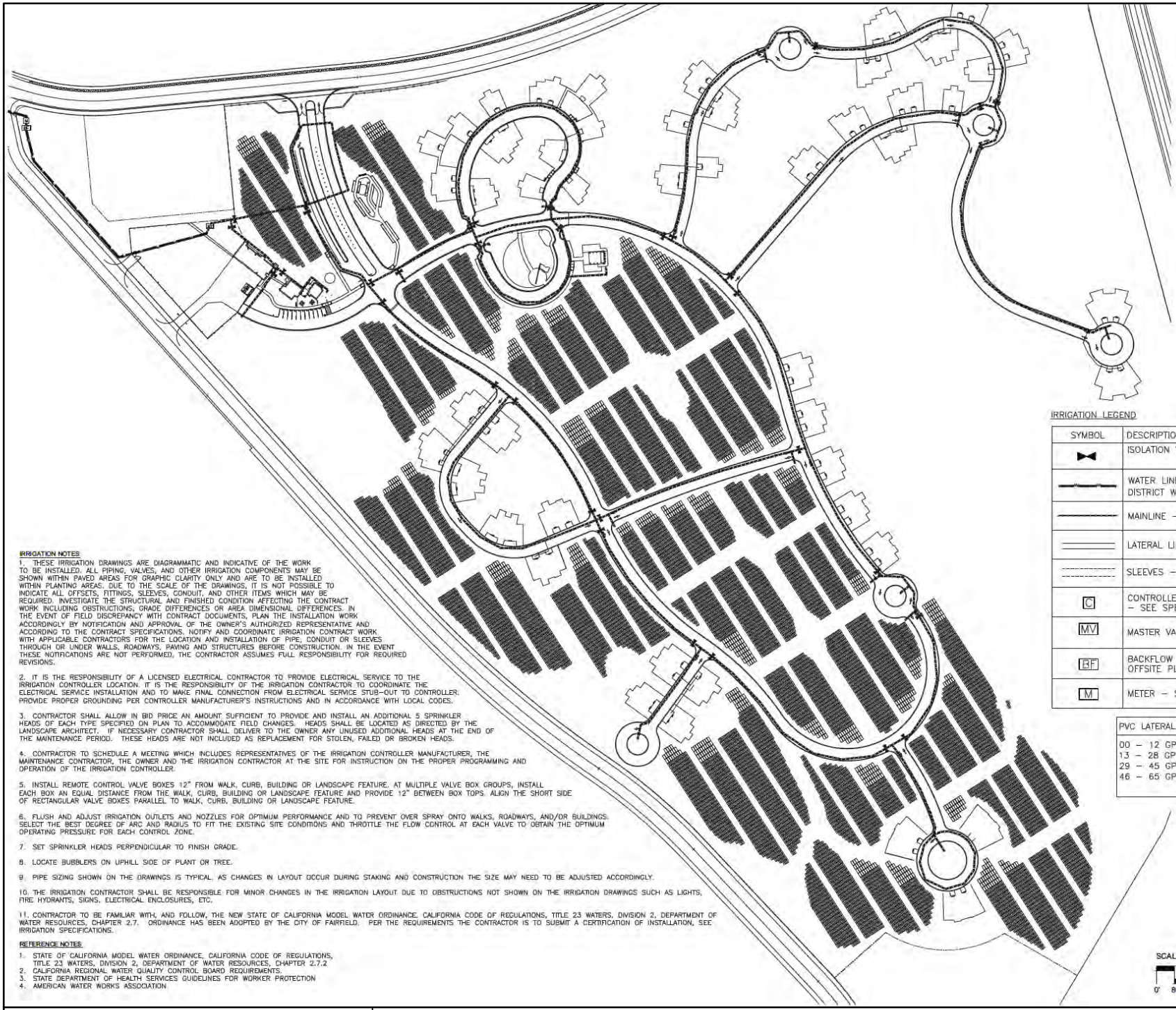
Proposed Project Planting Plan

N

Date 03-07-2019

Figure 2-5

Source: 2015 Master Plan



IRRIGATION LEGEND

SYMBOL	DESCRIPTION	NOTES
	ISOLATION VALVE – SEE SPECS	
	WATER LINE TO MARINA COAST WATER DISTRICT WATER – 2 1"	
	MAINLINE – 2 1" – SEE SPECS	
	LATERAL LINE – SEE SPECS	
	SLEEVES – SCHEDULE 40 PVC	
C	CONTROLLER W/ PEDESTAL ENCLOSURE – SEE SPECS	
MV	MASTER VALVE– 2 1" – SEE SPECS	
BF	BACKFLOW PREVENTER – 2 1" – SEE OFFSITE PLANS	
M	METER – SEE OFFSITE PLANS	

PVC LATERAL LINE SIZING
00 – 12 GPM: 1.0"
13 – 28 GPM: 1.5"
29 – 45 GPM: 2.0"
46 – 65 GPM: 2.5"

TYPICAL VALVE SIZING
00 – 12 GPM: 1.0" VALVE
13 – 28 GPM: 1.5"
29 – 45 GPM: 2.0"

IRRIGATION NOTES

1. THESE IRRIGATION DRAWINGS ARE DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. ALL PIPING, VALVES, AND OTHER IRRIGATION COMPONENTS MAY BE SHOWN WITHIN PAVED AREAS FOR GRAPHIC CLARITY ONLY AND ARE TO BE INSTALLED WITHIN PLANTING AREAS. DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, CONDUIT, AND OTHER ITEMS WHICH MAY BE REQUIRED. INVESTIGATE THE STRUCTURAL AND FINISHED CONDITION AFFECTING THE CONTRACT WORK INCLUDING OBSTRUCTIONS, GRADE DIFFERENCES OR AREA DIMENSIONAL DIFFERENCES. IN THE EVENT OF FIELD DISCREPANCY WITH CONTRACT DOCUMENTS, PLAN THE INSTALLATION WORK ACCORDINGLY BY NOTIFICATION AND APPROVAL OF THE OWNER'S AUTHORIZED REPRESENTATIVE AND ACCORDING TO THE CONTRACT SPECIFICATIONS. NOTIFY AND COORDINATE IRRIGATION CONTRACT WORK WITH APPLICABLE CONTRACTORS FOR THE LOCATION AND INSTALLATION OF PIPE, CONDUIT OR SLEEVES THROUGH OR UNDER WALLS, ROADWAYS, PAVING AND STRUCTURES BEFORE CONSTRUCTION. IN THE EVENT THESE NOTIFICATIONS ARE NOT PERFORMED, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR REQUIRED REVISIONS.

2. IT IS THE RESPONSIBILITY OF A LICENSED ELECTRICAL CONTRACTOR TO PROVIDE ELECTRICAL SERVICE TO THE IRRIGATION CONTROLLER LOCATION. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO COORDINATE THE ELECTRICAL SERVICE INSTALLATION AND TO MAKE FINAL CONNECTION FROM ELECTRICAL SERVICE STUB-OUT TO CONTROLLER. PROVIDE PROPER GROUNDING PER CONTROLLER MANUFACTURER'S INSTRUCTIONS AND IN ACCORDANCE WITH LOCAL CODES.

3. CONTRACTOR SHALL ALLOW IN BID PRICE AN AMOUNT SUFFICIENT TO PROVIDE AND INSTALL AN ADDITIONAL 5 SPRINKLER HEADS OF EACH TYPE SPECIFIED ON PLAN TO ACCOMMODATE FIELD CHANGES. HEADS SHALL BE LOCATED AS DIRECTED BY THE LANDSCAPE ARCHITECT. IF NECESSARY CONTRACTOR SHALL DELIVER TO THE OWNER ANY UNUSED ADDITIONAL HEADS AT THE END OF THE MAINTENANCE PERIOD. THESE HEADS ARE NOT INCLUDED AS REPLACEMENT FOR STOLEN, FAILED OR BROKEN HEADS.

4. CONTRACTOR TO SCHEDULE A MEETING WHICH INCLUDES REPRESENTATIVES OF THE IRRIGATION CONTROLLER MANUFACTURER, THE MAINTENANCE CONTRACTOR, THE OWNER AND THE IRRIGATION CONTRACTOR AT THE SITE FOR INSTRUCTION ON THE PROPER PROGRAMMING AND OPERATION OF THE IRRIGATION CONTROLLER.

5. INSTALL REMOTE CONTROL VALVE BOXES 12" FROM WALK, CURB, BUILDING OR LANDSCAPE FEATURE. AT MULTIPLE VALVE BOX GROUPS, INSTALL EACH BOX AN EQUAL DISTANCE FROM THE WALK, CURB, BUILDING OR LANDSCAPE FEATURE AND PROVIDE 12" BETWEEN BOX TOPS. ALIGN THE SHORT SIDE OF RECTANGULAR VALVE BOXES PARALLEL TO WALK, CURB, BUILDING OR LANDSCAPE FEATURE.

6. FLUSH AND ADJUST IRRIGATION OUTLETS AND NOZZLES FOR OPTIMUM PERFORMANCE AND TO PREVENT OVER SPRAY ONTO WALKS, ROADWAYS, AND/OR BUILDINGS. SELECT THE BEST DEGREE OF ARC AND RADIUS TO FIT THE EXISTING SITE CONDITIONS AND THROTTLE THE FLOW CONTROL AT EACH VALVE TO OBTAIN THE OPTIMUM OPERATING PRESSURE FOR EACH CONTROL ZONE.

7. SET SPRINKLER HEADS PERPENDICULAR TO FINISH GRADE.

8. LOCATE BUBBLERS ON UPHILL SIDE OF PLANT OR TREE.

9. PIPE SIZING SHOWN ON THE DRAWINGS IS TYPICAL. AS CHANGES IN LAYOUT OCCUR DURING STAKING AND CONSTRUCTION THE SIZE MAY NEED TO BE ADJUSTED ACCORDINGLY.

10. THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR MINOR CHANGES IN THE IRRIGATION LAYOUT DUE TO OBSTRUCTIONS NOT SHOWN ON THE IRRIGATION DRAWINGS SUCH AS LIGHTS, FIRE HYDRANTS, SIGNS, ELECTRICAL ENCLOSURES, ETC.

11. CONTRACTOR TO BE FAMILIAR WITH, AND FOLLOW, THE NEW STATE OF CALIFORNIA MODEL WATER ORDINANCE, CALIFORNIA CODE OF REGULATIONS, TITLE 23 WATERS, DIVISION 2, DEPARTMENT OF WATER RESOURCES, CHAPTER 2.7. ORDINANCE HAS BEEN ADOPTED BY THE CITY OF FAIRFIELD. PER THE REQUIREMENTS THE CONTRACTOR IS TO SUBMIT A CERTIFICATION OF INSTALLATION, SEE IRRIGATION SPECIFICATIONS.

REFERENCE NOTES

1. STATE OF CALIFORNIA MODEL WATER ORDINANCE, CALIFORNIA CODE OF REGULATIONS, TITLE 23 WATERS, DIVISION 2, DEPARTMENT OF WATER RESOURCES, CHAPTER 2.7.2
2. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD REQUIREMENTS.
3. STATE DEPARTMENT OF HEALTH SERVICES GUIDELINES FOR WORKER PROTECTION
4. AMERICAN WATER WORKS ASSOCIATION

SCALE: 1" = 80'-0"

0' 80' 160' 320'

N

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Proposed Project Irrigation Plan

Date: 03-07-2019

Figure: 2-6

- Main water line sized according to water pressure conditions and water use requirements for the site, and parallels main roads in landscape buffers;
- Main water line has quick coupler valves every 100 feet to aid in maintenance operations; and
- Design to water within a maximum 12-hour watering window.

Infrastructure

Drainage

Nearly all the existing site runoff and a small amount of off-site runoff currently collect in the retention basin constructed as part of Phase 1. The Reuse Plan requires all new development to contain 100 percent of storm water runoff on-site by retention and percolation. Therefore, future off-site development would be required to capture and accommodate runoff on-site.

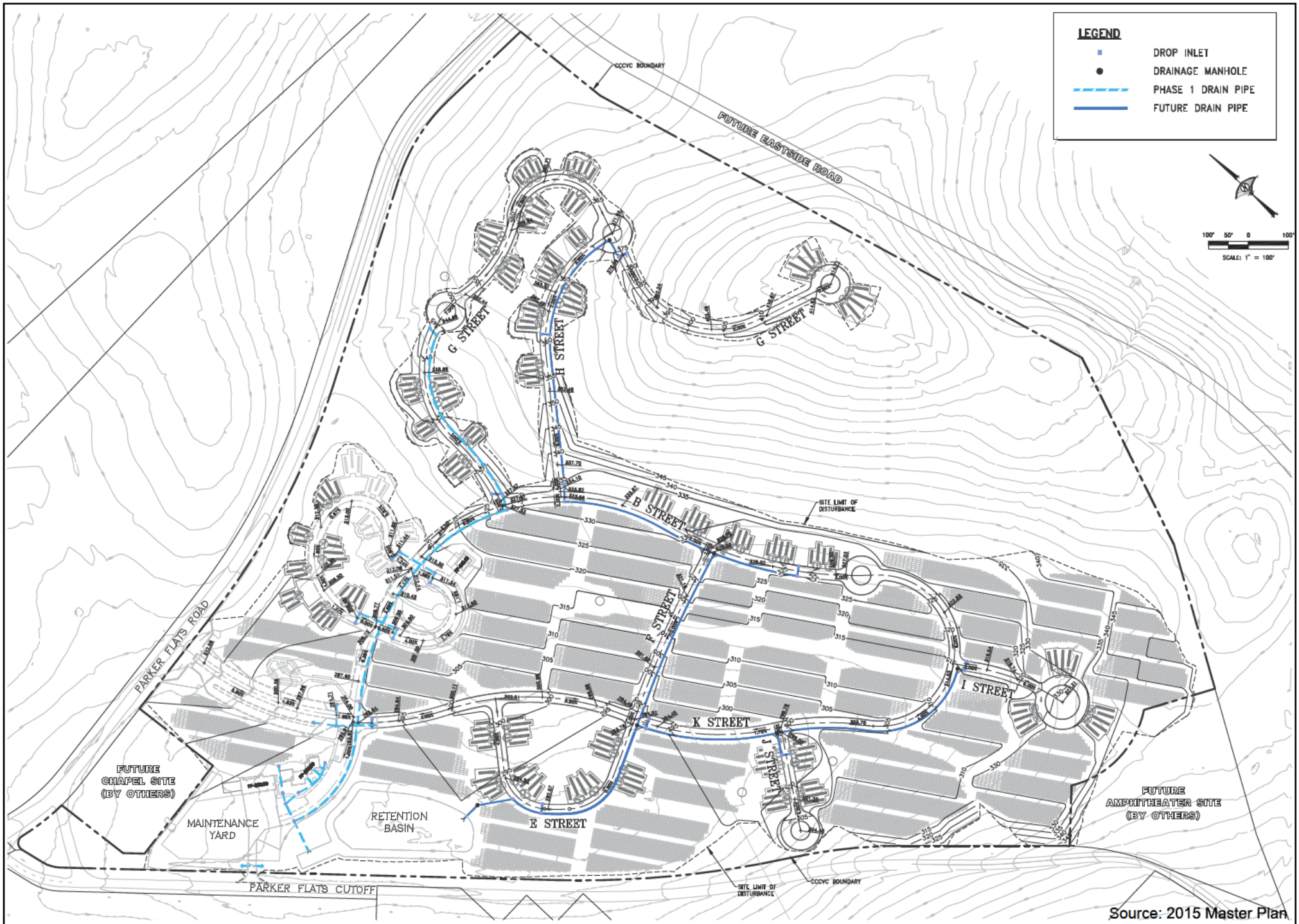
A portion of the project site is identified as being within a 100-year floodplain by the Federal Emergency Management Agency (FEMA). The pre-project mapping was not accurate, and, as part of Phase 1, the floodplain limits were updated and a Letter of Map Revision (LOMR) was issued by FEMA that revised the 100-year floodplain as that area below elevation 286 feet. However, the LOMR was not based on the as-built Phase 1 grading, which created the retention basin below elevation 286 feet. If future phases of the cemetery propose filling in this area, additional excavation would be required to provide the required storage in a reduced footprint.

Drainage improvements under the 2015 Master Plan would use Low Impact Design (LID) methods by conveying runoff in a combination of sheet flow, bio-swales, and conveyance piping (**Figure 2-7, 2015 Master Plan Drainage Plan**). The natural drainage patterns of the project site would be preserved to the maximum extent possible, in line with the stormwater management policies of FORA, Seaside, and the County.

Water

The Marina Coast Water District (MCWD) is responsible for providing water and wastewater service within their service area on the former Fort Ord. The cemetery site is located within the MCWD service area. Long-term water demand for the cemetery is anticipated to be a maximum of 5 acre-feet/year (afy). Of this, the combined potable water demand for the office and maintenance yard is anticipated to be 0.8 afy. The current use at the office building is 0.04 afy. The irrigation demand for the plant establishment period (the first two to three years after construction) is estimated to be up to 4 afy per phase of construction. Since this is only a temporary demand, this would be a temporary allocation and not a long-term allocation. Through the use of local, drought-tolerant species, a long-term water demand of one to two afy for landscape and general maintenance activities may be achieved after the initial plant establishment period for each phase. The cemetery has a 15 afy water supply from the U.S. Department of the Army (Army) until the irrigation needs are met. The cemetery has a total 7 afy of permanent water supply (2 afy from the County and 5 afy from the Army).

The MCWD Pressure Zones D and E are located to the northwest and southwest of the project site, respectively. Both are fed from reservoirs abutting the southwest corner of the project site. The MCWD has stated that the Zone D system currently has the capacity to handle the development of the cemetery. The majority of the cemetery development is within the Zone D service elevation range of 300 to 400 feet. The only conceptual element of the 2015 Master Plan currently outside Zone D is the monument (flag pole) area at elevation 417 feet. If necessary, this area could be served by the Zone D system with the use of a booster pump to provide additional pressure. An existing 24-inch Zone D water main crosses Normandy Road approximately 100 feet west of the intersection of Parker Flats Cut-Off and Normandy



Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Proposed Project Drainage Plan	Date 03-07-2019	Figure 2-7

Road, which is approximately 150 feet west of the project boundary. This is the point of connection for the cemetery.

Water for fire suppression would also be provided by the MCWD. Approximately 6,200 linear feet of water main may be constructed to serve fire hydrants (**Figure 2-8, 2015 Master Plan Water Plan**). Fire hydrants spread throughout the site are assumed to be required, although given the lack of buildings and limited landscaping, it is possible this requirement may be waived.

Sanitary Sewer

The MCWD provides sanitary sewer to the project site. An existing 12-inch sanitary sewer main is located in Normandy Road approximately 120 feet west of the intersection of Normandy Road and Parker Flats Cut-Off (approximately 740 feet west of the main entrance) and flows to the west. A sewer pump station was installed as part of Phase 1 along with a two-inch sewer force main that discharges at the existing MCWD manhole. Additional four-inch gravity sewer lines that lead to the pump station provide service to the administrative complex as well as the maintenance building. Sewage is treated at the Monterey One Water (M1 Water) wastewater treatment plant. The only areas of the project generating sewage are at the administrative complex and maintenance building. Phase 1 built-out the project's sewer infrastructure.

Recycled Water

Seaside requires that the project's irrigation systems be plumbed for reclaimed water in anticipation of the availability of recycled water for the cemetery. The MCWD has installed several trunk lines; however, it is unknown when the system will go online and when recycled water will become available. Recycled water signage would be installed when and if recycled water is available. It is assumed that potable water would be used for irrigation until such time as recycled water is available.

Electrical and Gas

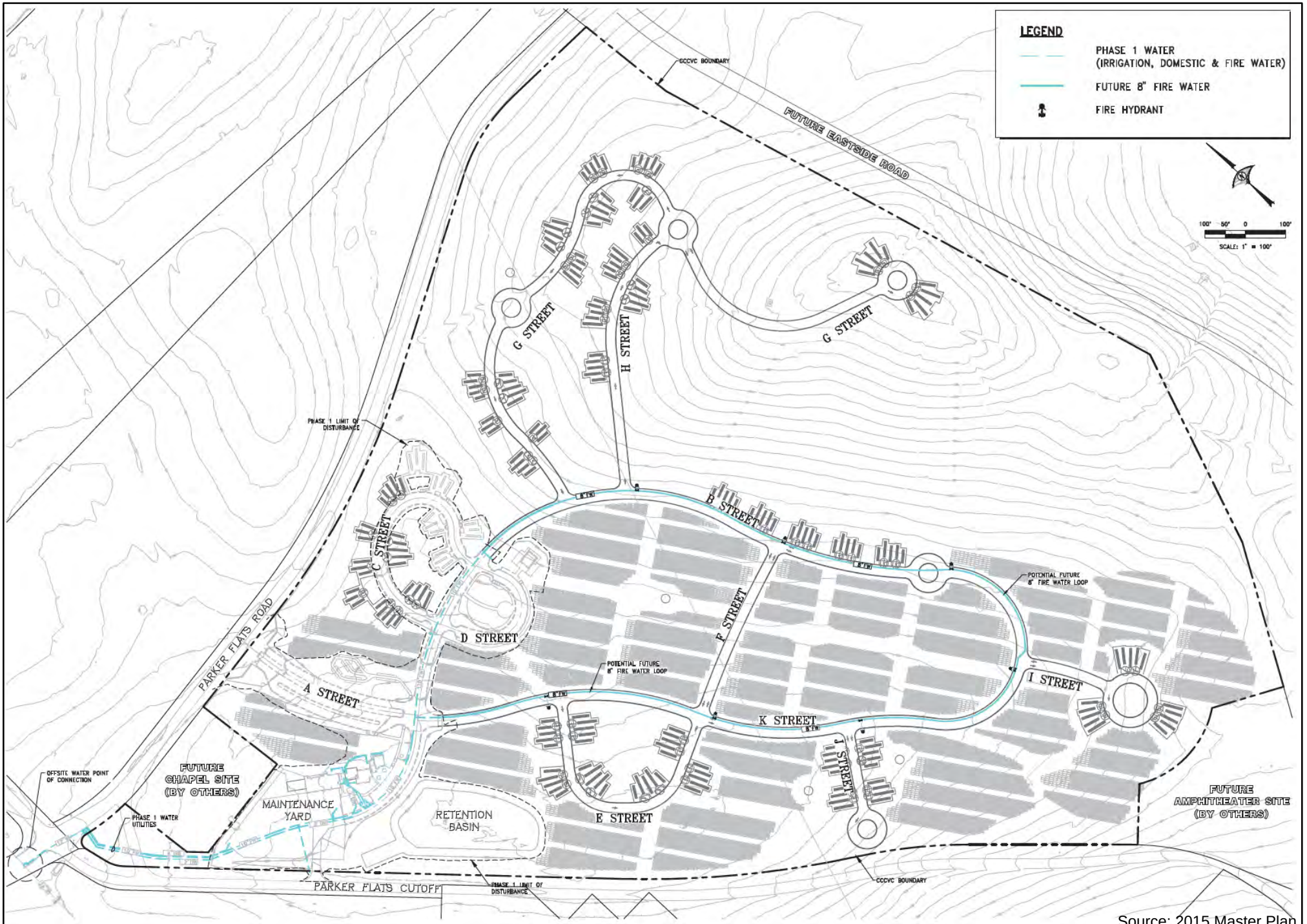
The proposed development is located with the jurisdiction of Pacific Gas and Electric (PG&E) for electric services. Natural gas service is not being provided. Phase 1 constructed the entirety of the cemetery's electric infrastructure.

Off-Site Utility Improvements

All utility points of connection are located on Normandy Road near the project entrance. Water, sewer, electric, and telephone are all located within 150 feet of the project boundary and were connected to as part of Phase 1. The nearest recycled water point of connection is at General Jim Moore Boulevard. It is assumed that the 3,500 linear feet of new reclaimed water main required to connect the project would not be constructed by the cemetery due to its anticipated low irrigation water demand.

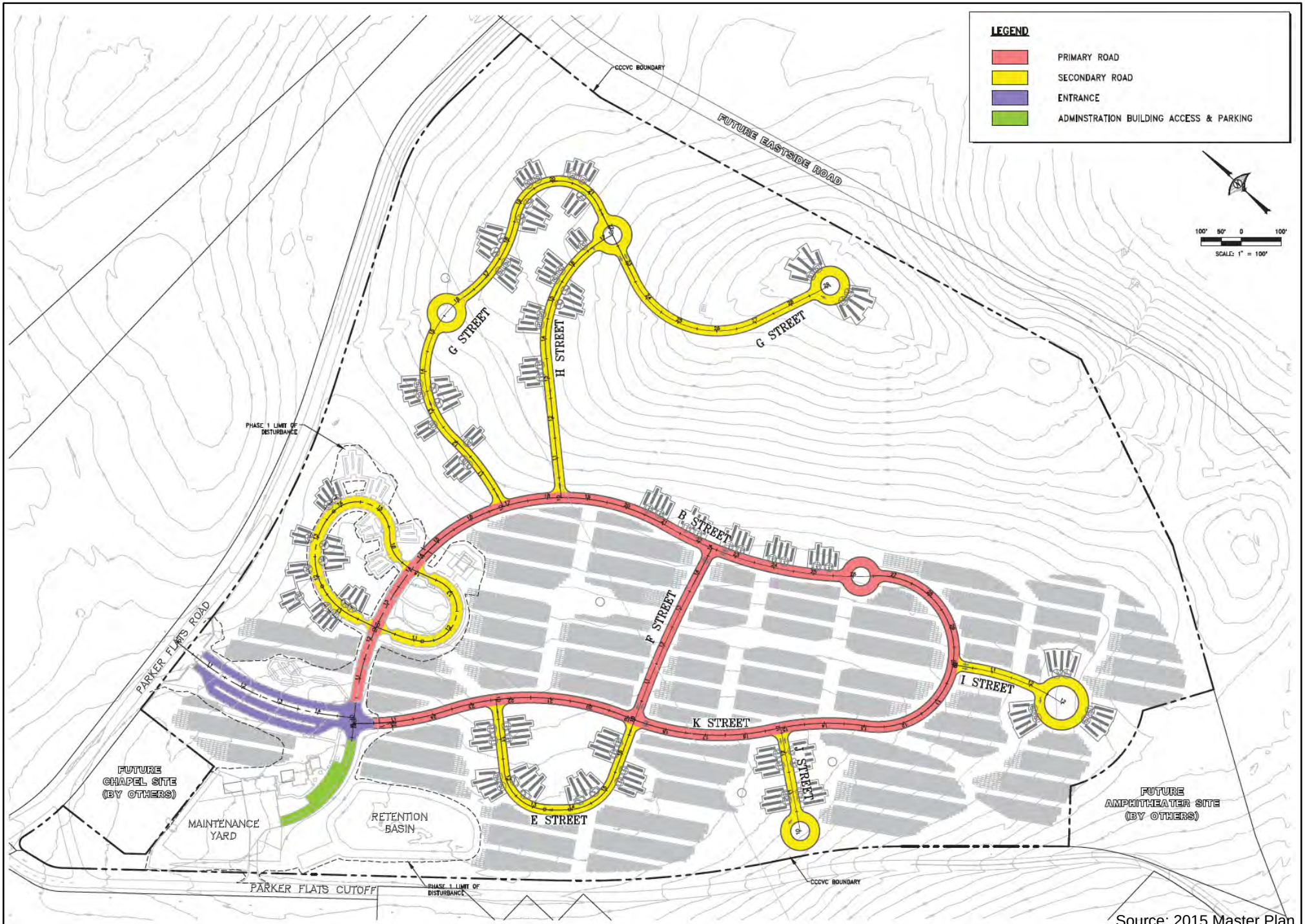
Roadway System

Roadway improvements constructed as part of Phase 1 included a main entry roadway, an access road, a primary road forming a loop, and multiple secondary roadways (**Figure 2-9, 2015 Master Plan Road Layout**). Phase 1 also included a visitor/employee parking area for the administration and maintenance buildings, which consisted of ten standard parking spaces and one accessible parking space. The maintenance yard has a non-public secondary access via Parker Flats Cut-Off, which is normally used for large delivery vehicles only. This secondary access also serves as an emergency vehicle access for the site. Phase 1 provided sidewalks connecting the visitor/employee parking and cortege assembly areas with the administration and maintenance buildings. Sidewalks were also constructed along B Street to connect the administration building to the memorial walk, flag/assembly area, and committal shelter area.



Source: 2015 Master Plan

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Proposed Project Water Plan	Date 03-07-2019	Figure 2-8



Source: 2015 Master Plan

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Proposed Project Road Layout	Date 03-07-2019	Figure 2-9

Future roadway improvements consist of loops and cul-de-sacs to provide access to the additional columbaria, flag plaza, and burial sites. Future roadways would generally be 24-feet wide (face of curb to face of curb), which is the NCA standard. In some cases, roadways may be larger (29-feet wide) to provide emergency access and access compliance.

Off-Site Improvements

As part of Phase 1, Parker Flats Road was widened from Parker Flats Cut-Off to the cemetery entrance. Curb and gutter were installed and provisions were made for possible future sidewalk installation. It is unknown at this time whether the cemetery would be responsible for any additional future frontage improvements along Parker Flats Road. Parker Flats Cut-Off is a rural, two-lane road with no shoulders. This roadway is currently only accessible by authorized vehicles and is not open to the public for motorized vehicular use. A new road, the Northeast Southwest Arterial Connector, is planned for construction along the eastern project boundary. It is intended to serve as an alternative route between Salinas and Seaside. Artillery Hill would serve as a visual and sound buffer for traffic on this future parkway.

Grading

The site has varying terrain and the cemetery layout generally occurs on the less steep western side of the site. The soils are mostly sandy silt. The overall grading seeks to balance the excavation and fill needed (**Figure 2-10, 2015 Master Plan Overall Cut and Fill**). The former Fort Ord, including the project site, was used for training military personnel with equipment and munitions. These training activities left behind munitions and explosives of concern (MEC), specifically unexploded ordnance (UXO) and discarded military munitions (DMM) (please refer to **Section 3-9, Hazardous Materials and Hazards**). The site has been evaluated for the presence of UXO, including a geophysical survey and the site has been cleared for non-residential development (EMC and EDAW, 1997). Removal of hazardous materials at this location is not anticipated; however, UXO and DMM have been documented at the site.

As a result, grading and soil movement cannot occur within a Soils Management Plan area due to a deed restriction for all remediated parcels on the former Fort Ord, including the project site, and ordinances by Seaside and the County regarding digging and excavating on the former Fort Ord. These ordinances require a plan to ensure that any soil from the site is stored on-site or in an acceptable location. In addition, due to the risk of UXO on the site, grading operations in previously undisturbed areas would require direct observation by UXO-trained personnel. A site-specific UXO Plan would be developed during the design phase and included as part of the construction requirements. UXO-trained construction support personnel would be required to be on-site to serve as a consultant to the contractor during all grading and/or excavating operations (Chapter 15.34 City Code and Chapter 16.10 of County Code). These plans would be prepared during the construction document phase for each phase of work.

A unique challenge for cemetery development is that is requires a substantial amount of earthwork and excavation to accommodate the burial sites, particularly the burial crypts, which create a void of approximately 4.5 cubic yards each. Crypt construction requires raising the site in many areas to accommodate this excess fill. In addition, it is necessary that all potential areas that would receive any type of burial be excavated and the soil cleaned, in order to avoid the cost and delay of having unexploded ordinance technicians on-site during excavation of each burial. Ideally, the earthwork would be balanced by phase, though this is not readily achievable. Therefore, moving of materials in following phases within the site may be used to minimize earthwork costs.

Elevations Table			
Cut/Fill	Minimum Elevation	Maximum Elevation	Color
CUT	---	-8	
	-8	-6	
	-6	-4	
	-4	-2	
	-2	0	
FILL	0	2	
	2	4	
	4	6	
	6	8	
	8	---	

240' 120' 0 240'

SCALE: 1" = 240'



Source: 2015 Master Plan

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Proposed Project Overall Cut and Fill	N	Date 03-07-2019	Figure 2-10

Signage

The signage system provides visitors with information, direction, and regulations for the cemetery. Signs are proposed to be located to direct the visitor and where best observable. Directional signs are proposed at key intersections. Section markers are proposed at each corner of the burial sections.

Sustainability

Sustainability is an important feature of the cemetery design. High efficiency mechanical equipment would be provided as well as low usage high-efficiency plumbing features. Finishes would be selected to contain low volatile organic compounds (VOCs), rapidly renewable materials, and recycled content.

Construction

Build-out of the 2015 Master Plan would not occur at one time, rather it would be developed in multiple phases (**Figure 2-3, 2015 Master Plan Phasing Plan**). Each phase is anticipated to be approximately ten years apart for the next 100 years. Each phase would vary in overall size, but development would generally range between three and four acres (**Figure 2-3, 2015 Master Plan Phasing Plan**). The duration of construction for each phase is anticipated to take approximately 12-18 months. Hours of construction would typically be between 8:00 AM and 5:00 PM, excluding Federal holidays.

Each phase would be designed to balance all cut and fill from earthwork (grading) where feasible. No soils would be exported off-site in accordance with deed restrictions and local ordinances. Types of construction equipment anticipated to be used for each phase of construction include graders, excavators, backhoe, loaders, and tractors. The anticipated number of construction workers for each phase would range from 20-30. Staging areas for future phases of development would occur adjacent to the current phase being developed and would be restored to pre-project conditions. Staging areas would be used for staging equipment and supplies, and stockpiling of excavated soils.

Operations and Maintenance

Operations and maintenance (O&M) would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1). Maintenance activities would include: landscaping such as trimming and replanting of trees, shrubs, groundcover, or perennials, as needed; trash and debris removal; cleaning and repainting buildings and structures as needed; irrigation repair (until landscaping is established by phase); cleaning and repairing storm drainage facilities, including the existing retention basin, and maintenance of oil water separator; maintenance of roads, parking, and fencing. Each State cemetery is managed by CalVet personnel in conformance with Federal, State, and regional policies, goals, and objectives. Typical operation activities include burial or inurnment of veterans and eligible family members and the placement and maintenance of a grave marker or niche cover.

Cemetery operations include conducting Memorial Day and other special ceremonies (please refer to discussion on special events below), as well as the care of the graves, structures, and grounds. Operating hours for the cemetery are 8:00 AM to 5:00 PM every day of the year. Currently, there are four employees at the CCCVC (i.e., one manager, one skilled laborer, and two office technicians). However, there are five positions budgeted for Phase 1 and this vacancy may be filled at any time. For Phases 2 and 3, it is anticipated that three additional employees would be needed to operate and maintain the cemetery (i.e., one lead groundskeeper, one skilled laborer, and one associate program analyst). It is anticipated that this hiring trend would continue every couple phases of development through build-out, with an estimated 20 total employees.

It is anticipated that on average approximately ten visitor vehicle trips would occur on-site per day. The number of burial events may fluctuate throughout the week with Fridays and Mondays anticipated being

the busiest days; however, the number of burials would not exceed four events per day. In addition, each burial event would occur during a specific time slot and would not overlap with another burial event. It is anticipated that an average of approximately two burial events would occur per day with an additional 20 to 40 vehicles expected to occur on-site for each burial event. The number of visitors is expected to increase over time as the number of burials increase. It is anticipated that an average of approximately 500 veterans and dependents would be buried at the CCCVC per year.

Typical vehicle trips per days including employees, visitors, and maintenance and services are expected to be approximately 80 vehicles per day with an additional 20 vehicles per day on weekends. This is based on an average of two burial events per day with an average of 30 vehicles per burial. The worst case scenario for typical operations would involve four burial events on a weekend day with an average of 40 vehicles per burial events for a total of 200 vehicles per day.

Special Events

Memorial Day, Veterans Day, and Independence Day are special events that are expected to generate an average of approximately 1,000 visitors per event. These special events would be organized by the local community and off-site parking with shuttle service would be required.

Proposed Phase 2

Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property owned by the State (**Figure 2-11, Phase 2 Site Layout**). Based on demand and available funding, the burial facilities and site location proposed for Phase 2 differ from that described in the Proposed 2015 Master Plan. Based on demand and funding, the facilities in Phase 2 were revised to accommodate 2,000 crypts and 1,700 in-ground cremains, as compared to a combination of 2,875 casket burials and 9,800 columbaria proposed in the 2015 Master Plan. During the preliminary design and planning process, a preference for certain design features and desire to reduce impacts to the natural landscape resulted in further revision to the proposed combination of burial facilities and site layout, as described herein.

The proposed Phase 2 project description is based primarily on the 35% Schematic Design Plans for Phase 2 and the 35% Schematic Design – Design Narrative and Program Information (Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019a; Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019b). A number of scoping comments focused on potential impacts on the land and resources. These comments were considered during design and reflected in the 35% Schematic Design Plan. The proposed Phase 2 facilities have been designed in a manner that takes advantage of the topography and open areas within the existing native vegetation to reduce costs and minimize impacts to the site. Phase 2 of the CCCVC would include the following on-site improvements:

- 1,000 In-Ground Cremains;
- 1,791 Standard Crypts;
- 40 Oversize Crypts;
- Supporting roads and infrastructure; and
- Two memorial walls.

No new structures or mechanical systems are proposed in Phase 2.

PHASING LEGEND

- PHASE 1 (EXISTING)
- PHASE 2
- PHASE 3 (FUTURE)
- PHASE 4 (FUTURE)
- PHASE 6 (FUTURE)

GRAVESITE SUMMARY

PHASE 2 SUMMARY	PROVIDED
CRYPTS	1,791
OVERSIZE CRYPTS	40
IN-GROUND CREMAINS (IGC)	1,000
TOTAL	2,831

DESIGN DESCRIPTION

1. DESIGN HAS GRADING AND CRYPTS WITHIN THE LOMR. BOUNDARY TO BE REDEFINED DURING CLOMR PROCESS.
2. TREES ARE PRESERVED NORTH OF SECTION 1.
3. ELIMINATES 158 TREES (>24" DBH) AND 252 TREES (<24" DBH) = 410.
4. 395 LF OF NEW ROAD.
5. MIN CRYPT ELEVATION IS 294, ALLOWING FOR 8 FEET OF COVER OVER THE LOMR FLOOD ELEVATION 286.
6. IRRIGATION AISLES VARY FROM 3-FT TO 15-FT BASED ON GRADING NEEDS. AISLES OCCUR EVERY 48 FEET.

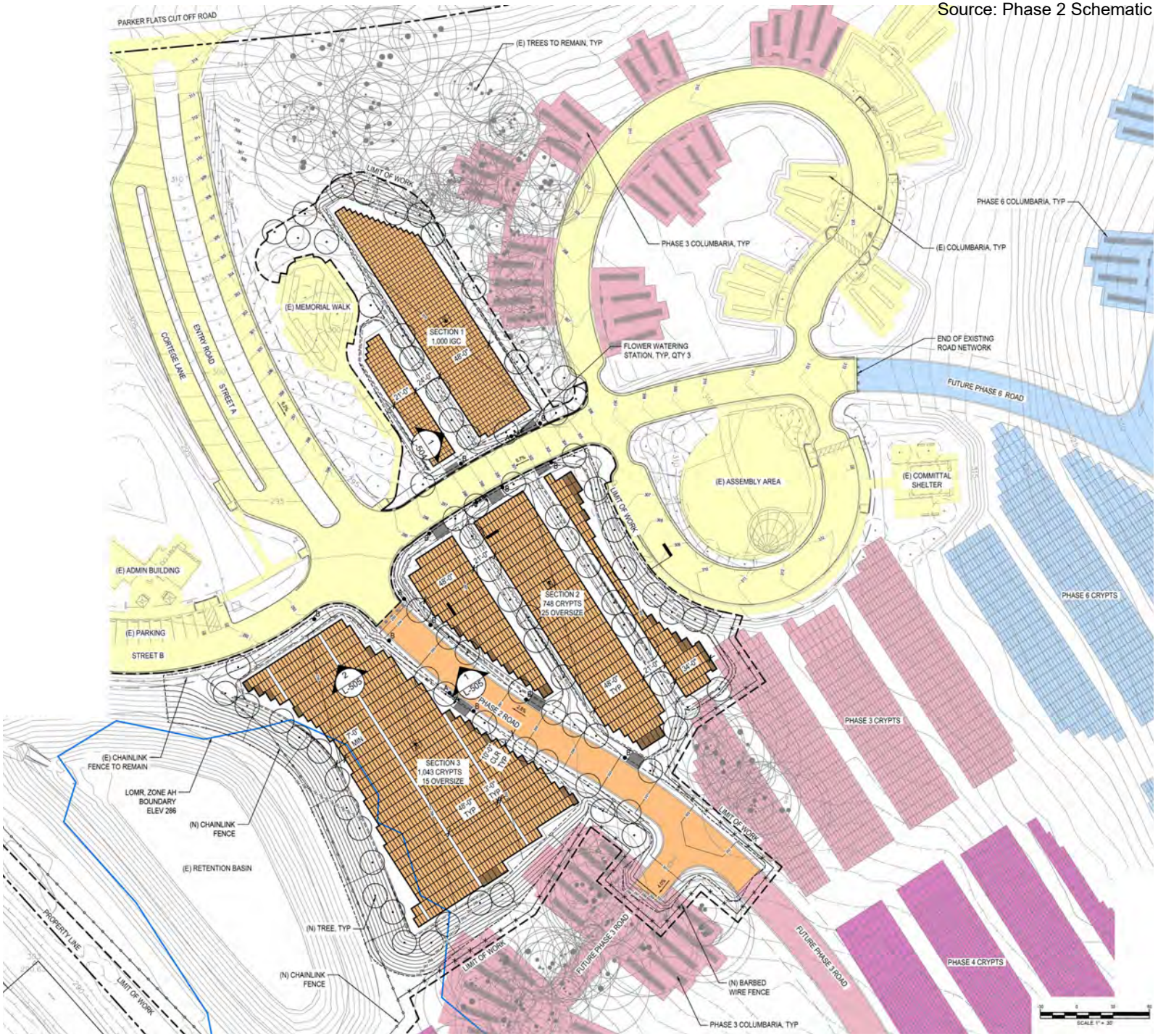
LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- (N) FENCE - 6 FT HIGH VINYL COATED CHAINLINK FENCE W/ PRIVACY SLATS
- (E) FENCE - 6 FT HIGH VINYL COATED CHAINLINK FENCE W/ PRIVACY SLATS
- (N) FENCE - BARBED WIRE
- CRYPTS 3 x 8 FEET
- OVERSIZE CRYPTS 4.5 x 9 FEET
- IN-GROUND CREMAINS (IGC) 3 x 4 FEET
- DECOMPOSED GRANITE W/ METAL HEADER
- STABILIZED DECOMPOSED GRANITE W/ METAL HEADER
- FLOWER WATERING STATION
- (N) TREE
- (E) TREE TO BE RETAINED
- A TYPE A: TRAFFIC AND REGULATORY SIGNAGE
- B TYPE B: DIRECTIONAL SIGNAGE

NOTE: ALL SIGNS TO BE INSTALLED W/ CAST STONE POST AND COLLAR PLATE PER NCA STANDARD. GRAVESITE NUMBERING TO BE GRANITE.

- DIRECTION OF GRAVESITE MARKER

Source: Phase 2 Schematic



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Site Layout

N

Date: 03-07-2019

Figure: 2-11

Site Design

In-Ground Cremains

Section 1 of Phase 2 would be developed east of the existing memorial walk (**Figure 2-11, Phase 2 Site Layout**). Two terraces of in-ground cremains would allow for 1,000 burials with minimal disturbance to the adjacent hillside. Cremains plots would be established as three-foot by four-foot plots with upright headstones. A 15-foot planting aisle would allow for absorption of the three-foot grade change between the two rows.

Unstabilized decomposed granite would cover the ground to eliminate the need for high water-use turf. Low-growing ornamental vegetation and formal landscaping would line the roadway separating the burials from the road edge. A 12-foot access path of stabilized decomposed granite would be provided for access from the roadway. An eight-foot, unstabilized decomposed granite buffer would provide maintenance access along the east side of each burial section.

Crypts

Sections 2 and 3 would be developed south of the existing B Street (**Figure 2-11, Phase 2 Site Layout**). An additional 395 feet (approximately 0.3 acres) of roadway would be added to access these burials and allow for vehicle turn-around. Combined, these sections would include 1,791 standard three-foot by eight-foot double-depth precast concrete crypts and 40 oversize 4.5-foot by nine-foot double-depth precast concrete crypts. Double-depth crypts allow for the placement of two caskets per burial plot. Section 3 would utilize standard three-foot irrigation aisles and maintain a slope of less than two percent across the entire section. Unstabilized decomposed granite would cover the ground to eliminate the need for high water-use turf. Low-growing ornamental vegetation and formal landscaping would line the roadway separating the burials from the road edge.

A 12-foot access path of stabilized decomposed granite would be provided for both visitors and cemetery maintenance from the roadway. An eight-foot unstabilized decomposed granite buffer would provide maintenance access along the edge of each burial section. Crypts would utilize upright headstones.

Landscaping and Irrigation

The Planting Plan for Phase 2 of the CCCVC is shown in **Figure 2-12, Phase 2 Planting Plan**; the proposed landscaping is shown in **Figure 2-11, Phase 2 Site Layout**. The 35% Schematic Design Plans include a minimum of 111 coast live oak trees planted on-site. The plan includes various tree and shrub plantings, including species that are either native to the site or have proven successful in the Phase 1 planting areas. The design strategy employs primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials that require no irrigation once established. These plants reflect the character of Seaside and the County, and would meet the necessary requirement for low water usage. As described above, the cemetery has a limited water supply that would not support the traditional lawns associated with most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and seasonal variation. Hardscape would complement plant material in areas where vehicular or heavy foot traffic is anticipated. Existing oaks would be preserved where possible.

The irrigation system currently uses potable water. Phase 2 irrigation would tie into the existing irrigation mainline (**Figure 2-13, Phase 2 Irrigation Plan**). New irrigation valves would be installed and controlled by the site's existing Rainbird ESP-LXD Controller, which can be expanded for use with up to 200 stations. The current irrigation system makes use of 71 stations.

Source: Phase 2 Schematic



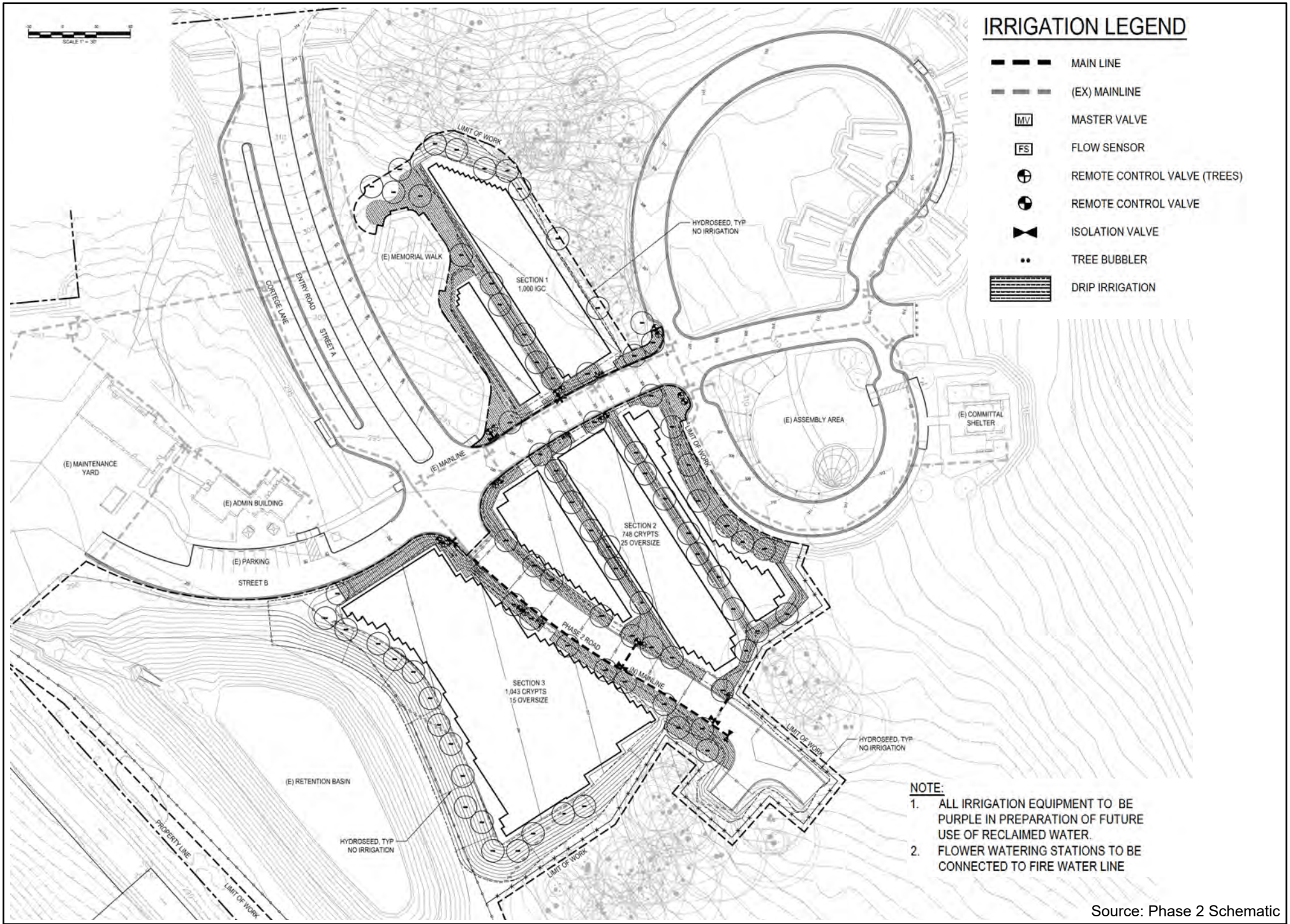
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Planning and Environmental Consulting

Phase 2 Planting Plan

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Date
03-07-2019

Figure
2-12



Source: Phase 2 Schematic

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Irrigation Plan

N

Date
03-07-2019

Figure
2-13

Infrastructure

Drainage

All runoff from Phase 2 development would drain into the existing retention basin located along Parker Flats Cut-Off Road. The existing retention basin was converted from a natural depression during Phase 1 to serve as an earth borrow site and was not designed as a flood control basin for any specific event. Therefore, Phase 2 includes improvements to the retention basin to contain the 100-year flood volume from Phases 1 and 2 and the undeveloped remainder of the cemetery, with a 100-year maximum water surface elevation of 283 feet. The proposed improvements to the basin would meet the requirements developed by the Central Coast Regional Board in Resolution NO. R3-2013-0032 (Post-Construction Management Requirements for Development Projects in the Central Coast Order). Phase 2 of the cemetery falls within watershed management Zone 4. The design improvements to the retention basin would meet the following requirements:

- Infiltrate the runoff generated by the 95th percentile rainfall event (1.2 inches). The bottom of the existing basin would be excavated to ensure infiltration of the 95th percentile storm event runoff within 48 hours.
- 2-year through 100-year post-development runoff values cannot exceed pre-development runoff values. Detention aims at mitigating the impacts of hydromodification. Since the total runoff from the 100-year event would be fully retained within the basin, no additional improvements would be necessary unless warranted by future phases.

As defined in Seaside Municipal Code Section 16.24.070, Seaside requires that storm drain facilities accommodate the 100-year storm event. The storm drain facilities, including the storm drain and retention basin, would be improved to be sized to accommodate 100-year storm event with Phase 2 (**Figure 2-14, Phase 2 Demolition Plan**).

The existing retention basin falls within a FEMA-designated special flood hazard Zone AH, as shown on the effective Flood Insurance Rate Map (FIRM) Panel #06053C0195H (please refer to **Section 3.10, Hydrology and Water Quality** for more information), with a base flood elevation of 286.1 feet. Since the proposed improvements to the basin would not raise the 100-year water surface elevation, a Conditional Letter of Map Revision would not be required from FEMA.

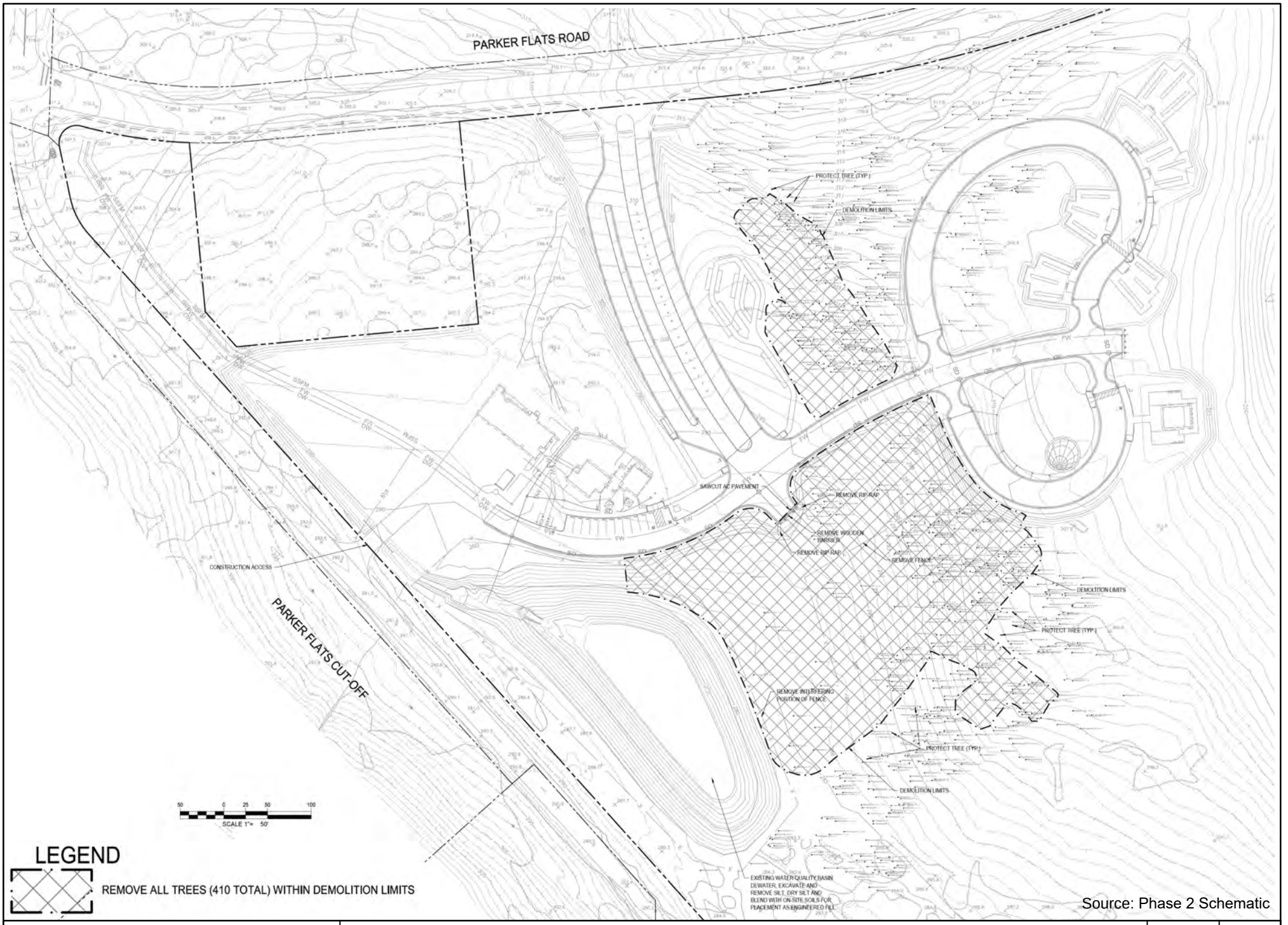
Water

The initial water needed for plant establishment would be provided by the MCWD as part of the existing allocation. Phase 2 irrigation would tie into the existing irrigation mainline (**Figure 2-13, Phase 2 Irrigation Plan**).

The California Department of Forestry and Fire Prevention (CAL FIRE) would be contacted during the design process to determine if a fire water loop system with fire hydrants would be needed in the A Street/B Street loop. There are no combustible structures currently planned for future phases, but due to the heavy brush and dense tree coverage, and the proliferation of wildfires in California in recent years, CAL FIRE may require such a system for combating vegetation fires. An eight-inch fire water mainline would be installed within A Street, if CAL FIRE confirms that a fire loop is needed and a fire hydrant would be installed at the A Street and E Street intersection (**Figure 2-15, Phase 2 Overall Utility Plan**).

Sewer

Since the 2015 Master Plan does not include any buildings or restrooms in future phases, sanitary sewer pipelines are not included in Phase 2.



Source: Phase 2 Schematic

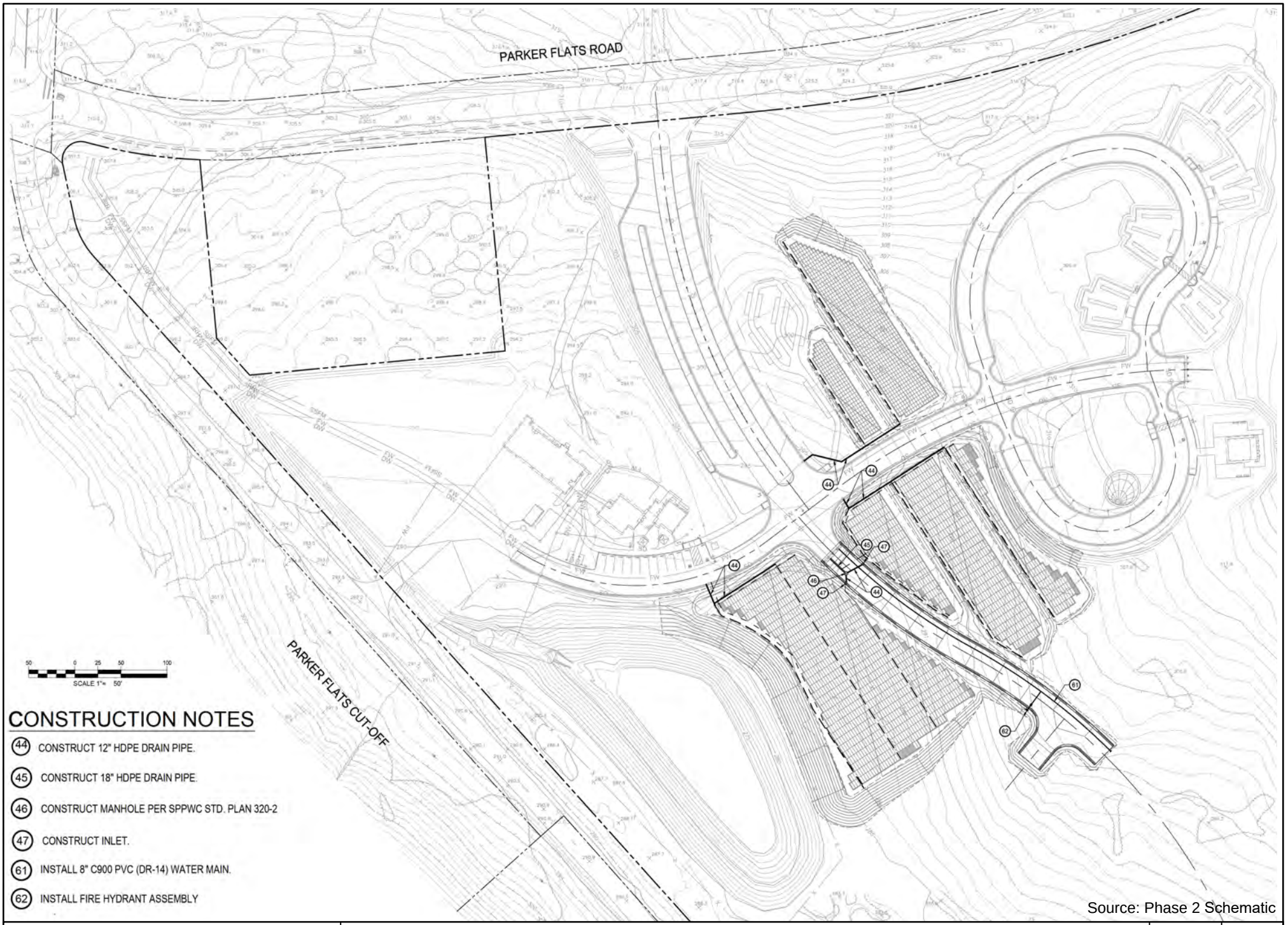
Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Demolition Plan

N

Date
03-07-2019

Figure
2-14



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Overall Utility Plan

N

Date: 03-07-2019

Figure: 2-15

Electric/Phone

Since the 2015 Master Plan does not include any buildings or restrooms in future phases, electrical and telecommunications systems are not proposed to be extended through Phase 2. As described above, the irrigation system for Phase 2 would utilize the existing irrigation control from Phase 1.

Roadway and Access Improvements

Roadway improvements in Phase 2 would be limited to the 395 linear feet of new roadway to access the Phase 2 crypt sections. The street would consist of a 30-foot wide, two-lane roadway with parking allowed on one side. Per USDVA standards, no sidewalks would be provided in the in-ground cremains or crypt sections. A fire-access turnaround would be provided at the end of the new roadway. All burial sections would be accessed via a 12-foot wide stabilized decomposed granite path. Access paths would be sloped less than two percent. Where possible, burial sections have been provided with multiple access points.

Site Preparation

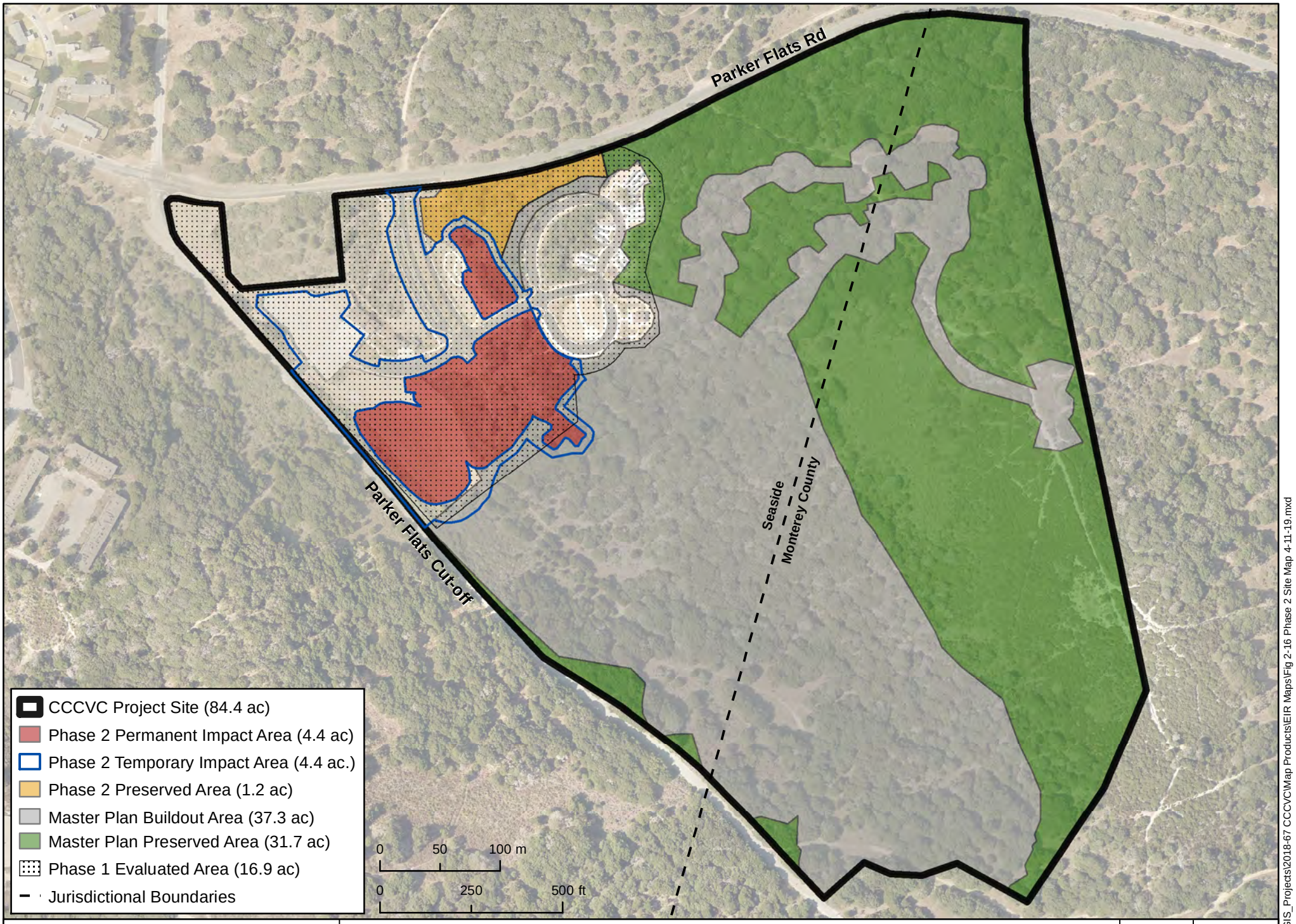
The implementation of Phase 2 involves the development of approximately 4.4 acres within the 84.4-acres cemetery site (**Figure 2-16, Phase 2 Site Map**). Site preparation would primarily consist of ground-disturbance (e.g., grading) and vegetation removal within this area, including improvements within approximately 1.3 acres of the existing retention basin and approximately 3.1 acres of native and non-native groundcover, shrubs, and trees in the remaining area (**Figure 2-14, Phase 2 Demolition Plan**). The basin would be dewatered, excavated, and removed of silt to increase the infiltration and storage capacity of the basin to accommodate the 100-year flood volume for Phases 1 and 2. The silt would be dried and stored in the maintenance yard, and blended with on-site soils for placement as engineered fill. Silt and soil with high organic content will be either stockpiled in the maintenance yard or used for landscaping. In addition, existing rip-rap, interfering fencing, pavement, and wooden barrier would be removed to facilitate construction activities. Within the 3.1 acres of existing vegetation, the 35% Schematic Design Plans estimate the removal of approximately 410 coast live oak trees equal to or greater than six inches in diameter at two feet above the ground. Approximately 443 coast live oak trees equal to or greater than six inches in diameter at two feet above the ground would be retained on-site and protected during construction activities. Most of these trees would be located within a proposed preservation area (**Figure 2-16**).

Removal of hazardous materials at this location is not anticipated; however, UXO and MEC have been documented at the site (please refer to **Section 3.9, Hazardous Materials and Hazards**). The site has been evaluated for the presence of UXO and MEC, including a geophysical survey and the site has been cleared for non-residential development (EMC and EDAW, 1997). A site-specific UXO plan would be developed during the design phase and included as part of the construction requirements. UXO-trained construction support personnel would be required to be on-site to serve as a consultant to the contractor during all grading and/or excavating operations (Chapter 15.34, Seaside Municipal Code).

Grading

As discussed above in the 2015 Master Plan project description, a unique challenge for cemetery development is that it requires a substantial amount of earthwork and excavation to accommodate the burial sites, particularly the burial crypts, which create a void of approximately 4.5 cubic yards each. Crypt construction requires raising the site in many areas to accommodate this excess fill. Therefore, grading on-site would be designed to achieve several goals:

- To respect the natural drainage pattern, vegetation, and contours of the site to the extent feasible.



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Planning and Environmental Consulting

Phase 2 Site Map

N

Date
04-11-2019

Scale
1 in=333.3 ft

Figure
2-16

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 2-16 Phase 2 Site Map 4-11-19.mxd

- To provide overland release that avoids adverse impacts to existing development and gathering areas, and does not result in significant erosion and sedimentation in natural areas.
- Provide ADA paths of travel as required.
- Provide a balanced site to the extent feasible.
- Meet the aesthetics of the landscape design required by CalVet and USDVA.

The 35% Schematic Design Plans estimate that approximately 4,200 cubic yards of fill would be imported, and no soils would be exported, in accordance with deed restrictions (**Figures 2-17, Phase 2 Grading Plan 1 and 2-18, Phase 2 Grading Plan 2**).

Sustainability

Sustainability is an important feature of project design. As described above, Phase 2 would include significant water conservation features. The design would also include using finishes and materials that contain low VOCs, rapidly renewable materials, and recycled content.

Construction

Construction of Phase 2 is anticipated to begin in late 2019 or early 2020 and would take approximately 13 months. Construction activities would require various equipment including, but not limited to, chipper/grinder, dump truck, loader, water truck, bulldozer, compactor, excavator, paving machine, delivery trucks, steel wheel compactor, backhoes, trenchers, golf carts or "gators," and concrete truck and related paving equipment.

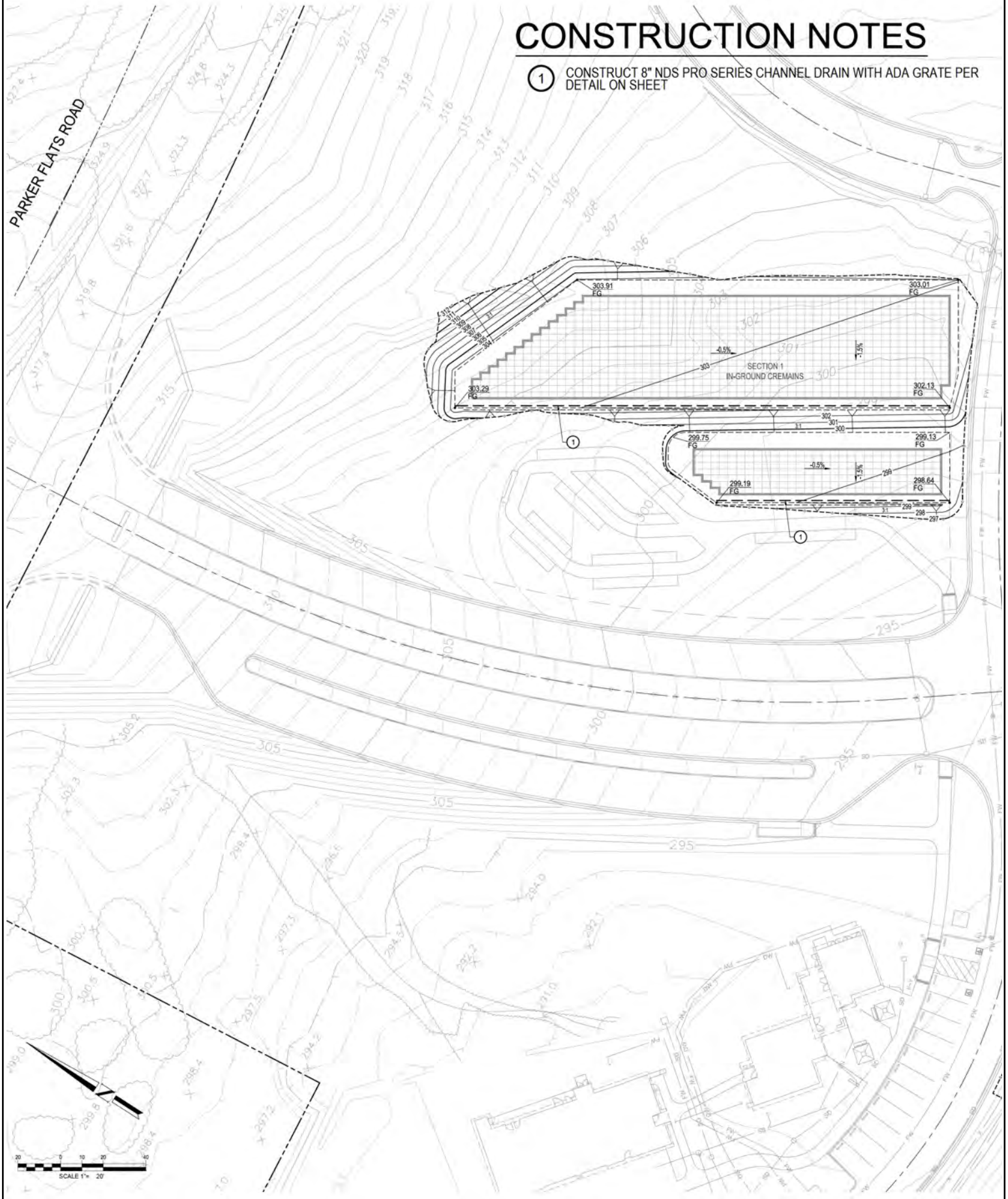
Approximately 4.4 acres would be temporarily impacted during construction to provide staging areas for equipment and supplies, access, and stockpiling (**Figure 2-16, Phase 2 Site Map**). The temporary construction zone (TCZ) is primarily developed and paved; any vegetated areas disturbed during construction would be restored to pre-project conditions. The existing maintenance complex would be used for staging and stockpiling to reduce temporary impacts to existing vegetation.

Approximately 20 construction employees would be required on-site for months one to 11 and 15 employees required for months 12 to 13. The last month would include implementation of the landscape plan and road construction, which would include plantings, irrigation, asphalting, striping, and completing punch list type repairs. **Table 2-3** provides a summary of the construction phasing.

The existing maintenance yard would serve as the construction staging area, with its non-public secondary access via Parker Flats Cut-Off serving as the main access point for construction crew and equipment. The existing main entrance to the CCCVC and existing roadways within the cemetery property would also be used to access various portions of the Phase 2 site during construction. Parker Flats Cut-Off may also provide access to construction equipment while performing improvements to the existing retention basin.

It is anticipated that construction equipment and vehicles would use Parker Flats Road and Normandy Road as the primary local routes to the site. Construction workers would be instructed to enter the site via the maintenance entrance and park in the maintenance yard.

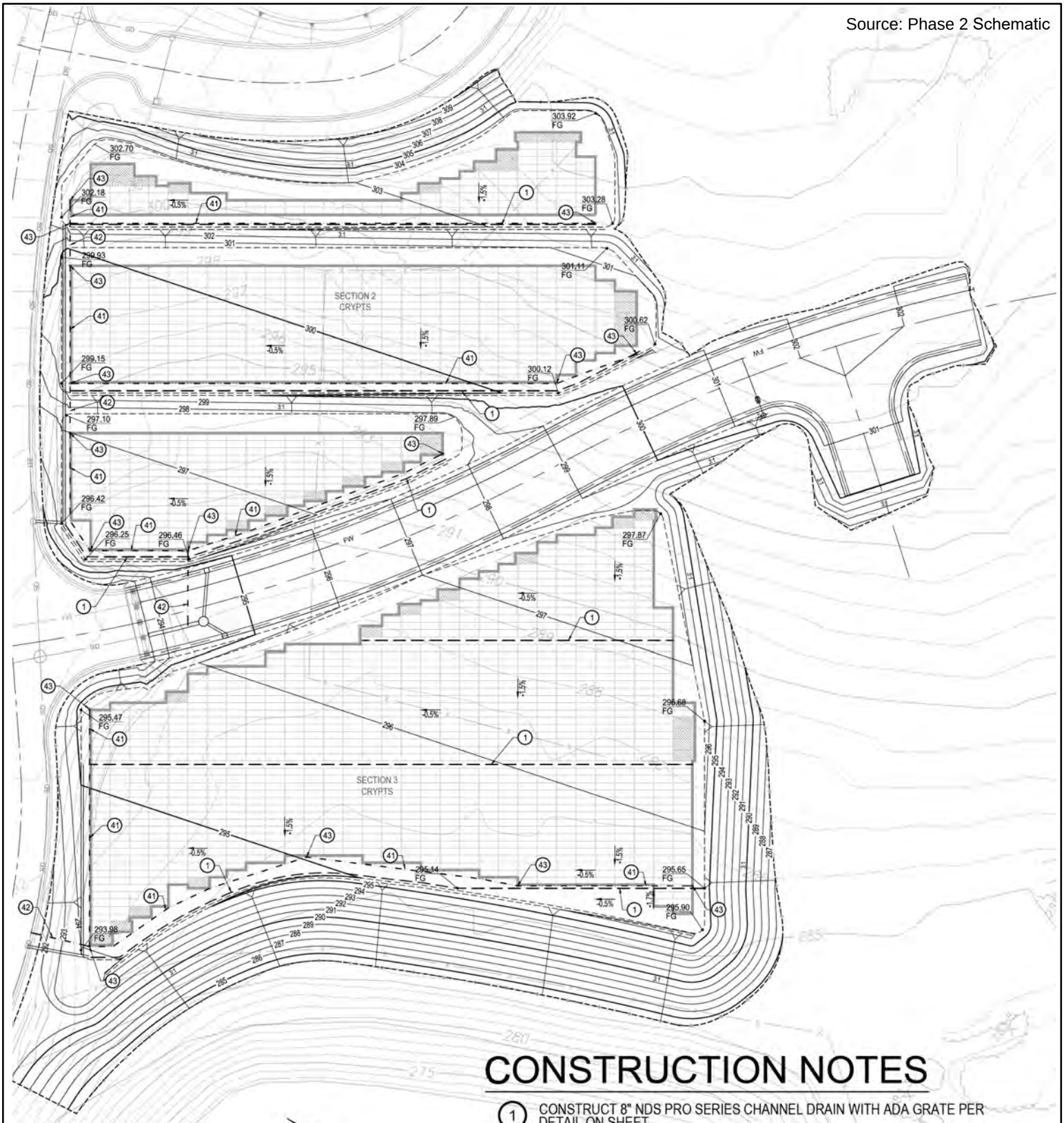
Total water demand during the demolition, site preparation, and grading phases is estimated to be approximately 1,500 gallons per day for a period of 220 days, totaling 330,000 gallons. Construction of paved areas and landscaping would require approximately 500 gallons per day for a period of 40 days, totaling an additional 20,000 gallons of water. The water would come from the MCWD water supply via a hydrant located on-site.



Source: Phase 2 Schematic

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Phase 2 Grading Plan 1	Date 03-07-2019	Figure 2-17

Source: Phase 2 Schematic



CONSTRUCTION NOTES

(1) CONSTRUCT 8" NDS PRO SERIES CHANNEL DRAIN WITH ADA GRATE PER DETAIL ON SHEET

(41) INSTALL 4" PERFORATED PVC PERIMETER PIPE SEE DETAIL ON SHEET C-501.

(42) INSTALL 4" HDPE NON-PERFORATED PIPE.

(43) CONSTRUCT CLEANOUT PER DETAIL ON SHEET C-501.

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Phase 2 Grading Plan 2	Date 03-07-2019	Figure 2-18

Table 2-3. Construction Schedule (Anticipated Start Date Late 2019/Early 2020, 13 months)

Construction Phase	Duration (Days)	Equipment	Number of Construction Employees	Number of Vehicle Trips per Day
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20	20 Worker Trips/Day 525 Haul Truck Trips[1]
Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20	20 Worker Trips/Day
On-Site Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15	15 Worker Trips/Day 50 Haul Truck Trips[2]

[1] Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.
[2] Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5-inch application material thickness) and an average haul truck capacity of 8 cubic yards.

Operations and Maintenance

Operations and maintenance during Phase 2 would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1). Maintenance activities would include: landscaping such as trimming and replanting of trees, shrubs, groundcover, or perennials, as needed; trash and debris removal; cleaning and repainting buildings and structures as needed; irrigation repair (until landscaping is established); cleaning and repairing storm drainage facilities, including the existing retention basin, and maintenance of oil water separator; maintenance of roads, parking, and fencing. Each State cemetery is managed by CalVet personnel in conformance with Federal, State, and regional policies, goals, and objectives. Typical operation activities include burial or inurnment of veterans and eligible family members and the placement and maintenance of a grave marker or niche cover.

Cemetery operations include conducting Memorial Day and other special ceremonies (see below), as well as the care of the graves, structures, and grounds. Operating hours for the cemetery are 8:00 AM to 5:00 PM every day of the year. Currently, there are four employees at the CCCVC (i.e., one manager, one skilled laborer, and two office technicians). However, there are five positions budgeted for Phase 1 and this vacancy may be filled at any time. For Phases 2 and 3, it is anticipated that three additional employees would be needed to operate and maintain the cemetery (i.e., one lead groundskeeper, one skilled laborer, and one associate program analyst). For the purposes of this analysis, it is assumed that three additional employees would be hired at the start of Phase 2 operation.

Visitation may increase with the implementation of Phase 2. Visitation is allowed between the hours of 8:00 AM and 5:00 PM every day of the year. It is anticipated that on average approximately ten visitor vehicle trips would occur on-site per day. The number of burial events may fluctuate throughout the week

with Fridays and Mondays anticipated being the busiest days; however, the number of burials would not exceed four events per day. In addition, each burial event would occur during a specific time slot and would not overlap with another burial event. It is anticipated that an average of approximately two burial events would occur per day with an additional 20 to 40 vehicles expected to occur on-site for each burial event. The number of visitors is expected to increase over time as the number of burials increase. It is anticipated that an average of approximately 500 veterans and dependents would be buried at the CCCVC per year.

Typical vehicle trips per day including employees, visitors, and maintenance and services are expected to be approximately 80 vehicles per day with an additional 20 vehicles per day on weekends. This is based on an average of two burial events per day with an average of 30 vehicles per burial. The worst case scenario for typical operations would involve four burial events on a weekend day with an average of 40 vehicles per burial events for a total of 200 vehicles per day.

Special Events

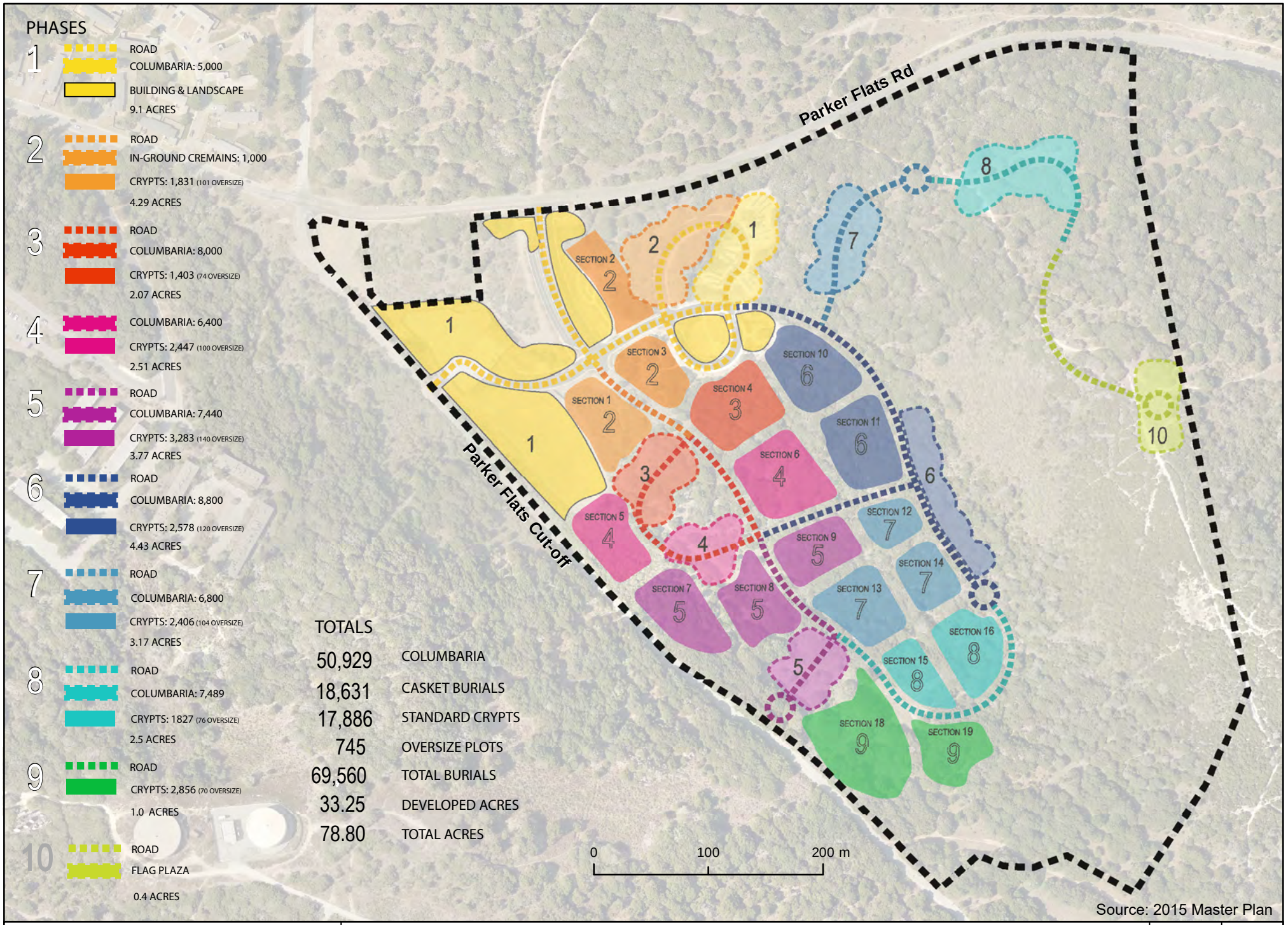
Memorial Day, Veterans Day, and Independence Day are special events that are expected to generate an average of approximately 1,000 visitors per event. These special events would be organized by the local community and off-site parking with shuttle service would be required.

2.4.2 Alternative 2: Reduced CCCVC 2015 Master Plan

The final burial count in the Proposed CCCVC 2015 Master Plan exceeds the recommended 100-year count by approximately 36,000 burials, as set forth by the USDVA (2015 Master Plan, page 42; 2008 Master Plan, page 1-1 of Volume I and page 6.0-A3 of Volume II). Therefore, Alternative 2 was developed to accommodate the recommended 100-year count, which would be approximately 69,560 burials. As a result, Alternative 2 would reduce the number of phases and overall footprint of the 2015 Master Plan. **Table 2-4** enumerates the number of crypts and columbaria to be constructed with each phase, which accommodate a similar percentage of columbarium for cremains and in-ground casket burials (approximately 73 percent and 27 percent, respectively). Phases 8 and 9 would be reduced, and Phases 10 and 11 would be eliminated (**Figure 2-19, Alternative 2: Reduced CCCVC Master Plan**). However, the completion of the Flag Plaza on top of Artillery Hill and its access road would remain in the plan.

Table 2-4. Alternative 2: Reduced CCCVC 2015 Master Plan Phasing

Phase	Acres	Crypts	Columbaria
1	9.1	0	5,000
2	4.29	1,831	1,000*
3	2.07	1,403	8,000
4	2.51	2,447	6,400
5	3.77	3,283	7,440
6	4.43	2,578	8,800
7	3.17	2,406	6,800
8	2.5	1,827	7,489
9	1.0	2,856	
10	0.4		
TOTAL	33.24	18,631	50,929
* Phase 2 would be the same as proposed in Alternative 1. Please note that 1,000 columbaria are not proposed in this alternative or Alternative 1. This number reflects the number of proposed in-ground cremains.			



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Alternative 2: Reduced CCCVC 2015 Master Plan

N

Date 03-07-2019

Figure 2-19

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Fig 2-2 - Master Plan Site Plan.mxd

2.4.3 Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 was developed to accommodate CalVet and USDVA's original request that Phase 2 provide 2,000 crypts and 1,700 in-ground cremains, an increase of 869 burials from the proposed project. The Alternative 3 site plan is shown in **Figure 2-20, Alternative 3: CCCVC Master Plan – Modified Phase 2**. The plots sizes would be the same as the proposed project. This alternative would be located in the same general area as the proposed project. This alternative incorporates smaller groupings of in-ground cremains to in-fill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. Therefore, this alternative would have a larger disturbance footprint compared to the proposed project. However, the grading quantities would be similar to the proposed project since both include a similar development footprint on the adjacent hillside. As a result, Alternative 3 would impact a similar number of coast live oak trees as the proposed project; approximately 411 trees would require removal. This concept would require visitors to walk through the memorial walk in order to access the new burials. It provides minimal buffer from the cortege area, memorial walk, and main entrance road.

2.4.4 Alternative 4: No Action Alternative

CEQA and NEPA require the discussion of a No Action Alternative in an EIR and EA. Under the No Action Alternative, the proposed project would not be constructed and no physical changes to the site would occur. There would be no change in the current availability of veteran-specific burial space in the State of California. The gravesite capacity would eventually be depleted at the CCCVC. Veterans and their families in the Monterey Bay Region would be underserved in the future; in many cases, this would require veterans and their families to either travel more than 100 miles to reach a National or State Veterans Cemetery or use a private cemetery for burials. Furthermore, the No Action Alternative would create a hardship for the survivors of deceased veterans for attending the funeral and for grave visitation, because of the distances between homes and the burial sites. If veterans and their families must resort to private burials, they are deprived of the honor and privilege bestowed upon them by a grateful nation for their service to their country.

The No Action Alternative would limit CalVet's ability to implement a key objective of its Strategic Plan, which is to "provide for deceased veterans and their families through the development and administration of additional State Veterans Cemeteries."

GRAVESITE SUMMARY - ALT 3

PHASE II SUMMARY	PROVIDED
CRYPTS	1,960
OVERSIZE CRYPTS	40
IN-GROUND CREMAINS (IGC)	1,700
TOTAL	3,700

ASSUMPTIONS

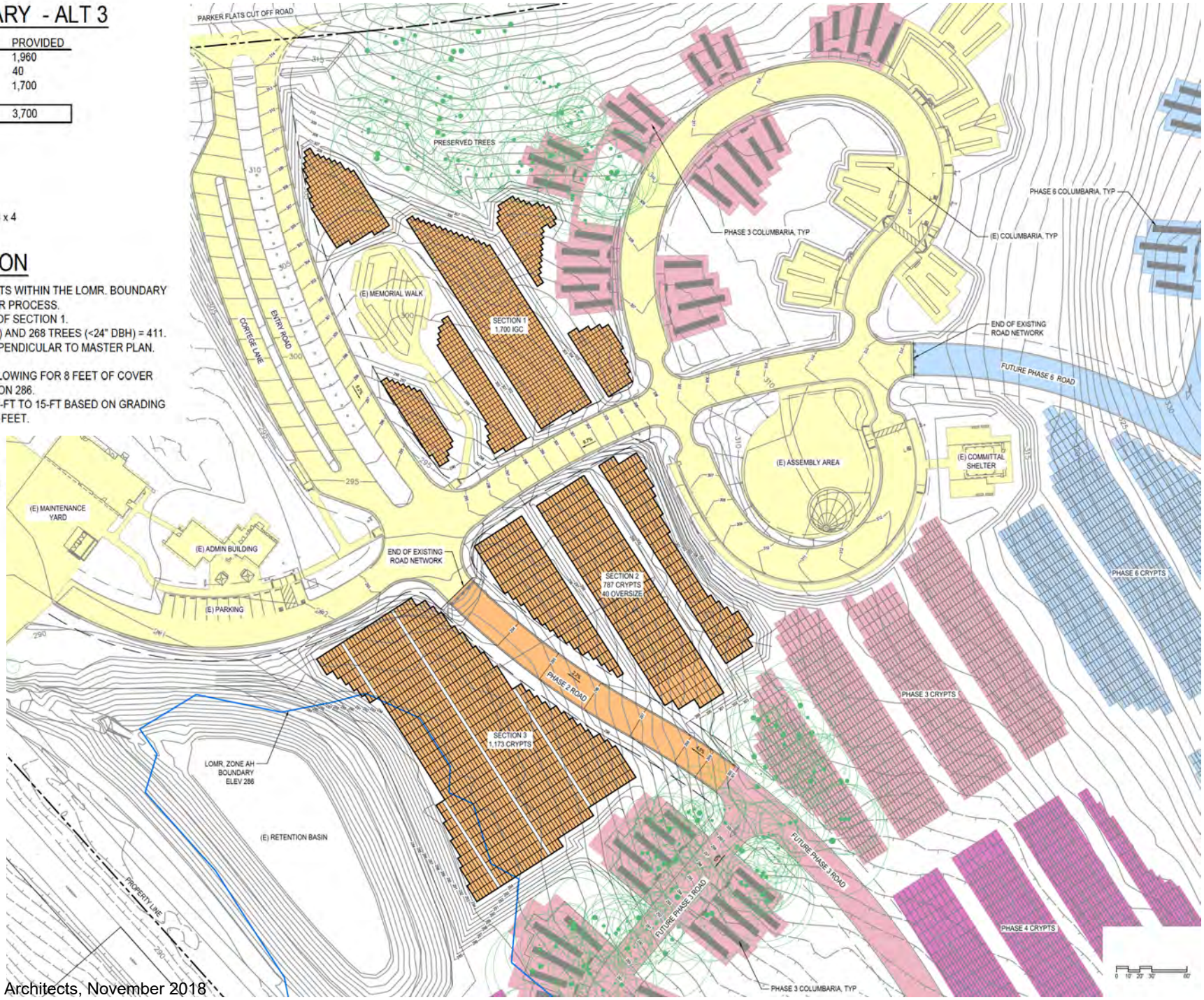
1. CRYPTS SIZE 3 x 8
2. OVERSIZE 5 x 10
3. IN-GROUND CREMAIN (IGC) SIZE 3 x 4

DESIGN DESCRIPTION

1. DESIGN HAS GRADING AND CRYPTS WITHIN THE LOMR. BOUNDARY TO BE REDEFINED DURING CLOMR PROCESS.
2. TREES ARE PRESERVED NORTH OF SECTION 1.
3. ELIMINATES 143 TREES (>24" DBH) AND 268 TREES (<24" DBH) = 411.
4. ORIENTATION OF CRYPTS IS PERPENDICULAR TO MASTER PLAN.
5. 275 LF OF NEW ROAD.
6. MIN CRYPT ELEVATION IS 294, ALLOWING FOR 8 FEET OF COVER OVER THE LOMR FLOOD ELEVATION 286.
7. IRRIGATION AISLES VARY FROM 3-FT TO 15-FT BASED ON GRADING NEEDS. AISLES OCCUR EVERY 48 FEET.

PHASING LEGEND

- PHASE 1 (EXISTING)
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 6



Source: RHAA Landscape Architects, November 2018

2.5 ALTERNATIVES ELIMINATED FROM CONSIDERATION

Several other alternatives to the proposed project were considered; however, during the evaluation of these alternatives, it was determined that they did not meet the purpose and need or objectives identified in **Section 2.2.2** above and were not reasonable in the context of the criteria identified in **Section 2.3.1**. The following section represents a brief description of the alternatives considered but eliminated from further consideration.

2.5.1 CCCVC 2008 Development Master Plan

The 2008 Master Plan does not incorporate Phase 1 of the CCCVC as built. As a result, the plan is outdated and does not reflect current conditions. In addition, the site plan has a greater development footprint than the 2015 Master Plan, which would result in increased environmental impacts. The 2008 Master Plan does not meet the objective to "incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs." It also would not avoid or substantially reduce one or more potentially significant impacts of the proposed project. For these reasons, this alternative was not carried forward in the EIR/EA analysis.

2.5.2 Different Location

Public comments identified the need to analyze alternatives to the proposed project, including different locations, given the difficulty of mitigating for impacts to large areas of coast live oak woodland, steep topography of the site, and unknown munitions hazards. Based on these public comments, an alternative was developed that reduces the 2015 Master Plan footprint and is being analyzed in this EIR/EA (please refer to **Section 2.4.2., Alternative 2: Reduced CCCVC 2015 Master Plan**). One suggested alternative location was the former Beach Ranges on the former Fort Ord. This site is property of the California Department of Parks and Recreation (California State Parks) and designated as a State Park (the Fort Ord Dunes State Park). Relocating the in-ground burials to this site may result in an increase in environmental impacts due to the presence of special-status species within the park and the site could be subject to sea level rise and coastal erosion. In addition, there would be significant legal challenges in changing the use of that public site. The State owns the 84-acre CCCVC property and Phase 1 has been completed. It would also be difficult for the State to acquire additional property elsewhere when it has already been provided a sufficient acreage to develop the CCCVC. It would be most logical to keep the cemetery on one property to reduce environmental impacts. As described above, the potential impacts associated with unknown military munitions have been addressed. The property has been remediated and the State would be required to prepare and implement plans and procedures related to reducing impacts from unexploded ordinance. For these reasons, this alternative was not carried forward in the EIR/EA analysis.

2.5.3 Phase 2 "Alternative 1"

In the preliminary design phase for Phase 2, the design team developed "Alternative 1," which most closely followed the 2015 Master Plan for the burial development north of the existing roadway. To meet the originally outlined quantity of 1,700 in-ground cremains, the development would extend deep within the northern hillside, requiring the elimination of many coast live oak trees and heavy regrading. The development would also require reallocating area previously planned for future columbaria as in-ground cremains. The alternative proposed 2,000 crypts and 1,700 in-ground cremains. This alternative would

require the removal of 466 trees. This alternative would result in an increase in environmental impacts and would not meet the Phase 2 objective of incorporating "the visual qualities and characteristics of the local landscape and native vegetation, working with the existing topography and open areas with existing native vegetation as much as possible, while meeting the programmatic needs." Therefore, this alternative was not carried forward for analysis.

2.5.4 Phase 2 "Alternative 2"

In the preliminary design phase for Phase 2, the design team also developed "Alternative 2," which explored smaller groupings of in-ground cremains to in-fill the open space surrounding the existing memorial walk. This alternative would result in a larger development footprint, and, thus, result in an increase in ground-disturbance activities. The development would require some regrading of the adjacent hillside and removal of 403 trees. The alternative proposed 2,000 crypts, 1,700 in-ground cremains. This alternative would require visitors to walk through the memorial walk in order to access the new burials. It provided minimal buffer from the cortege area, memorial walk, and main entrance road. This alternative would not avoid or substantially reduce one or more potentially significant impacts of the proposed project. For these reasons, this alternative was not carried forward in the EIR/EA analysis.

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Chapter 3.0 ENVIRONMENTAL SETTING AND ENVIRONMENTAL IMPACTS

3.1 INTRODUCTION

This chapter characterizes the environmental setting and environmental impacts for the proposed project and alternatives, including the No Action Alternative. This chapter provides a program-level analysis of the physical environmental effects of implementation the Proposed 2015 Master Plan and Alternative 2: Reduced 2015 Master Plan; and a project-level analysis of the physical environmental effects of implementing the Proposed Phase 2 and Alternative 3: CCCVC Master Plan -- Modified Phase 2. This chapter describes the environmental setting, assesses impacts, and identifies mitigation measures for significant impacts.

This chapter relies on existing information and analyses primarily from the following documents, which describe the resources of the former Fort Ord, jurisdictions located therein, and planned development activities; additional data sources to support specific resource discussions are cited in the text:

- Final Initial Study and Mitigated Negative Declaration/Environmental Assessment and Response to Comments, California Central Coast Veterans Cemetery Project – Phase 1 (ECORP, 2014a);
- Fort Ord Reuse Plan (Reuse Plan) and EIR (EMC and EDAW, 1997);
- City of Seaside General Plan (City of Seaside, 2003) and EIR (City of Seaside and Cotton/Bridges/Associates, 2004); and
- County of Monterey General Plan (County of Monterey, 2010a) and EIR (ICF, 2010).

The analysis contained in this chapter evaluates the potential physical effects associated with implementation of the proposed project and alternatives that may directly, indirectly, or cumulatively affect the environment in accordance with State CEQA Guidelines (Section 15064(d)) and CEQ NEPA Regulations (40 CFR 1508.8). CEQA and NEPA require that the direct, indirect, and cumulative effects of proposed actions be assessed and disclosed. For the purposes of this EIR/EA, the terms "effects" and "impacts" are used interchangeably (CEQA Guidelines 15358 and 40CFR 1508.8). The CEQA Guidelines and NEPA Regulations define three types of effects (or impacts):

1. Direct effects are caused by the action and occur at the same time or place (NEPA 40 CFR 1508.8(a) and CEQA Guidelines 15064(d)(1)).
2. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (NEPA 40 CFR 1508.8). Indirect effects may include growth inducing effects and other effects related to induced change in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (CEQA Guidelines Section 15358(a)(2)). If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect change in the environment (CEQA Guidelines Section 15064(d)(2)).
3. Cumulative impact is an impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what entity (Federal, non-Federal, or private) is taking the actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a

period of time (NEPA 40 CFR 1508.7 and CEQA Guidelines Section 15355). Please refer to **Chapter 4, Other Statutory Considerations** for the cumulative impact analysis.

Direct and indirect impacts can also vary in duration and result in temporary, short-term, and long-term effects on the physical environment. A temporary effect would occur only during the activity. A short-term effect would last from the time an activity ceases to some intermediate period of approximately one to five years. A long-term or permanent effect would last longer than five years after an activity ceases. Long-term effects may be the result of ongoing maintenance and operation of a project or may result in a permanent change in the condition of a resource, in which case it could be considered a permanent effect.

3.1.1 Environmental Baseline

The environmental setting for each resource topic evaluated in this chapter serves as the environmental baseline for the impact analysis. The baseline represents the resource conditions and best available information at the time each resource topic was evaluated for this Draft EIR/EA. The environmental baseline represents the physical conditions or environmental setting by which an action's physical impacts are evaluated. Clearly identifying the environmental baseline is an important component of the CEQA/NEPA process and ensures that the potential effects of an action are evaluated against the same environmental conditions.

The effects of the proposed project (Alternative 1), the two action alternatives (Alternatives 2 and 3), and the no action alternative (Alternative 4) were determined by comparing estimates of resulting conditions with baseline conditions. While the general purpose and intent of establishing a baseline are similar under CEQA and NEPA, the definition of baseline conditions differs between CEQA and NEPA. The State CEQA Guidelines contain specific requirements related to the identification of the appropriate baseline. CEQA Guidelines Section 15125(a) require that an EIR include a description of "the physical environmental conditions in the vicinity of a project, as they exist at the time...environmental analysis is commenced..." These environmental conditions normally constitute the baseline physical conditions by which the CEQA lead agency determines whether an impact is significant. Generally, the appropriate CEQA baseline is the existing environmental conditions at the time the NOP was published or the time the environmental analysis was commenced. NEPA, on the other hand, does not contain the same procedural requirements. Under NEPA, the no action alternative (i.e., the expected future conditions without the project) is the baseline to which the action alternatives are compared; the no action alternative is also compared to existing conditions.

3.1.2 Significance Determinations

The analysis contained in this EIR/EA evaluates the potential environmental consequences associated with the proposed project and alternatives in accordance with the requirements of CEQA and NEPA. This analysis is limited to evaluating whether the proposed project and alternatives would represent a "significant effect on the environment" under CEQA, or would "significantly affect the quality of the human environment" according to NEPA.

CEQA and NEPA have a mutual objective to identify significant environmental impacts; however, the definition and approach for determining "significance" is slightly different. CEQA defines a *significant effect on the environment* as "a substantial, or potentially substantial, adverse change in the environment" (PRC Div. 13 21068). State CEQA Guidelines Section 15382 describes *adverse change* as an "adverse change in any of the physical conditions within the area affected by the project including

land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." CEQ NEPA Regulations 1508.14 defines the *human environment* as "the natural and physical environment and the relationship of people with that environment." *Significant,* as used in NEPA, requires considerations of both context and intensity (CEQ NEPA Regulations 1508.27).

Significance criteria, or thresholds of significance, are commonly used under CEQA in order to determine the extent and magnitude of potential impacts. A "threshold of significance" is "an identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect would normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant" (CEQA Guidelines Section 15064.7). Under CEQA, a lead agency may rely on significance thresholds based on Appendix G of the State CEQA Guidelines or an adopted set of local thresholds, although it is not required (CEQA Guidelines 15064.7). NEPA does not set forth substantive criteria for determining the "significance" of potential effects. CEQ NEPA Regulations identify that the determination of significance is based on two criteria: context and intensity. Context is defined as the need to evaluate impacts within the environmental setting in which they occur (40 CFR Section 1508.279a)). Intensity is defined as the severity of the impacts with the evaluation of 10 non-exclusive criteria (40 CFR Section 1508.27(b)).

Each resource section of this EIR/EA identifies the criteria used to assess the potential effects of the proposed project. Significance criteria used in these analyses are based on both CEQA and NEPA standards, including Appendix G of the CEQA Guidelines. Where CEQA and NEPA standards differ, the more rigorous threshold was applied. This ensures that the criteria applied in the analysis are adequate under both Federal and State regulations and the mitigation measures identified will similarly meet both standards.

In evaluating the potential impacts of the proposed project and alternatives, the level of significance is determined by applying the threshold of significance presented for each resource evaluation area. While CEQA requires that identification of the level of significance for each impact be stated in an EIR, NEPA regulations do not require such a discussion. Evaluation of each resource area must take into account that some impacts determined to be significant under CEQA may not necessarily be determined significant under NEPA (e.g., NEPA does not compel mandatory findings of significance). However, for both CEQA and NEPA, environmental impact categories are established by the CEQA and NEPA lead agencies to determine whether an impact is considered significant. For the purpose of this EIR/EA and to provide the degree of specificity required under CEQA, the following terminology is used to evaluate the level of significance of impacts discussed in this EIR/EA. These terms are consistent with the generally accepted standards of CEQA compliance practice.

- **No impact (NI).** No project-related impacts to the environment would occur with development of the proposed project and alternatives. This impact level does not require mitigation measures.
- **Less Than Significant Impact (LS).** The impact would not result in a substantial adverse change in the environment. This impact level does not require mitigation measures.
- **Less Than Significant With Mitigation Incorporated (LSM).** An impact that may have a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (CEQA Guidelines Section 15382). However, the incorporation of mitigation measures that are specified after analysis would reduce the project-related impact to a less-than-significant level.
- **Significant and Unavoidable Impact (SU).** An impact is considered significant and unavoidable if the analysis concludes that there could be a substantial adverse effect on the environment, and

no feasible mitigation measures are available to reduce the impact to a less-than-significant level.

- **Beneficial Impact (BI).** An impact is considered beneficial if the analysis concludes that there will be a positive change in the environment.
- **Residual Impact.** A residual impact refers to the level of impact after the implementation of mitigation measures.

This EIR/EA uses the term "mitigation" consistent with Section 15126.4(a)(1)(A) of the CEQA Guidelines, which states that an EIR shall "distinguish between measures which are proposed by the project proponents to be included in the project, and other measures proposed by the lead…agency…and not included in the project."

3.1.3 Overview of the Analysis

The information included in this Draft EIR/EA is based on the best available information. The lead agencies, through the scoping process and discussions with agencies and stakeholders, gathered information and performed focused studies to document resource conditions and evaluate the potential impacts of the proposed project and alternatives. The methods used to evaluate impacts of the alternatives were selected based on CalVet and USDVA standard practices and input from responsible Federal, State, and local agencies and resource topic experts. The resource topic experts included engineers, geologists, biologists, cultural resources specialists, arborists, landscape architects, hydrologists, and qualified agency and consultant technical experts. For a full list of preparers and those consulted during the preparation of this Draft EIR/EA, please refer to **Chapter 5, Consultation and Coordination**, and **Chapter 7, List of Preparers**.

This Draft EIR/EA analyzes the potential effects of the proposed project on the environment under the applicable environmental resource topics listed in the CEQA Initial Study Checklist in Appendix G of the State CEQA Guidelines and NEPA Regulations. Based on comments received during the scoping process and preliminary review, **Chapter 3, Environmental Setting and Environmental Impacts** of this Draft EIR/EA includes a detailed evaluation of the resource topics identified in **Table 3.1-1; Chapter 4, Other Statutory Considerations** provides a discussion of cumulative impacts.

Table 3.1-1 Resource Topics/Sections and Abbreviations Key

Resource Topics (Section Number)	Abbreviations
Aesthetics (see **Section 3.2**)	AES
Air Quality (see **Section 3.3**)	AQ
Biological Resources (see **Section 3.4**)	BIO
Cultural and Tribal Resources (see **Section 3.5**)	CTR
Energy (see **Section 3.6**)	ENG
Geology, Soils, and Seismicity (see **Section 3.7**)	GEO
Greenhouse Gas Emissions (see **Section 3.8**)	GHG
Hazards and Hazardous Materials (see **Section 3.9**)	HAZ
Hydrology/Water Quality (see **Section 3.10**)	HYD
Land Use/Planning (see **Section 3.11**)	LU
Noise (see **Section 3.12**)	NOI
Public Services (see **Section 3.13**)	PS
Socioeconomics and Environmental Justice (see **Section 3.14**)	SEJ
Transportation (see **Section 3.15**)	TR
Utilities and Service Systems (see **Section 3.16**)	UT

Each environmental resource section includes a discussion of the environmental setting, applicable regulations pertaining to the resource area, impact assessment, and mitigation measures where applicable. Each section of **Chapter 3** contains the following elements:

Environmental Setting. This subsection presents a description of the existing physical environmental conditions in the vicinity of the proposed project and alternatives with respect to each resource area at an appropriate level of detail to understand the impact analysis.

Regulatory Framework. This subsection provides a brief discussion of Federal, State, and local regulations and policies that are applicable to the resource topic and the proposed project and alternatives.

Impacts and Mitigation Measures. This subsection evaluates the potential for the proposed project and alternatives to affect the physical environment. Significance criteria for evaluation of environmental impacts are defined in the beginning of the impact analysis section, including an explanation of how the significance criteria are used in the evaluation of impacts for the proposed project and alternatives. This subsection includes a discussion of the approach to the analysis, including identification of the significance criteria that are not applicable to the proposed project and alternatives. Potential impacts are identified and characterized. Where feasible, mitigation measures are identified to avoid or reduce identified significant impacts to a less-than-significant level.

In **Sections 3.2-3.16**, the level of detail used when describing environmental impacts for each resource topic varies in proportion to their significance, meaning that severe impacts are described in more detail than less consequential impacts, as required by 40 CFR 1502.2(b) and CEQA Guidelines Section 15126.2(a). The purpose is to help decision makers and the public focus on each alternatives' key effects. CEQA requires that an EIR be prepared with a sufficient degree of analysis to provide decision makers with information that enables them to make an informed decision. An evaluation of the environmental effects of a proposed project under CEQA need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible (CEQA Guidelines Section 15151). This EIR/EA provides a factual and objective disclosure of the environmental impacts of the proposed project.

The proposed project would involve implementing the 2015 Master Plan. Since Phase 1 has already been constructed, the proposed project involves implementing the remaining phases of the 2015 Master Plan – Phases 2 through 11. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in late 2019/early 2020. Phase 2 of the 2015 Master Plan has been sufficiently developed to a level of certainty within the 35% Schematic Design Plans that it is ready for a detailed environmental impacts analysis associated with its implementation. Therefore, this EIR/EA analyzes Phase 2 at a project level, while analyzing the build-out of the 2015 Master Plan at a programmatic level (please refer to **Section 1.3** for more detail on the Level of Analysis).

CalVet and USDVA do not anticipate proceeding with the development of Phases 3 through 11 of the 2015 Master Plan in the immediate future, nor does it have sufficient construction-level detail available to enable an analysis of project-specific impacts at this time. Due to the long-term nature of the 2015 Master Plan, it is preferable not to speculate as to specific site plans or facilities at this time because these phases likely will evolve over the next 100 years, based on demand and funding availability. Additional environmental review under CEQA and NEPA for these phases will be undertaken, as appropriate, during subsequent implementation of the 2015 Master Plan.

Environmental impacts are evaluated to the extent possible and at an appropriate level of detail given the level of project information available in the 2015 Master Plan and Phase 2 35% Schematic Design

Plans. CEQA Guidelines Section 15146 states that the degree of specificity required in an EIR will correspond with the degree of specificity involved in the underlying activity which is described in the EIR. For the Proposed 2015 Master Plan and Alternative 2: Reduced 2015 Master Plan, appropriate programmatic mitigation measures have been developed that provide for performance standards to ensure that the mitigation will reduce the impacts to a less-than-significant level, where feasible.

The analysis for each resource area includes discussions of the existing environmental setting, applicable significance criteria, and potential environmental impacts. In addition, where applicable, environmental commitments and project design features that would reduce adverse impacts to environmental resources are identified.

3.1.4 Resources Not Considered in Detail

A preliminary analysis of the key environmental issues was conducted for this EIR/EA to assess the potential for environmental resources to be significantly affected by the proposed project and alternatives. Based on the preliminary analysis, it was determined that agricultural and forestry resources, mineral resources, and recreation would not be significantly affected by the proposed project or alternatives. Therefore, to help narrow the scope of this EIR/EA and focus the analysis on the issues that are potentially significant, these environmental resources are not considered in detail in this EIR/EA (40 CFR 1501.1, 40 CFR 1501.1(d), 40 CFR 1501.7(a)(3), and CEQA Guidelines Section 16063(c)(3)). The reasons for elimination are discussed below in accordance with NEPA Regulations (40 CFR 1508.0) and CEQA Guidelines (Section 15128).

Agricultural and Forestry Resources

The proposed project and alternatives would not have an effect on agricultural or forestry resources because former Fort Ord lands do not contain significant agricultural resources or timberland. There are no designated prime or important farmlands, or parcels with Williamson Act contracts on former Fort Ord lands. Impacts to oak woodland are addressed in **Section 3.4, Biological Resources**.

Mineral Resources

The proposed project and alternatives would not have an effect on mineral resources because former Fort Ord lands do not contain significant mineral resources which would potentially be used for extraction. Therefore, effects on mineral resources are not analyzed further in this EIR/EA.

Recreation

The proposed project and alternatives would not increase the use of existing neighborhood and regional parks or other recreational facilities. The proposed project and alternatives do not include recreational facilities nor would they require the construction or expansion of such facilities. Therefore, effects on recreation are not analyzed further in this EIR/EA.

3.2 AESTHETICS

3.2.1 Introduction

This section assesses the existing visual quality of the proposed project site and potential changes to the visual and aesthetic environment that would result from the proposed project and alternatives. The visual analysis is based on field surveys conducted by DD&A, photos of the proposed project site from various vantage points, and aerial photographs of the site and its surroundings. Photographs were taken from points that illustrate the existing visual character of the proposed project area (**Figure 3.2-1, Photo Points**). **Figure 3.2-2, Public Views** and **Figure 3.2-3, Representative Site Photos** contain representative site photographs of the property and surrounding area.

Public and agency comments were received during the public scoping period. To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. No comments concerning aesthetics were received. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.2.2 Environmental Setting

Regional Overview

The proposed project is located on the former Fort Ord within the City of Seaside and Monterey County. Monterey County is aesthetically rich and visually diverse. The area includes several visual features including coastal views, agricultural fields, natural ridgelines, and oak woodlands which are widely recognized and highly regarded for their aesthetic quality. The City of Seaside is situated adjacent to the Pacific Ocean along the Monterey Peninsula. The surrounding hillsides provide a backdrop for the City and offer scenic views of Monterey Bay and the peninsula.

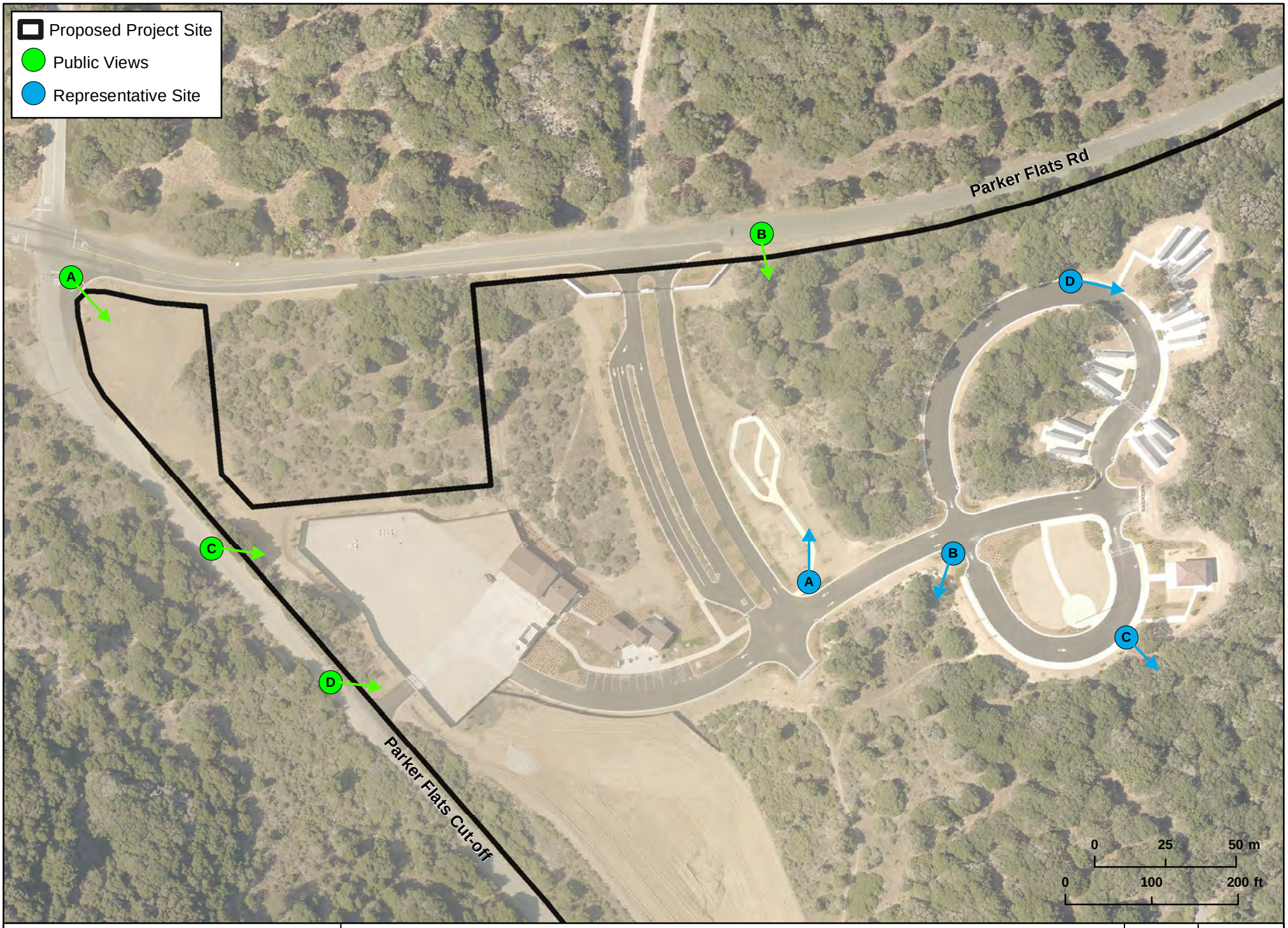
Concepts and Terminology

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. Depending on the extent to which a project's presence would alter the visual character and quality of the environment, a visual or aesthetic impact may occur. Visual quality, visual character, affected viewers and visual sensitivity are the terms used throughout the analysis, and are defined below.

Visual Quality

Visual quality is defined as the overall visual impression or attractiveness of a site or locale as determined by its aesthetic qualities (such as color, variety, vividness, coherence, uniqueness, harmony, and pattern). Natural and built features combine to form perspectives with varying degrees of visual quality, which are rated in this analysis as low, moderate, and high, as follows:

- **Low.** The location is lacking in natural or cultural visual resource amenities typical of the region. A site with low visual quality will have aesthetic elements that are relatively unappealing and perceptibly uncharacteristic of the surrounding area.
- **Moderate.** The location is typical or characteristic of the region's natural or cultural visual amenities. A site with moderate visual quality maintains the visual character of the surrounding area, with aesthetic elements that do not stand out as either contributing to, or detracting from, the visual character of an area.



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Photo Points

N

Date
03-19-2019

Scale
1 in=141.7 ft

Figure
3.2-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 3.2-3 Photo Points.mxd



Photo A. View of CCCVC from a residential area at intersection of Parker Flats Rd. and Park Flats Cut-off Rd.



Photo B. View of oak woodland screening of CCCVC from Parker Flats Rd.



Photo C. View of vegetation screening of CCCVC from Parker Flats Cut-off Rd.



Photo D. View of maintenance yard and proposed construction staging area for Phase 2 from Parker Flats Cut-Off Rd.

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Public Views	Date 03-08-2019	Figure 3.2-2



Photo A. View of Phase 2 area from Memorial Walkway.



Photo B. View of Phase 2 area with Master Plan area beyond.



Photo C. View of oak woodland at Master Plan area.



Photo D. View of columbaria within oak woodland.

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Representative Site Photos	Date 03-08-2019	Figure 3.2-3

- **High.** The location has visual resources that are unique or exemplary of the region's natural or cultural scenic amenities. A site with high visual quality is likely to stand out as particularly appealing and makes a notable positive contribution to the visual character of an area.

Visual Character

Visual character is a general description of the visual attributes of a particular land use setting and the unique set of landscape features. The purpose of defining the visual character of an area is to provide the context within which the visual quality of a particular site or locale is most likely to be perceived by the viewing public. For natural and open space settings, visual character is most commonly described in terms of areas with common landscape attributes (such as landform, vegetation, or water features).

Visual Sensitivity

Visual sensitivity is the overall measure of a site's susceptibility to adverse visual changes. Visual sensitivity is rated as high, moderate, or low and is determined based on the combined factors of visual quality, viewer types and volumes, and visual exposure to the proposed project as described above. A setting's overall visual sensitivity is the measure of its susceptibility to significant visual impacts as a result of project-caused visual change.

Site Characteristics

Scenic Resources

The California Scenic Highway Program is part of the California Department of Transportation (Caltrans) and was established to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. There are no locally designated scenic roads in the project area. The two closest routes designated as scenic highways by the California Department of Transportation (Caltrans, 2011), or deemed eligible for such designation, include Highway 1 and Highway 68 as described below, which are over five miles from the project site.

- Highway 1. The portion of Highway 1, 1.5 miles west of the project site is designated Caltrans Eligible Scenic Highway.
- Highway 68. The segment of Highway 68, approximately 4 miles southwest of the project site is a Caltrans Officially Designated Scenic Highway.

In addition, there are no federally designated wild and scenic rivers in the project vicinity (National Wild and Scenic River System, 2019).

Visual Character and Quality

The existing visual character of the project area is comprised of distant mountain ranges, undeveloped land, and residential development. The proposed project site is bound by Parker Flats Road on the north and Parker Flats Cut-off Road on the west. The project site is mostly undeveloped characterized by rolling hill topography and five vegetative communities including coast live oak woodland, maritime chaparral, central coastal scrub, non-native grassland, and ruderal/disturbed/landscaped. Surrounding land uses in the vicinity of the project area include CSUMB, residential development, and former Fort Ord military buildings to the north and northwest, Charter School to the west, and undeveloped land to the south and southeast.

The undeveloped lands on the former Fort Ord exhibits relatively high visual quality, due to its vividness, intactness, and unity. However, the site is not located within a designated scenic vista or scenic corridor as defined by the County General Plan (County, 2010a), Fort Ord Master Plan (County, 2010b), or

Seaside General Plan (Seaside, 2003). Because the project site and vicinity do contain aesthetic elements that are notably appealing, the visual quality of the site is considered moderate.

The site is visible from adjacent roadways Parker Flats Road and Parker Flats Cut-Off Road, which are closed to unauthorized vehicles but often used for recreational users in the area. The overall visual sensitivity of this site is considered moderate because of the variable conditions of the area, characterized by both natural and developed (e.g., adjacent residential area and existing Phase 1 development) visual setting.

Light and Glare

Sources of existing nighttime light at the cemetery include exterior lighting on the entry monument, U.S. flag pole, and security lighting for the administration and maintenance buildings associated with the Phase 1 development.

3.2.3 Regulatory Framework

Federal

National Scenic Byways Program

Highway 1 from Carmel south to Big Sur (and beyond) is designated as an "All American Road" under the Federal Highway Administration's National Scenic Byways Program. All roads nationally designated are considered part of America's Byways collection and must possess at least one of these six intrinsic qualities: historic, cultural, natural, scenic, recreational, and/or archaeological. To receive an All-American Road designation, a road must possess multiple intrinsic qualities that are nationally significant and contain one-of-a-kind features that do not exist elsewhere. The road must also be considered a "destination unto itself," and must provide an exceptional travel experience.

State

California State Scenic Highway Program

The California State Scenic Highway program was created by the Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The program includes a list of highways that are either designated or eligible for designation as a Scenic Highway. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, Sections 260 through 263. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view.

3.2.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. have a substantial adverse effect on a scenic vista;

b. substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view from a State Scenic Highway;

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

d. create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Impact Analysis Overview

Approach to Analysis

The following impact analysis addresses the short-term (construction-related) and long-term (operations and maintenance-related) impacts on scenic resources, scenic vistas, and the visual character of the proposed project site (which includes the proposed project and alternatives) and surroundings. The visual impact analysis is based on field observations of the proposed project site and surrounding viewsheds conducted in February 2019, site and aerial photographs, computer-aided street-view tours (Google Earth), and review of relevant planning documents.

Construction Impacts

The evaluation of temporary visual impacts during construction considers whether construction activities would substantially degrade the existing visual character or quality of the site or surrounding area and the duration over which this change would occur. Being temporary in nature, construction-related effects of this type of proposed project on visual quality are generally considered to have a less-than-significant impact unless there are unusual construction features or duration.

Operational Impacts

Permanent visual impacts from project siting and operation are assessed based on the proposed project and alternatives' potential to have a substantial adverse effect on scenic vistas, substantially damage scenic resources, substantially degrade the existing visual character, or quality of the site and its surroundings. The evaluation of permanent visual impacts of the operation and maintenance of the proposed project and alternatives relative to site's overall visual sensitivity is presented. **Table 3.2-1**, **Visual Impact Scale for Operational Analysis**, presents a scale of three levels (i.e., high, moderate, and low) using the concepts and terminology discussed in **Concepts and Terminology** above for determining the level of impact for each of the above significance criteria for both construction-related, and siting and operational impacts.

Table 3.2-1 Visual Impact Scale for Operational Impact Analysis

		Overall Visual Sensitivity		
		High	**Moderate**	**Low**
Visual Contrast/ Change	**High**	Significant	Significant	Less-than-Significant
	Moderate	Significant	Less-than-Significant	Less-than-Significant
	Low	Less-than-Significant	Less-than-Significant	Less-than-Significant
	No Change/ Effect	No Impact	No Impact	No Impact

Table 3.2-1 considers overall visual sensitivity of the site and its surroundings, as well as the visual change or contrast that would be caused by the proposed project and alternatives. "Overall Visual Sensitivity" brings together the factors discussed in **Concepts and Terminology** above into a single consolidated measure: visual quality; affected viewers and exposure conditions; and visual sensitivity, as

discussed for each proposed project component site in **Site Characteristics**. **Visual Contrast/Change** refers to the transformation or modification of the appearance of the proposed project site and/or its surroundings. As seen in the table, each of these measures are rated high, moderate, and low, with the significance dependent on how the proposed project impact would compare with both measures.

Areas of No Impact

Some of the significance criteria outlined above are not applicable to the proposed project and alternatives, or the proposed project and alternatives would not result in impacts related to these criteria, as explained below.

(b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view from a State Scenic Highway. (No impact during construction or operation for the proposed project or alternatives). As stated above, the nearest State Scenic Highways are approximately five miles from the project site. The project site is not visible from a designated State Scenic Highway, and, therefore, would not damage scenic resources and historic buildings within view of a State Scenic Highway. Thus, significance criterion "b" is not applicable to the proposed project and is not discussed further.

Summary of Impacts

Table 3.2-2 provides a summary of potential impacts to aesthetics from the proposed project and alternatives.

Table 3.2-2. Summary of Impacts – Aesthetics

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact AES-1: Have a substantial adverse effect on a scenic vista.	LS	LS	LS	LS	NI
Impact AES-2: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings.	LS	LS	LS	LS	NI
Impact AES-3: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact AES-1: Have a substantial adverse effect on a scenic vista. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The 2015 Master Plan would involve the construction and operation of Phases 3-11 on approximately 37 acres within the 84.4-acre project site; the remaining 31.7 acres would be preserved as open space. Construction of Phase 2 would involve approximately 4.4 acres of ground disturbance, of which, approximately 1.3 acres of disturbance would be associated with regrading and expanding the existing retention basin. Construction staging and access for Phase 2 would occur primarily within approximately 4.4 acres of existing paved and disturbed areas (please refer to **Figure 2-16**). Approximately 1 acre consisting mostly of oak woodland would be preserved as open space as part of Phase 2.

The project site is characterized as rolling hill topography. Proposed construction activities could result in temporary changes to the visual character and quality in the vicinity of the project site due to presence of construction vehicles, equipment and materials, stockpiles, and exposed soils. Depending on the phase and construction location, views of oak woodlands and distant rolling hills from adjacent public roads may be temporarily obstructed by construction equipment and building materials used during construction. As described above in **Section 3.2.2, Environmental Setting**, the project site is bound by undeveloped coast live oak woodland on the east and south, Parker Flats Cut-Off Road on the west, and Parker Flats Road to the north. Several residences located at the intersection of Parker Flats Road and Parker Flats Cut-Off have a direct line of sight to the project site (see **Figure 3.2-2**). However, due to the topography, site design to minimize impacts to oak woodland, and the existing native vegetation and landscaping, the Phase 1 development is not easily visible from the intersection and the proposed project would be sited further away (**Photo A, Figure 3.2-2**). Chartwell School is located approximately 680 feet west of the proposed project and approximately 85 feet higher in elevation than Phase 2 but at a similar elevation to the highest point within the entire project site. The existing oak woodland between the school and proposed project would screen views of the project site from the school.

The construction of Phase 2 and the 2015 Master Plan would require vegetation removal (including coast live oak tree removal) and grading, which would alter the visual quality and affect views of the site. However, in meeting with the project objective to "incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs," the layouts for Phase 2 and the 2015 Master Plan have been designed and sited to minimize impacts to oak woodland and the topography. For Phase 2, the in-ground cremains and crypts are proposed in terraces to minimize grading, vegetation removal, and disturbance to the adjacent hillside. The 1-acre preservation area associated with Phase 2 would be located along Parker Flats Road and consists mostly of oak woodland, which would screen the site from the roadway. Phase 2 is sited further away from the residences, located to the east and south of Phase 1, and does not include any buildings or structures. The ground disturbance associated with construction activities for Phase 2 would be temporary and the Planting Plan includes the planting of 111 coast live oak trees as well as other trees, shrubs, and groundcover plantings, within disturbed areas (**Figure 2-12**).

For the remaining phases of the 2015 Master Plan, each phase would also be designed and sited to minimize impacts to the native landscape. As discussed in **Chapter 2, Proposed Project and Alternatives**, future phases would be designed to achieve several goals, including, but not limited to, respecting the natural drainage pattern, vegetation, and contours of the site to the extent feasible. In

addition, approximately 17.1 acres of coast live oak woodland would be protected within the proposed preservation area. Future phases would also include implementation of phase-specific planting plans with a focus of planting coast live oak trees and other native vegetation. Where major grading is proposed, new oak trees would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. Future phases of the Master Plan primarily consist of road improvements, columbarium, and crypts, and do not include not include buildings. The design of the crypts and columbarium would be similar to Phases 1 and 2 where the columbarium are set back within the existing oak woodland and preserving oak woodland between burial sections, and the crypts would be placed on terraces, minimizing impacts to the natural landscape.

The project site is considered to have a moderate visual quality and visual sensitivity as discussed in **Approach to Analysis** above. Although the project would be visible from public viewing areas, given the moderate visual character/quality of the site, the proposed project's commitment to retaining oak woodland and minimizing impacts to the natural landscape, and the vegetational screening components incorporated into the proposed project, the visual contrast and change of public views and the surrounding area resulting from the proposed project is considered moderate. As shown in **Table 3.2-1**, when a site's overall visual sensitivity is moderate and the visual contrast and change of public views are moderate, impacts are considered less-than-significant. Therefore, the construction and operation of the proposed project would not substantially alter the visual quality of the site and surrounding land uses or interfere with existing views of the rolling hill topography and the horizon from public viewpoints. This impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be located at the same project site as the proposed project, and would have a similar, but reduced, development footprint. Therefore, Alternative 2 would have less visual impact than the proposed project and would not substantially alter the visual quality nor impede views of the existing landscape. A less-than-significant impact would occur. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be greater than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AES-2: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Please refer to the discussion under **Impact AES-1**. Due to the nature of the topography and proposed design features that would minimize impacts to the natural landscape, the proposed project would not substantially alter the visual quality of the site from surrounding land uses or interfere with existing views of the rolling hill topography and the horizon. The proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings. A less-than-significant impact would occur. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Construction of Alternative 2 would be slightly less than the impact described for the proposed project above. The overall footprint of construction would be reduced; therefore, it is assumed that the amount of visual impacts would be reduced. This is a less-than-significant impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Under Alternative 3, the development footprint would be larger but at the same site as the proposed project, and, therefore, the potential for visual impacts would increase. However, Alternative 3 would implement the same design features as the proposed project, minimizing impacts to the natural landscape. This is a less-than-significant impact. No mitigation measures are required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AES-3: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Phase 1 of the CCCVC installed most of the lighting planned for the build-out of the cemetery. Sources of existing nighttime light at the cemetery include exterior lighting on the entry monument, U.S. flag pole, and security lighting for the administration and maintenance buildings associated with the Phase 1 development. Phase 2 does not propose any new lighting. The 2015 Master Plan would include a flag pole on the top of Artillery Hill, which would be illuminated at night, and may require additional security lighting. Security lighting would be pointed downward to minimize effects on day or nighttime views of the surrounding landscape. In addition, the existing vegetation would reduce the visibility of exterior lighting from the off-site viewing locations. A less-than-significant impact would occur. No mitigation is required.

Alternative 2: Reduced Impact 2015 Master Plan

The lighting proposed under Alternative 2 would be the same as the proposed project. This is a less-than-significant impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The lighting proposed under Alternative 3 would be the same as the proposed project. This is a less-than-significant impact. No mitigation measures are required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.3 AIR QUALITY

3.3.1 Introduction

This section describes the existing environmental baseline for air quality relevant to the proposed project and alternatives, including a description of regional topography and climate, and evaluates the potential effects to air quality as a result of implementation of the proposed project and alternatives. In addition, this section outlines applicable Federal, State, and local air quality regulatory requirements, local and regional air quality pollutants, existing conditions, ambient air quality standards (AAQS), and sensitive receptors. This section is based on the air quality analysis of the proposed project prepared by Ambient Air Quality and Noise Consulting (Ambient, 2019a) and contained in **Appendix C**. The Monterey Bay Air Resources District (MBARD) is the regional agency tasked with managing air quality in the region, which is overseen by the California Air Resources Board (ARB). MBARD has published CEQA Air Quality Guidelines that also are used in this assessment to evaluate air quality impacts of projects (MBARD, 2008).

Public and agency comments were received during the public scoping period. To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. No comments concerning air quality were received. For a complete list of public comments received during the public scoping period, please refer to **Appendix A**, **NOP and Public Comment Letters**.

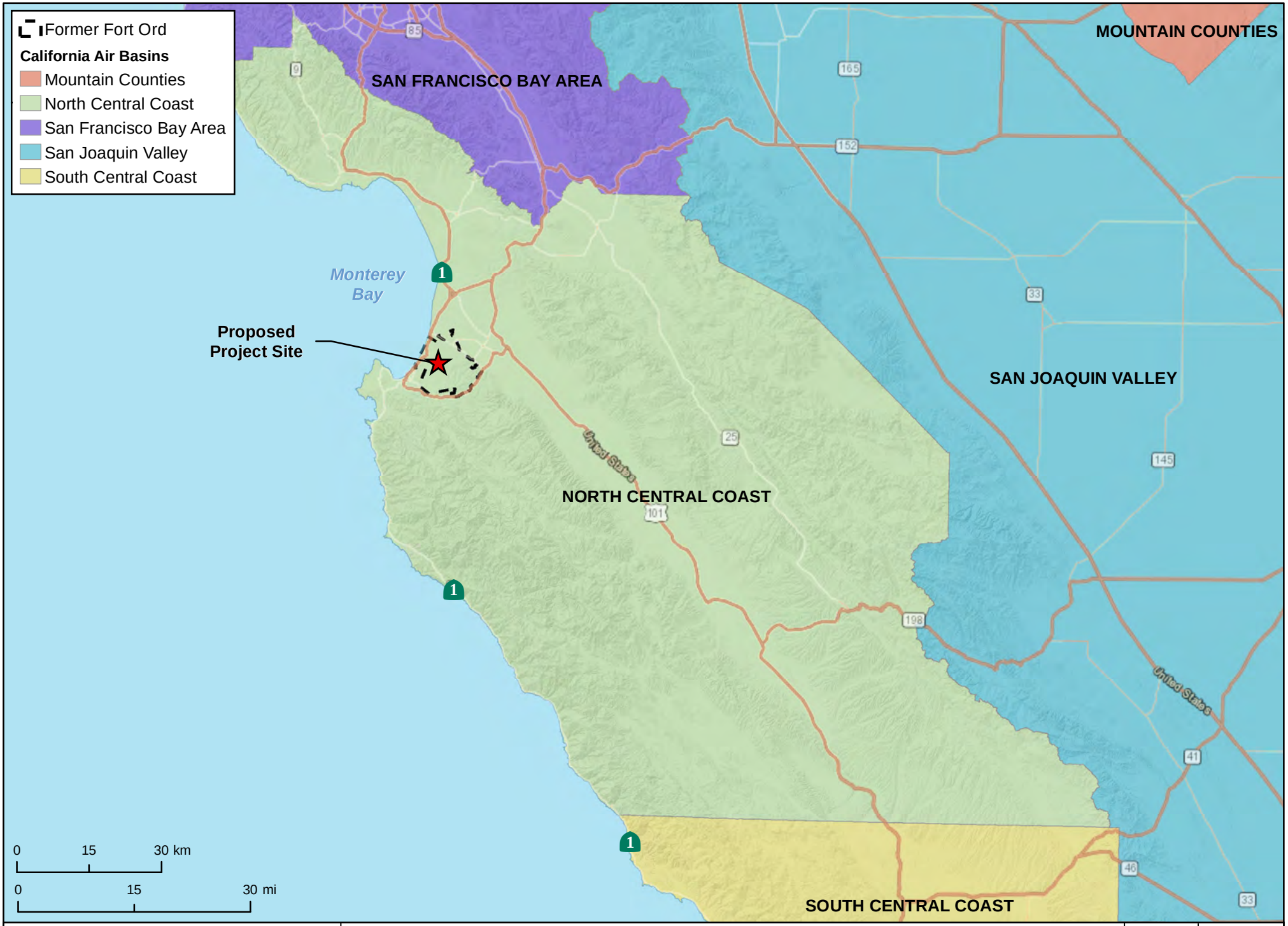
3.3.2 Environmental Setting

Regional Overview

The proposed project is located within the North Central Coast Air Basin (NCCAB), one of fourteen (14) statewide basins designated by the ARB. The NCCAB covers an area of 5,159 square miles along the central California coast. The NCCAB is comprised of Monterey, Santa Cruz, and San Benito Counties; please refer to **Figure 3.3-1** for a graphical depiction of the location of the NCCAB. The MBARD is responsible for local control and monitoring of criteria air pollutants throughout the NCCAB. Air quality is affected by topography, meteorology, and climate. These factors are discussed in more detail in the following sections.

Topography

The NCCAB is generally bounded by the Diablo Range to the northeast, which together with the southern portion of the Santa Cruz Mountains forms the Santa Clara Valley which extends into the northeastern tip of the NCCAB. Farther south, the Santa Clara Valley transitions into the San Benito Valley, which runs northwest-southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley that extends from Salinas at the northwest end to King City at the southeast end. The northwest portion of the NCCAB is dominated by the Santa Cruz Mountains.



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Air Basin Map

N

Date 03-09-2019

Scale 1 in=15.8 mi

Figure 3.3-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 3.3-1 Air Basin Map.mxd

Meteorology and Climate

The climate of the NCCAB is dominated by a semi-permanent high pressure cell over the Pacific Ocean. In the summer, the dominant high pressure cell results in persistent west and northwest winds across the majority of coastal California. As air descends in the Pacific high pressure cell, a stable temperature inversion is formed. As temperatures increase, the warmer air aloft expands, forcing the coastal layer of air to move onshore producing a moderate sea breeze over the coastal plains and valleys. Temperature inversions inhibit vertical air movement and often result in increased transport of air pollutants to inland receptor areas.

In the winter, when the high pressure cell is weakest and farthest south, the inversion associated with the Pacific high pressure cell is typically absent in the NCCAB. Air frequently flows in a southeasterly direction out of the Salinas and San Benito valleys in the NCCAB. The predominant offshore flow during this time of year tends to aid in pollutant dispersal producing relatively healthful to moderate air quality throughout the majority of the region. Conditions during this time are often characterized by afternoon and evening land breezes and occasional rain storms. However, local inversions caused by the cooling of air close to the ground can form in some areas during the evening and early morning hours.

Winter daytime temperatures in the NCCAB typically average in the mid 50s during the day, with nighttime temperatures averaging in the low 40s. Summer daytime temperatures typically average in the 60s during the day, with nighttime temperatures averaging in the 50s. Precipitation varies within the region, but in general, annual rainfall is lowest in the coastal plain and inland valley, higher in the foothills, and highest in the mountains.

Criteria Air Pollutants

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the U.S. Environmental Protection Agency (U.S. EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air. An ambient air quality standard is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. Standards established for the protection of human health are referred to as primary standards; whereas, standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this section.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere. Health effects of common criteria air pollutants are also summarized in **Table 3.3-1**.

Table 3.3-1 Summary of Criteria Air Pollutants and Health Effects

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Ozone (O_3)	Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. Motor vehicle exhaust industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes.
Particulate Matter (PM_{10} & $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Can get deep into your lungs or even enter your blood stream, and cause serious health problems; Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Carbon Monoxide (CO)	Formed when carbon in fuel is not burned completely;' a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	Fuel combustion in motor vehicles and industrial sources. Motor vehicles; electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming, and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Sulfur Dioxide (SO_2)	Formed when fuel containing sulfur, such as coal and oil, is burned; when gasoline is extracted from oil; or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, large ships, and fuel combustion in diesel engines.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel; damage crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Source: CAPCOA 2019		

Ozone (O_3) is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when oxides of nitrogen (NO_X) and VOCs, also referred to as reactive organic gases (ROG) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

Reactive Organic Gas (ROG) is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

Volatile Organic Compounds (VOC) are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Oxides of Nitrogen (NO_X) are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO_X, nitrogen dioxide (NO_2), is a reddish-brown gas that is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Particulate Matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- Inhalable coarse particles ($PM_{2.5}$ - PM_{10}), such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- Fine particles ($PM_{2.5}$), such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- Ultrafine particles (UFP), are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

Carbon Monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, ARB and U.S. EPA designate urban areas as CO nonattainment areas instead of the entire basin as with ozone and PM_{10}. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover.

Sulfur Dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 parts per million [ppm] can cause death). OSHA regulates workplace exposure to H_2S.

Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The California Air Resources Board (ARB) has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

Visibility Reducing Particles: Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Vinyl Chloride (C_2H_3Cl or **VCM)** is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Odors

Typically, odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The MBARD does not have an individual rule or regulation that specifically addresses odors; however, odors would be subject to MBARD Rule 402, Nuisance. Any actions related to odors would be based on citizen complaints to local governments and the MBARD.

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are

not expected to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered "criteria pollutants" under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to NAAQS or California ambient air quality standards (CAAQS). Instead, the U.S. EPA and the ARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with MBARD rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the U.S. EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The following provides a summary of the primary TACs of concern within the State of California and related health effects:

Diesel Particulate Matter (DPM) was identified as a TAC by the ARB in August 1998. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40 percent of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (ARB, 2013).

In October 2000, the ARB issued a report entitled: "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles", which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRPP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (ARB, 2013 and ARB, 2000).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

Acetaldehyde is a federal hazardous air pollutant. The ARB identified acetaldehyde as a TAC in April 1993. Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Sources of acetaldehyde include emissions from combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. A majority of the statewide acetaldehyde emissions can be attributed to mobile sources, including on-road motor vehicles, construction and mining equipment, aircraft, recreational boats, and agricultural equipment. Area sources of emissions include the burning of wood in residential fireplaces and wood stoves. The primary stationary sources of acetaldehyde are from fuel combustion from the petroleum industry (ARB, 2013).

Acute exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic intoxication of acetaldehyde resemble those of alcoholism. The U.S. EPA has classified acetaldehyde as a probable human carcinogen. In California, acetaldehyde was classified on April 1, 1988, as a chemical known to the state to cause cancer (U.S. EPA, 2018a and ARB, 2013).

Benzene is highly carcinogenic and occurs throughout California. The ARB identified benzene as a TAC in January 1985. A majority of benzene emitted in California (roughly 88 percent) comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. These sources include on-road motor vehicles, recreational boats, off-road recreational vehicles, and lawn and garden equipment. Benzene is also formed as a partial combustion product of larger aromatic fuel components. To a lesser extent, industry-related stationary sources are also sources of benzene emissions. The primary stationary sources of reported benzene emissions are crude petroleum and natural gas mining, petroleum refining, and electric generation that involves the use of petroleum products. The primary area sources include residential combustion of various types such as cooking and water heating (ARB, 2013).

Acute inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidences of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. The U.S. EPA has classified benzene as known human carcinogen for all routes of exposure (U.S. EPA, 2018a).

1,3-butadiene was identified by the ARB as a TAC in 1992. Most of the emissions of 1,3-butadiene are from incomplete combustion of gasoline and diesel fuels. Mobile sources account for a majority of the total statewide emissions. Additional sources include agricultural waste burning, open burning associated with forest management, petroleum refining, manufacturing of synthetics and man-made materials, and oil and gas extraction. The primary natural sources of 1,3-butadiene emissions are wildfires (ARB, 2013).

Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Epidemiological studies have reported a possible association between 1,3-butadiene exposure and cardiovascular diseases. Epidemiological studies of workers in rubber plants have shown an association between 1,3-butadiene exposure and increased incidence of leukemia. Animal studies have reported tumors at various sites from 1,3-butadiene exposure. In California, 1,3-butadiene has been identified as a carcinogen.

Carbon Tetrachloride was identified by the ARB as a TAC in 1987 under California's TAC program (ARB, 2013). The primary stationary sources reporting emissions of carbon tetrachloride include chemical and

allied product manufacturers and petroleum refineries. In the past, carbon tetrachloride was used for dry cleaning and as a grain-fumigant. Usage for these purposes is no longer allowed in the United States. Carbon tetrachloride has not been registered for pesticidal use in California since 1987. Also, the use of carbon tetrachloride in products to be used indoors has been discontinued in the United States. The statewide emissions of carbon tetrachloride are small (about 1.96 tons per year), and background concentrations account for most of the health risk (ARB, 2013).

The primary effects of carbon tetrachloride in humans are on the liver, kidneys, and central nervous system. Human symptoms of acute inhalation and oral exposures to carbon tetrachloride include headache, weakness, lethargy, nausea, and vomiting. Acute exposures to higher levels and chronic (long-term) inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans. Human data on the carcinogenic effects of carbon tetrachloride are limited. Studies in animals have shown that ingestion of carbon tetrachloride increases the risk of liver cancer. In California, carbon tetrachloride has been identified as a carcinogen.

Hexavalent chromium was identified as a TAC in 1986. Sources of Hexavalent chromium include industrial metal finishing processes, such as chrome plating and chromic acid anodizing, and firebrick lining of glass furnaces. Other sources include mobile sources, including gasoline motor vehicles, trains, and ships (ARB, 2013).

The respiratory tract is the major target organ for hexavalent chromium toxicity, for acute and chronic inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to hexavalent chromium, while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled hexavalent chromium is a human carcinogen, resulting in an increased risk of lung cancer. In California, hexavalent chromium has been identified as a carcinogen.

Para-Dichlorobenzene was identified by the ARB as a TAC in April 1993. The primary area-wide sources that have reported emissions of para-dichlorobenzene include consumer products such as non-aerosol insect repellants and solid/gel air fresheners. These sources contribute nearly all of the statewide para-dichlorobenzene emissions (ARB, 2013).

Acute exposure to paradichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans. The U.S. EPA has classified para-dichlorobenzene as a possible human carcinogen.

Formaldehyde was identified by the ARB as a TAC in 1992. Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Photochemical oxidation is the largest source of formaldehyde concentrations in California ambient air. Directly emitted formaldehyde is a product of incomplete combustion. One of the primary sources of directly-emitted formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is also used in fumigants and soil disinfectants. The primary area sources of formaldehyde emissions include wood burning in residential fireplaces and wood stoves (ARB, 2013).

Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute and chronic inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. Formaldehyde is classified as a probable human carcinogen.

Methylene Chloride was identified by the ARB as a TAC in 1987. Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California, where methylene chloride is the main ingredient in many paint stripping formulations. Plastic product manufacturers, manufacturers of synthetics, and aircraft and parts manufacturers are stationary sources reporting emissions of methylene chloride (ARB, 2013).

The acute effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic exposure to methylene chloride suggest that the central nervous system is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride. In California, methylene chloride has been identified as a carcinogen.

Perchloroethylene was identified by the ARB as a TAC in 1991. Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents. In California, the stationary sources that have reported emissions of perchloroethylene are dry cleaning plants, aircraft part and equipment manufacturers, and fabricated metal product manufacturers. The primary area sources include consumer products such as automotive brake cleaners and tire sealants and inflators (ARB, 2013).

Acute inhalation exposure to perchloroethylene vapors can result in irritation of the upper respiratory tract and eyes, kidney dysfunction, and at lower concentrations, neurological effects, such as reversible mood and behavioral changes, impairment of coordination, dizziness, headaches sleepiness, and unconsciousness. Chronic inhalation exposure can result in neurological effects, including sensory symptoms such as headaches, impairments in cognitive and motor neurobehavioral functioning, and color vision decrements. Cardiac arrhythmia, liver damage, and possible kidney damage may also occur. In California, perchloroethylene has been identified as a carcinogen.

Asbestos

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than 1 percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by ARB as a TAC in 1986. The ARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

3.3.3 Regulatory Framework

Air quality within the NCCAB is regulated by several jurisdictions including the U.S. EPA, ARB, and MBARD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both State and local regulations may be more stringent.

Federal

U.S. Environmental Protection Agency

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

Federal Clean Air Act

The FCAA required the U.S. EPA to establish NAAQS, and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in **Table 3.3-2**.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

Table 3.3-2 Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards*	National Standards* (Primary)
Ozone (O_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 µg/m^3	–
	24-hour	50 µg/m^3	150 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	12 µg/m^3
	24-hour	No Standard	35 µg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm
	8-hour	9 ppm	9 ppm
	8-hour (Lake Tahoe)	6 ppm	–
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppb
Sulfur Dioxide (SO_2)	AAM	–	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	3-hour	–	0.5 ppm (1300 µg/m^3)**
	1-hour	0.25 ppm	75 ppb
Lead	30-day Average	1.5 µg/m^3	–
	Calendar Quarter	–	1.5 µg/m^3
	Rolling 3-Month Average	–	0.15 µg/m^3
Sulfates	24-hour	25 µg/m^3	No Federal Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent.	

ppm=parts per million; ppb=parts per billion; AAM=Annual Arithmetic Mean; µg/m^3=micrograms per cubic meter
** For more information on standards visit: https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf*
***Secondary Standard*
Source: ARB 2018c

National Emission Standards for Hazardous Air Pollutants

Pursuant to the FCAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

State

California Air Resources Board

The ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA of 1988. Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing CAAQS, which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in **Table 3.3-2**. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

California Clean Air Act

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO_2, and NO_2 by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

California Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

Assembly Bills 1807 & 2588 - Toxic Air Contaminants

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

California Building Standards Code

The California Building Standards Code (CBC), commonly referred to as Title 24, contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. Included in the CBC are energy efficiency standards, which are commonly referred to as California Green Building Standards or CalGreen standards. The CBC is adopted every three years by the California

Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC was most recently updated in 2016.

Regional/Local

Monterey Bay Air Resources District

The MBARD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the NCCAB, within which the project is located. Responsibilities of the MBARD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA. In an attempt to achieve NAAQS and CAAQS and maintain air quality, the MBARD has most recently completed the *2008 Air Quality Management Plan* (AQMP) for achieving the state ozone standards and the *2007 Federal Maintenance Plan* for maintaining federal ozone standards (MBARD, 2018b).

To achieve and maintain ambient air quality standards, the MBARD has adopted various rules and regulations for the control of airborne pollutants. The MBARD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

- **Rule 402 (Nuisances).** The purpose of this rule is to prohibit emissions that may create a public nuisance. Applies to any source operation that emits or may emit air contaminants or other materials.
- **Rule 425 (Use of Cutback Asphalt).** The purpose of this rule is to limit emissions of vapors of organic compounds from the use of cutback and emulsified asphalt. This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.

3.3.4 Regulatory Attainment Designations

The attainment status of the NCCAB is summarized in **Table 3.3-3**. An attainment designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A nonattainment designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation(s) was caused by an exceptional event, as defined in the criteria. Unclassified designations indicate insufficient data is available to determine attainment status.

Under the CCAA, the basin is designated as a nonattainment transitional area for the state ozone AAQS. The NCCAB is also designated a nonattainment area for the state PM_{10} AAQS. Under the FCAA, the NCCAB is currently designated attainment for the recently established eight-hour ozone federal AAQS. The NCCAB is designated either attainment or unclassified for the remaining state and federal AAQS.

The conformity review process is intended to ensure that Federal agency actions will not cause or contribute to new violations of any Federal ambient air quality standards; will not increase the frequency or severity of any existing violations of Federal ambient air quality standards; and will not delay the timely attainment of Federal ambient air quality standards. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for State standards regardless of the status of the area. The proposed project is located in an attainment/unclassified area for all current NAAQS. Therefore, regional conformity requirements do not apply.

Table 3.3-3 NCCAB Attainment Status Designations

Pollutant	State Designation	National Designation
Ozone (O_3)	Nonattainment [1]	Attainment/Unclassified[2]
Inhalable Particulates (PM_{10})	Nonattainment	Attainment
Fine Attainment ($PM_{2.5}$)	Attainment	Unclassified/Attainment [3]
Carbon Monoxide (CO)	Monterey County-Attainment San Benito County-Unclassified Santa Cruz County-Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO_2)	Attainment	Attainment/Unclassified[4]
Sulfur Dioxide (SO_2)	Attainment	Attainment[5]
Lead	Attainment	Attainment/Unclassified[6]

Notes:

1) *Effective July 26, 2007, the ARB designated the NCCAB a nonattainment area for the State ozone standard, which was revised in 2006 to include an 8-hour standard of 0.070 ppm.*
2) *On March 12, 2008, EPA adopted a new 8-hour ozone standard of 0.075 ppm. In April 2012, EPA designated the NCCAB attainment/unclassified based on 2009-2011 data.*
3) *This includes the 2006 24-hour standard of 35 µg/m3 and the 2012 annual standard of 12 µg/m3.*
4) *In 2012, EPA designated the entire state as attainment/unclassified for the 2010 NO_2 standard.*
5) *In June 2011, the ARB recommended to EPA that the entire state be designated as attainment for the 2010 primary SO_2 standard. Final designations to be addressed in future EPA actions.*
6) *On October 15, 2008 EPA lowered the NAAQS for lead to 0.15 µg/m^3. Final designations were made by EPA in November 2011.*

Source: ARB 2018b, MBARD 2018a.

3.3.5 Ambient Air Quality

Air pollutant concentrations are measured at several monitoring stations in Monterey County. The "Salinas #3 Monitoring Station" is the closest representative monitoring site to the proposed project site with sufficient data to meet U.S. EPA and/or ARB criteria for quality assurance. This monitoring station monitors ambient concentrations of ozone, nitrogen dioxide, and $PM_{2.5}$. Ambient monitoring data for PM_{10} was obtained from the "King City 415 Pearl Street Monitoring Station." Carbon monoxide has not been exceeded in recent years and, as a result, is no longer monitored in Monterey County. Ambient monitoring data for the last three years of available measurement data (i.e., 2015 through 2017) are summarized in **Table 3.3-4**. As depicted, state and federal standards for ozone and nitrogen dioxide did not exceed ambient air quality standards during the last three years of available data. The national ambient air quality standard for $PM_{2.5}$ was exceeded once at the Salinas monitoring station during the last three years. The national standard for PM_{10} at the King City monitoring station was not exceeded. Given that prevailing winds typically flow from the west to the east, ambient PM concentrations along coastal areas, including the project site, are anticipated to be less.

Table 3.3-4 Summary of Ambient Air Quality Monitoring Data[1]

	2015	2016	2017
Ozone			
Maximum concentration, ppm (1-hour/8-hour average)	0.068/0.061	0.066/0.058	0.082/0.070
Number of days state/national 1-hour standard exceeded	0/0	0/0	0/0
Number of days state/national 8-hour standard exceeded	0/0	0/0	0/0
Nitrogen Dioxide (NO_2)			
Maximum concentration, ppm (1-hour average)	33	33	34
Annual average	5	4	4
Number of days state/national standard exceeded	0/0	0/0	0/0
Suspended Particulate Matter (PM_{10})[3]			
Maximum concentration, µg/m^3 (state/national)	72.6	71.4	95.3
Annual Average	24.5	26.0	29.3
Number of days state/national standard exceeded	*/0	*/0	*/0
Suspended Particulate Matter ($PM_{2.5}$)			
Maximum concentration, µg/m^3 (state/national)	22.6	28.7	42.2
Annual Average	4.5	5.2	5.6
Number of days national standard exceeded (measured/calculated[2])	0/0	0/0	1/1

ppm = parts per million by volume, µg/m^3 = micrograms per cubic meter
1. Ambient data was obtained from the Salinas #3 Monitoring Station.
2. Measured days are those days that an actual measurement was greater than the standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day.
3. Based on data obtained from the King City-415 Pearl Street Monitoring Station.
** = Insufficient data available to determine the value.*
Source: ARB 2019a

3.3.6 Sensitive Receptors

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Nearby sensitive receptors consist predominantly of residential dwellings. The nearest residential dwellings are located northwest of the project site, across Normandy Way. Chartwell School is located west of the project site, along Numa Watson Road.

3.3.7 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Conflict with or obstruct implementation of the applicable air quality plan;

b. violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c. result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d. expose sensitive receptors to substantial pollutant concentrations; or

e. create objectionable odors affecting a substantial number of people.

To assist local jurisdictions in the evaluation of air quality impacts, the MBARD has published the *CEQA Air Quality Guidelines* (MBARD, 2008). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, TAC, and cumulative air quality impacts. The following MBARD-recommended thresholds of significance were relied upon for determination of impact significance:

- **Short-term Emissions of Criteria Air Pollutants**. Construction impacts would be significant if the proposed project would emit greater than 82 pounds per day (lbs/day) of PM_{10}, or will cause a violation of PM_{10} NAAQS or CAAQS at nearby receptors. Construction-generated emissions of O_3 precursors (i.e., ROG or NO_X) are accommodated in the emission inventories of State and federally-required air plans. For this reason, the MBARD has not identified recommended thresholds of significance for construction-generated O_3 precursors.

- **Long-Term Emissions of Criteria Air Pollutants**. Operational impacts would be considered potentially significant if direct and indirect emissions would exceed 137 lbs/day of either ROG or NO_X, 82 lbs/day of PM_{10}, or if the project would contribute to local PM_{10} concentrations that exceed AAQS. Emissions of SO_X would be significant if the project generates direct emissions of greater than 150 lbs/day.

- **Local Mobile-Source CO Concentrations**. Local mobile-source impacts would be significant if the project generates direct emissions of greater than 550 lbs/day of CO or if the project would contribute to local CO concentrations that exceed the CAAQS of 9.0 ppm for 8-hours or 20 ppm for 1-hour. Indirect emissions are typically considered to include mobile sources that access the project site but generally emit off-site; direct emissions typically include sources that emitted on-site (e.g., stationary sources, on-site mobile equipment).

- **Toxic Air Contaminants**. TAC impacts would be significant if the project would expose the public to substantial levels of TACs so that the probability of contracting cancer for the Maximally Exposed Individual would exceed 10 in 1 million or if concentrations would result in a Hazard Index greater than 1 for the Maximally Exposed Individual.

- **Odorous Emissions**. Odor impacts would be significant if the project has the potential to frequently expose members of the public to objectionable odors.

Impact Analysis Overview

Approach to Analysis

Short-term construction emissions associated with construction of Phase 2 of the CCCVC were quantified using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Emissions were quantified based on project-specific data provided and default modeling parameters contained in the model for Monterey County. Emissions modeling assumptions are summarized in **Table 3.3-5**. Construction emissions for future phases are anticipated to be similar to Phase 2 construction-

generated emissions and were qualitatively discussed. Please refer to **Appendix C** for emissions modeling assumptions and results.

Long-term operational emissions for Phase 2 of the CCCVC were quantified using CalEEMod, version 2016.3.2, based on vehicle trip-generation rates provided. To be conservative, a maximum of 80 vehicles (160 vehicle trips) was assumed for weekdays and a maximum of 200 vehicles (400 vehicle trips) was assumed for weekend days. Actual trip-generation rates for most days of the year, excluding special events, would typically be less. Vehicle trip lengths were based on the maximum daily average trip length identified in the model of 9.7 miles per trip. The fleet mix was assumed to be predominantly light-duty vehicles. Other modeling assumptions, including energy usage rates, water usage rates, and waste-generation rates were based on CalEEMod model defaults. Operational emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed. Refer to **Appendix C** for emissions modeling assumptions and results.

Table 3.3-5 Construction Information – CCCVC Phase 2

Construction Phase	Duration (Days) [1]	Off-Road Equipment [2]	Construction Vehicle Trips [3]
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20 Worker Trips/Day 525 Haul Truck Trips [4]
Site Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20 Worker Trips/Day
Onsite Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15 Worker Trips/Day 50 Haul Truck Trips [5]

1. *Based on a conservative project-specific estimation of construction activity durations.*
2. *Based on default equipment assumptions contained in the CalEEMod computer model and, where available, project-specific construction information. All equipment assumed to operate 8 hours per day.*
3. *Worker trips are based on CalEEMod default assumptions and estimated equipment usage.*
4. *Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.*
5. *Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5 inch application material thickness) and an average haul truck capacity of 8 cubic yards.*

Areas of No Impact

All of the Threshold of Significance criteria outlined above are applicable to the proposed project and alternatives.

Summary of Impacts

Table 3.3-6 provides a summary of potential impacts to air quality from the proposed project and alternatives.

Table 3.3-6. Summary of Impacts – Air Quality

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact AQ-1: Conflict with or obstruct implementation of any applicable air quality plan.	LS	LS	LS	LS	NI
Impact AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation.	LS	LS	LS	LS	NI
Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	LS	LS	LS	LS	NI
Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations.	LS	LS	LS	LS	NI
Impact AQ-5: Create objectionable odors affecting a substantial number of people.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact AQ-1: Conflict with or Obstruct Implementation of Applicable Air Quality Plan. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Consistency with the AQMP is assessed by comparing the proposed growth associated with a proposed project with the population and dwelling unit forecasts adopted by the Association of Monterey Bay Area Governments (AMBAG)[1]. These projections are used to generate emission forecasts upon which the AQMP is based. Projects that are consistent with AMBAG's regional forecasts are considered

[1] AMBAG performs metropolitan level transportation planning on behalf of the region. Among its many duties, AMBAG manages the region's transportation demand model and prepares regional housing, population and employment forecast that are utilized in a variety of regional plans

consistent with the AQMP (MBARD, 2008). Projects that would result in a significant increase in emissions, in excess of MBARD significance thresholds (outlined above in **Section 3.3.7, Impacts and Mitigation Measures – Thresholds of Significance**, would potentially conflict with or obstruct implementation of the AQMP.

The proposed project would not result in a substantial increase in employment or population growth, nor would the proposed project result in significant short-term or long-term increases of criteria air pollutants (please refer to **Impacts AQ-3** and **AQ-4** for a more detailed discussion of air quality impacts). For these reasons, implementation of the proposed project is not anticipated to result in a substantial increase in either direct or indirect emissions that would conflict with or obstruct implementation of the AQMP. This impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would not result in a substantial increase in employment or population growth, nor would it result in significant short-term or long-term increases of criteria air pollutants. For these reasons, Alternative 2 would be consistent with the AQMP. A less-than-significant impact would occur. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would also be consistent with the AQMP. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AQ-2: Violate any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As discussed in **Impacts AQ-3** and **AQ-4**, the construction and operation of the proposed project would not result in short-term or long-term increases in emissions that would violate any air quality standard or contribute to an existing or projected air quality violation (Please refer to **Impacts AQ-3** and **AQ-4** for additional discussion of air quality impacts). As a result, this impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would not result in short-term or long-term increases in emissions that would violate any air quality standard or contribute to an existing or projected air quality violation (Please refer to **Impacts AQ-3** and **AQ-4** for additional discussion of air quality impacts). A less-than-significant impact would occur. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would not result in short-term or long-

term increases in emissions that would violate any air quality standard or contribute to an existing or projected air quality violation (Please refer to **Impacts AQ-3** and **AQ-4** for additional discussion of air quality impacts). A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Project region is Non-Attainment under an Applicable Federal or State Ambient Air Quality Standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction Emissions

Construction-generated emissions are short-term and of temporary duration, lasting only as long as construction activities occur, but possess the potential to represent a significant air quality impact. The construction of the proposed project would result in the temporary generation of emissions resulting primarily from site preparation and excavation, asphalt paving, as well as, motor vehicle exhaust associated with off-road construction equipment and on-road vehicle trips. Emissions of PM are largely associated with ground disturbance and the movement of construction vehicles and equipment on unpaved surfaces.

Construction-generated emissions associated with Phase 2 of the proposed project are summarized in **Table 3.3-7**. As depicted, Phase 2 would generate maximum daily PM_{10} emissions of approximately 32.2 lbs/day and would not exceed MBARD's significance threshold of 82 lbs/day. Furthermore, compliance with existing MBARD rules and regulations, such as Rule 402 (Nuisances) and Rule 425 (Use of Cutback Asphalt) would further minimize potential short-term air quality impacts. For instance, with application of water for the control of nuisance-related dust emissions, construction-generated PM_{10} would total approximately 15 lbs/day, or less.

Construction activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, construction emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed MBARD's significance threshold of 82 lbs/day. As a result, short-term construction activities would have a less-than-significant air quality impact. No mitigation is required.

Operational Emissions

Daily operational emissions associated with Phase 2 are summarized in **Table 3.3-8**. As depicted, Phase 2 would generate maximum daily emissions of approximately 0.9 lbs/day of ROG, 1.8 lbs/day of NO_X, 12.1 lbs/day of CO, less than 0.1 lbs/day of SO_X, 2.9 lbs/day of PM_{10}, and 0.8 lbs/day of $PM_{2.5}$. It is important to note that operational emissions were conservatively quantified based on maximum daily operational vehicle trip-generation rates. Operational emissions are projected to decline in future years due primarily to improvements in vehicle fuel efficiency. Daily operational emissions would not exceed applicable MBARD significance thresholds.

Operational activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, operational emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed MBARD's significance thresholds. As a

result, long-term operational activities would have a less-than-significant air quality impact. No mitigation is required.

Table 3.3-7. Construction Emissions of Criteria Air Pollutants – Phase 2

Construction Activity	Emissions (lbs/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Demolition				
On-Site:	3.8	39.6	1.8	1.6
Off-Site:	0.1	0.1	0.2	0.1
Total:	3.9	39.7	2.0	1.7
Site Preparation				
On-Site:	5.1	52.8	20.7	12.4
Off-Site:	0.1	0.1	0.2	0.1
Total:	5.2	52.9	20.9	12.5
Grading				
On-Site:	3.3	35.5	7.7	4.8
Off-Site:	0.2	1.8	0.3	0.1
Total:	3.5	37.3	8.0	4.9
Paving				
On-Site:	1.9	18.4	1.1	1.0
Off-Site:	0.1	0.5	0.2	0.1
Total:	2.0	18.9	1.3	1.1
Maximum Daily Emissions: [1]	14.6	148.8	32.2	20.2
MBARD Significance Threshold[2]:	-	-	82	-
Exceeds Threshold/Significant Impact?	NA	NA	No	NA

1. Based on highest daily emissions during summer or winter conditions without implementation of fugitive dust control measures. Assumes demolition, site preparation, grading, and paving could potentially occur simultaneously.
2. The MBARD has not identified significance thresholds for ROG, NO_X, or $PM_{2.5}$. Emissions of ROG and NO_X are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant impact on the attainment and maintenance of ozone AAQS. Emissions of $PM_{2.5}$ are a component of PM_{10}.
*Refer to **Appendix C** for emissions modeling assumptions and results.*

Table 3.3-8. Operational Emissions of Criteria Air Pollutants – Phase 2

Source	Emissions (lbs/day) [1]					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Landscaping, Consumer Products, Architectural Coatings	0.02	0.00	0.00	0.00	0.00	0.00
Mobile Sources	0.90	1.81	12.13	0.03	2.92	0.80
Maximum Daily Emissions [5]:	0.9	1.8	12.1	<0.1	2.9	0.8
MBARD Significance Threshold:	137	137	550	150	82	-
Exceeds Threshold/Significant Impact?	No	No	No	No	No	NA

*1. To be conservative, maximum daily emissions are based on the highest daily emissions for summer or winter conditions. Refer to **Appendix C** for emissions modeling assumptions and results.*

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, construction and operational emissions would be less than the proposed project. Therefore, this impact would be less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, construction and operational emissions would be similar to Phase 2 under the proposed project. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentration. (Criterion d)

With regard to public health and welfare, both the U.S. EPA and the State of California have developed AAQS for various pollutants. These standards define the maximum amount of an air pollutant that can be present in ambient air. An AAQS is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. In general, the standards adopted by the State of California are equivalent to or more health-protective than the national standards established by the U.S. EPA.

To assist local jurisdictions with the evaluation of localized pollutant concentrations and potential health-related impacts, MBARD has developed recommended thresholds of significance and screening criteria for the pollutants of primary concern (e.g., PM_{10}, CO, TACs). Accordingly, project-generated emissions of PM_{10} that exceed 82 pounds per day (lbs/day) could result in a violation of PM_{10} AAQS at nearby receptors, which could result in health-related impacts to nearby receptors. In addition, ground-level concentrations of TACs that would result in an incremental increase in cancer risk of 10 in 1 million or a Hazard Index greater than 1 for the Maximally Exposed Individual would also be considered to result in a potentially significant impact to human health. Projects that contribute to or result in decreased levels of service (LOS) of E, or worse, at signalized intersections may contribute to localized CO concentrations that could exceed AAQS, which may result in health-related impacts to nearby individuals. Other pollutants of localized concern include exposure to naturally-occurring asbestos.

Short-term and long-term pollutants of primary concern with regard to potential health-related impacts include construction-generated emissions of TACs, naturally-occurring asbestos, particulate matter, and carbon monoxide.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

<u>Construction/Short-Term Exposure</u>

Naturally-Occurring Asbestos

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock. As a result, risk of exposure to asbestos during the construction process would be less than significant. No mitigation is required.

TACs (DPM Emissions)

The primary TAC of concern associated with short-term construction projects is diesel-exhaust particulate matter (DPM). Implementation of the proposed project would result in the generation of DPM emissions during construction associated with the use of off-road diesel equipment for site grading and excavation, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure to TACs are typically calculated based on a 25 to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximate 12-month period, project-related construction activities would constitute less than four percent of the typical exposure period. In addition, predominant wind flow in the project area typically flows from the west to the east. No sensitive receptors were identified immediately downwind of the project site that would be adversely affected by construction activities. Furthermore, no other major construction projects were identified in the project vicinity. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 10 in one million or a hazard index greater than 1). This impact would be less than significant impact to nearby sensitive receptors. No mitigation is required.

Fugitive Dust Emissions

Implementation of the proposed project would result in short-term emissions of fugitive PM associated with ground disturbance. However, compliance with applicable MBARD rules and regulations, including but not limited to, Rule 402 for the control of nuisance–related emissions would minimize potential impacts to occupants of nearby land uses. Furthermore, as noted in Impact AQ-3, construction-generated PM_{10} would not exceed MBARD's daily significance threshold of 82 lbs/day. As previously noted, MBARD has determined that emissions below 82 lbs/day would not be anticipated to exceed AAQS. In addition, predominant wind flow in the project area typically flows from the west to the east. No sensitive receptors were identified immediately downwind of the project site that would be adversely affected by construction activities. Furthermore, no other major construction projects were identified in the project vicinity and ambient concentrations of PM in the Monterey Bay area would not be anticipated to exceed ambient air quality standards. For these reasons, construction activities would have a less-than-significant short-term impact to nearby sensitive receptors. No mitigation is required.

<u>Operation/Long-Term Exposure</u>

TACs and Fugitive Dust Emissions

As previously noted, emissions of PM_{10} exceeding 82 lbs/day could result in a violation of PM_{10} AAQS at nearby receptors, which could result in health-related impacts. As noted in **Table 3.3-7**, the proposed project would generate a total of approximately 2.9 lbs/day of PM_{10}. A majority of these PM emissions would be associated with mobile sources and would be dispersed over a large area along area roadways. The proposed project would not generate localized emissions of PM_{10} that would exceed MBARD's significance threshold. The proposed project would not result in the installation of any major on-site sources of TACs or PM_{10} that would result in or contribute to increases in localized concentrations at nearby sensitive receptors. For these reasons, construction activities would be considered to have a less-than-significant short-term impact to nearby receptors. No mitigation is required.

Mobile-Source CO

As noted above, implementation of the proposed project would not result in the installation of any major stationary sources of emissions. As a result, CO generated by mobile sources would be considered the primary pollutant of local concern associated with long-term operational activities. Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. If inhaled, CO can be adsorbed easily by the blood stream and can inhibit oxygen delivery to the body, which can cause significant health effects ranging from slight headaches to death. The most serious effects are felt by individuals susceptible to oxygen deficiencies, including people with anemia and those suffering from chronic lung or heart disease. For this reason, localized mobile-source CO concentrations are of potential concern near signalized intersections that experience high traffic volumes/vehicle congestion and are projected to operate at unacceptable levels of service (i.e., LOS E, or worse).

Implementation of the proposed project would not result in or contribute to unacceptable levels of service (i.e., LOS E, or worse) at primarily affected signalized intersections. For this reason and given the regions low background CO concentrations, implementation of the proposed project would not result in or contribute to localized mobile-source CO concentrations that would be projected to exceed applicable AAQS. As a result, the project's contribution to localized CO concentrations and potential health-related impacts to nearby receptors would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, construction and operational emissions would be less than the proposed project. Therefore, this impact would be less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operational emissions are anticipated to be similar to Phase 2. Therefore, a less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact AQ-5: Create Objectionable Odors Affecting a Substantial Number of People.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Implementation of the proposed project would not result in the installation of any major sources of odors. In addition, no major sources of odors have been identified in the vicinity of the project site. As a result, implementation of the proposed project would not result in the long-term exposure of individuals to increased concentrations of odors. However, construction of the proposed facilities would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently and would dissipate rapidly within increasing distance from the source. As a result, short-term construction

activities would not expose a substantial number of people to frequent odorous emissions. For these reasons, this impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would also not result in exposing a substantial number of people to frequent odorous emissions. This impact would be less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operational emissions are anticipated to be similar to Phase 2. Therefore, Alternative 3 would not expose a substantial number of people to frequent odorous emissions. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.4 BIOLOGICAL RESOURCES

3.4.1 Introduction

Denise Duffy & Associates, Inc. (DD&A) prepared a Biological Resources Report (DD&A, 2019a) for the proposed project, which is contained in **Appendix D**. This section summarizes the biological resources present in the vicinity of the proposed project site, as described in the Biological Resources Report, and evaluates the potential effects of construction and operation of the proposed project and alternatives on these resources. These resources include plant communities, wildlife habitats, potentially occurring special-status plant and wildlife species, and natural communities within and adjacent to the proposed project site.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. Public and agency comments related to biological resources were received during the public scoping period, and are summarized below:

- Conduct a thorough analysis, including focused, protocol-level surveys, to determine potential presence of, impacts to, and mitigation measures for all state and federally listed species and all California Native Plant Society (CNPS) listed plants (California Rare Plant Ranks [CRPR] 1, 2, and 4) which may be in the project area;
- Conduct oak woodland surveys to determine population size, distribution, health, and adequate mitigation measures for woodlands, and include an updated forest resource evaluation;
- Consider alternative actions with a smaller footprint, especially alternatives which preserve oak woodlands contiguous to preserved woodlands on adjoining lands;
- Consider the total impact to biological resources from full build-out of all phases of the proposed project, and include mitigation measures for all phases;
- Consult with the U.S. Fish and Wildlife Service (USFWS) on potential impacts to federally listed species;
- Report any special-status species and natural communities detected during project surveys to CDFW; and
- Maintain consistency between Phase 2 plans and the Draft Fort Ord Habitat Conservation Plan (HCP).

For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.4.2 Environmental Setting

Regional Overview

The former Fort Ord, located between the Salinas and Carmel River watersheds, has a moderate Mediterranean climate, receiving 90 percent of its average 14.2 inches of annual precipitation from November through April. Most of the 27,832-acre former base consists of undeveloped training and open space areas, with 84 percent (23,473 acres) undeveloped and 16 percent (4,359 acres) developed. The

three major developed areas in the former Fort Ord are the former Main Garrison and East Garrison areas and the Marina Municipal Airport, formerly known as the Fritzsche Army Airfield.

The topography of the former Fort Ord is characterized by stabilized sand dunes in the western half of the base, transitioning to rolling hills and canyons in the eastern half. The sandy soils in the western half of the base are highly permeable and absorb much of the rainfall and runoff without forming distinct creek channels. The streams in the canyons in the eastern part of the base are small and intermittent. A number of creeks drain into the Salinas River. Canyon Del Rey drains the southern portion of the base and empties into Monterey Bay, a designated national marine sanctuary.

The soils in the former Fort Ord are characteristically medium-grained sand of low organic content. The soils are low in fertility and water-holding capacity, highly erodible, and excessively well drained. Although there are some minor inclusions of other soils, most of the soils in the former Fort Ord are represented in six major soil series (Arnold, Antioch, Baywood, Diablo, Oceano, and Santa Ynez) and three general classifications (Coastal beaches, Dune land, and Xerorthents).

The wide range of climatic, topographic, and soil conditions within the former Fort Ord contribute to the variety and uniqueness of the biological communities present. Eight broad categories of biological communities have been identified in the former Fort Ord: coastal strand and dune communities; maritime chaparral; coastal scrub; coast live oak woodland & savanna; grassland; riparian; wetland and open water; and marine communities.

Survey Methodology

Multiple biological surveys were conducted at the proposed project site between 2010 and 2019 by DD&A biologists. Additionally, ECORP conducted biological surveys of the site in 2013 and 2014 in support of the IS/EA for Phase 1 of the CCCVC project. Staub Forestry & Environmental Consulting (Staub) prepared a Forest Resource Evaluation of the project site in November 2010 (Staub, 2010). DD&A conducted a Supplemental Forest Resource Evaluation of the 2015 Master Plan area in January 2019 to verify and update the data provided in the 2010 Forest Resource Evaluation, which is included in **Appendix D** (DD&A, 2019b). The locations and dates for each of these surveys are outlined in **Table 3.4-1** below. Data collected during these surveys were used to assess the environmental conditions of the project site and its surroundings, evaluate environmental constraints at the site and within the local vicinity, and provide a basis for recommendations to minimize and avoid impacts.

The USFWS's protocol for special-status plant surveys requires surveys to be conducted approximately every three years (USFWS, 2000), while the California Department of Fish and Wildlife's (CDFW's) protocol requires surveys every one to five years depending on the vegetation types present (CDFW, 2018a). Given these protocols and that Phase 1 was constructed in 2015, the results of biological surveys prior to 2015 do not reflect current conditions. DD&A updated the vegetation map for the site in 2016, and conducted the Supplemental Forest Resource Evaluation in 2019. This analysis utilizes the best scientific information available at the time of publication. The analysis of special-status plant species within the Phase 2 site and 2015 Master Plan area is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. To provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to provide updated survey results; an addendum to the Biological Resources Report will be prepared to reflect the survey results and included in the Final EIR/EA. As phases are proposed approximately every 10 years, future phases of the 2015 Master Plan will be required to conduct biological surveys and analyses. Because special-status plant survey data would be outdated and no longer considered valid by the resource agencies, special-status plant surveys are not

proposed within the 2015 Master Plan and the programmatic analysis of special-status plant species within the 2015 Master Plan area is based on previous surveys and existing habitat conditions.

Table 3.4-1. Biological Surveys within the Proposed Project Site

Survey Type	Location	Date	Surveyor
Focused Botanical, Vegetation Types, and Reconnaissance-Level Wildlife Surveys	CCCVC Project Site	July 20 and 29, 2010; April 11, 12, 13, 15, and 18, 2011; and July 5, 2011	DD&A
Forest Resource Evaluation	CCCVC Project Site	November 2010	Staub Forestry & Environmental Consulting
Reconnaissance Survey	Phase 1 Survey Area	March 20 and 21, 2013	ECORP
Focused Botanical Survey (Spring-Blooming Species)	Phase 1 Survey Area	May 15, 2014	ECORP
Focused Botanical Survey (Summer-Blooming Species)	Phase 1 Survey Area	July 15, 2014	ECORP
Vegetation Type Mapping	CCCVC Project Site[1]	December 5-12, 2016	DD&A
Forest Resource Evaluation and Reconnaissance Survey	Phase 2 and 2015 Master Plan Areas	January 8, 2019	DD&A

Special-Status Species

Special-status species are those plants and animals that have been formally listed or proposed for listing as endangered or threatened, or are candidates for such listing under ESA or CESA. Listed species are afforded legal protection under the ESA and CESA. Species that meet the definition of rare or endangered under the CEQA Section 15380 are also considered special-status species. Animals on the CDFW's list of "species of special concern" (most of which are species whose breeding populations in California may face extirpation if current population trends continue) and avian species on USFWS's "Birds of Conservation Concern" list (birds that, without additional conservation actions, are likely to become candidates for listing under ESA) meet this definition and are typically provided management consideration through the CEQA process, although they are not legally protected under the ESA or CESA. Additionally, the CDFW also includes some animal species that are not assigned any of the other status designations in the California Natural Diversity Data Base (CNDDB); however, these species have no legal or protection status (CDFW, 2019).

Plants listed as rare under the California Native Plant Protection Act (CNPPA) or included in CNPS CRPR (formerly known as CNPS Lists) 1A, 1B, 2A, and 2B are also treated as special-status species as they meet the definitions of Sections 2062 and 2067 of the CESA and in accordance with CEQA Guidelines Section 15380.[2] In general, the CDFW requires that plant species on CRPR 1A (Plants presumed extirpated in California and Either Rare or Extinct Elsewhere), CRPR 1B (Plants rare, threatened, or endangered in California and elsewhere), CRPR 2A (Plants presumed extirpated in California, but more common elsewhere); and CRPR 2B (Plants rare, threatened, or endangered in California, but more common elsewhere) of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2019) be

[1] Final Biological Baseline Report for the Fort Ord Oak Woodland Conservation Plan project (DD&A, 2017).

[2] CNPS initially created five CRPR to categorize degrees of concern; however, to better define and categorize rarity in California's flora, the CNPS Rare Plant Program and Rare Plant Program Committee have developed the new CRPR 2A and CRPR 2B.

fully considered during the preparation of environmental documents relating to CEQA.[3] In addition, species of vascular plants, bryophytes, and lichens listed as having special-status by the CDFW are considered special-status plant species (CDFW, 2019). CNPS CRPR 4 species (plants of limited distribution) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA. Only species that fall into CRPR 1 and 2 are considered for this assessment. While other species (i.e., CRPR 3 or 4 species) are sometimes found in database searches or within the literature, these were not included within the analysis as they did not meet the definitions of Section 2062 and 2067 of CESA.

Raptors (e.g., eagles, hawks, and owls) and their nests are protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy the nest or eggs of any such bird except otherwise provided by this code or any regulation adopted pursuant thereto."

In addition, fully protected species under the Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians) are also considered special-status animal species. Species with no formal special-status designation but thought by experts to be rare or in serious decline may also be considered special-status animal species in some cases, depending on project-specific analysis and relevant, localized conservation needs or precedence.

Sensitive Habitats

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species, areas of high biological diversity, areas supporting rare or special-status wildlife habitat, and unusual or regionally restricted vegetation types. Vegetation types considered sensitive include those listed on the CDFW's *California Natural Communities List* (i.e., those habitats that are rare or endangered within the borders of California) (CDFW, 2018b), those that are occupied by species listed under ESA or are critical habitat in accordance with ESA, and those that are defined as Environmentally Sensitive Habitat Areas under the California Coastal Act. Specific habitats may also be identified as sensitive in city or county general plans or ordinances. Sensitive habitats are regulated under federal regulations (such as the Clean Water Act [CWA] and Executive Order [EO] 11990 – Protection of Wetlands), state regulations (such as CEQA and the CDFW Streambed Alteration Program), or local ordinances or policies (such as city or county tree ordinances and general plan policies).

Results

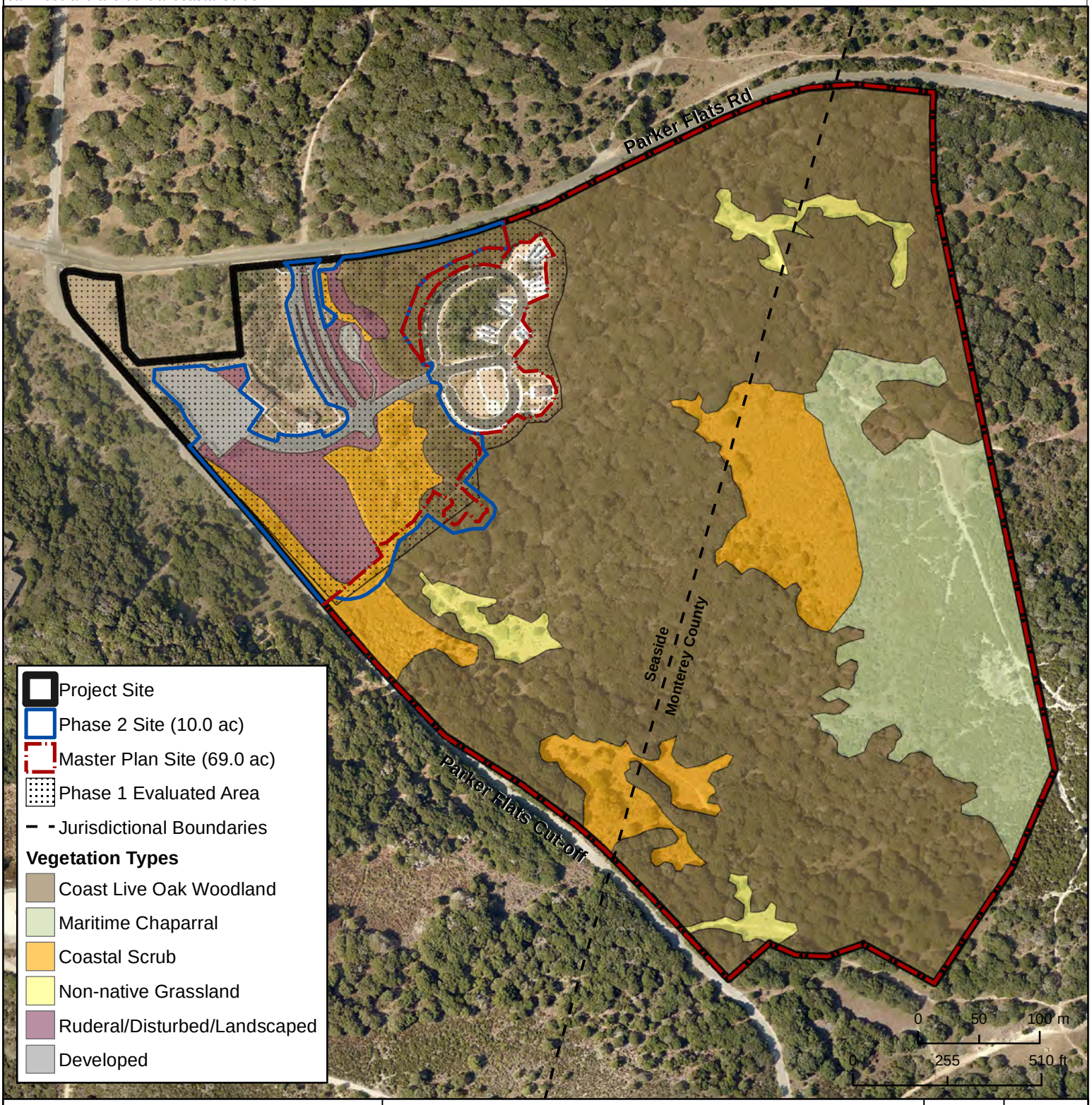
Vegetation Types

Five vegetation units were mapped within the project site (**Figure 3.4-1**). Additionally, a small portion of the project site is developed (paved road). **Tables 3.4-2** and **3.4-3** provide the acreages of these vegetation types within the Phase 2 and 2015 Master Plan sites, respectively. A brief description of each vegetation type can be found below along with a statement of the presence or potential presence of special-status species within each. In addition, each vegetation type description identifies whether the vegetation type is identified as sensitive on CDFW's *California Natural Communities List* (CDFW, 2018b).

3 CRPR 3 species (Plants about which we need more information - a review list) and CRPR 4 species (Plants of limited distribution - a watch list) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA.

Vegetation Type	Phase 2 Site				Master Plan Site		
	Permanent Impact Area	*Temporary Impact Area/ Staging*	*Preserved Area*	***Total***	*Buildout Area*	*Preserved Area*	***Total***
Coast Live Oak Woodland	1.1	0.5	1.0	**2.6**	31.1	17.1	**48.2**
Maritime Chaparral	0.0	0.0	0.0	**0.0**	1.3	10.0	**11.3**
Central Coastal Scrub	1.6	0.7	0.1	**2.4**	3.4	4	**7.4**
Non-Native Grassland	0.0	0.0	0.0	**0.0**	1.5	0.6	**2.1**
Ruderal/Disturbed/Landscaped	1.7	1.1	0.1	**2.9**	0.0	0.0	**0.0**
Developed	0.0	2.1	0.0	**2.1**	0.0	0.0	**0.0**
Total	**4.4**	**4.4**	**1.2**	**10**	**37.3**	**31.7**	**69**

Please note that the Phase 2 Temporary Impact Area/Staging overlaps with the Master Plan Site. As such, there is overlap in the vegetation type acreages of coast live oak woodland and central coastal scrub.



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Vegetation Map

N

Date 04-09-2019

Scale 1 in = 366.7 ft

Figure 3.4-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 8 - Vegetation Map.mxd

Table 3.4-2. Vegetation Types within the Phase 2 Site

Vegetation Type	Phase 2 Site (Acres)			
	Permanent Impact Area	Temporary Impact Area/Staging	Preserved Area	Total
Coast Live Oak Woodland	1.1	0.5	1.0	**2.6**
Central Maritime Chaparral	0.0	0.0	0.0	**0.0**
Central Coastal Scrub	1.6	0.7	0.1	**2.4**
Non-Native Grassland	0.0	0.0	0.0	**0.0**
Ruderal/Disturbed/Landscaped	1.7	1.1	0.1	**2.9**
Developed	0.0	2.1	0.0	**2.1**
Total	**4.4**	**4.4**	**1.2**	**10.0**
Bold indicates a sensitive habitat addressed in the Fort Ord HMP.				

Table 3.4-3. Vegetation Types within the 2015 Master Plan Site

Vegetation Type	2015 Master Plan Site (Acres)		
	Buildout Area	Preserved Area	Total
Coast Live Oak Woodland	31.1	17.1	**48.2**
Central Maritime Chaparral	1.3	10.0	**11.3**
Central Coastal Scrub	3.4	4	**7.4**
Non-Native Grassland	1.5	0.6	**2.1**
Ruderal/Disturbed/Landscaped	0.0	0.0	**0.0**
Developed	0.0	0.0	**0.0**
Total	**37.3**	**31.7**	**69.0**
Bold indicates a sensitive habitat addressed in the Fort Ord HMP.			

Coast Live Oak Woodland

Coast live oak (*Quercus agrifolia*) woodland is the dominant vegetation type within both the 2015 Master Plan and Phase 2 sites (**Figure 3.4-1**). The canopy is quite dense in many areas, and the understory is dominated by poison oak (*Toxicodendron diversilobum*) or, in some areas, invasive hottentot fig (also called ice plant; *Carpobrotus edulis*). Other plant species present within the coast live oak woodland include hedge-nettle (*Stachys* sp.), slender wild oat (*Avena barbata*), sheep sorrel (*Rumex acetosella*), fiesta flower (*Pholistoma auritum*), and scattered shrubs such as fuchsia-flowered gooseberry (*Ribes speciosum*), California coffeeberry (*Frangula californica*), and sticky monkey flower (*Diplacus aurantiacus*).

Coast live oak woodland is important habitat to many wildlife species. Oaks provide nesting sites for many avian species and cover for a variety of mammals, including mourning dove (*Zenaida macroura*), American kestrel (*Falco sparverius*), California ground squirrel (*Spermophilus beecheyi*), and California pocket mouse (*Chaetodipus californicus*). Acorns provide an important food source for acorn woodpecker (*Melanerpes formicivorus*), western scrub jay (*Aphelocoma californica*), and black-tailed deer (*Odocoileus hemionus columbianus*). Other common wildlife species found in the coast live oak woodland are raccoon (*Procyon lotor*), Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*). Generally, red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*) nest and roost in the coast live oaks. Additional avian species that may be found within the oak woodland habitat are presented in Appendix D of the Biological Resources Report (**Appendix D**).

No special-status plant species were observed within oak woodlands during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014a). However, suitable habitat for several special-status plant species is present within this vegetation type (**Appendix D**). As discussed in **Survey Methodology**, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of

2019 to provide updated survey results; an addendum to the Biological Resources Report will be prepared to reflect the survey results and included in the Final EIR/EA. In addition, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan, in compliance with CEQA, NEPA, ESA, and CESA.

No special-status wildlife species were observed within the coast live oak woodlands; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. The Northern California legless lizard and the coast horned lizard may also use this vegetation type for foraging and cover, and special-status bats and protected avian species, including Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, oak titmouse, Lawrence's goldfinch, Nuttall's woodpecker, spotted towhee, and Allen's hummingbird, may nest or roost within the coast live oak trees. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a portion of coast live oak woodland habitat within the 2015 Master Plan site is within the known dispersal range of the California tiger salamander (CTS) and may be used as upland aestivation and dispersal habitat for this species (please refer to species discussion below).

Oak woodlands are considered important natural communities because they provide a variety of ecological, aesthetic, and economical values. The extent of oak woodland in California has declined due to agricultural conversion, urban development, fuelwood harvesting, and grazing activities. Coast live oak woodland is not considered a sensitive natural community by CDFW (CDFW, 2018b); however, as a native tree and habitat, coast live oak trees and woodlands are typically protected under local tree removal ordinances and impacts are usually addressed and mitigated under CEQA.

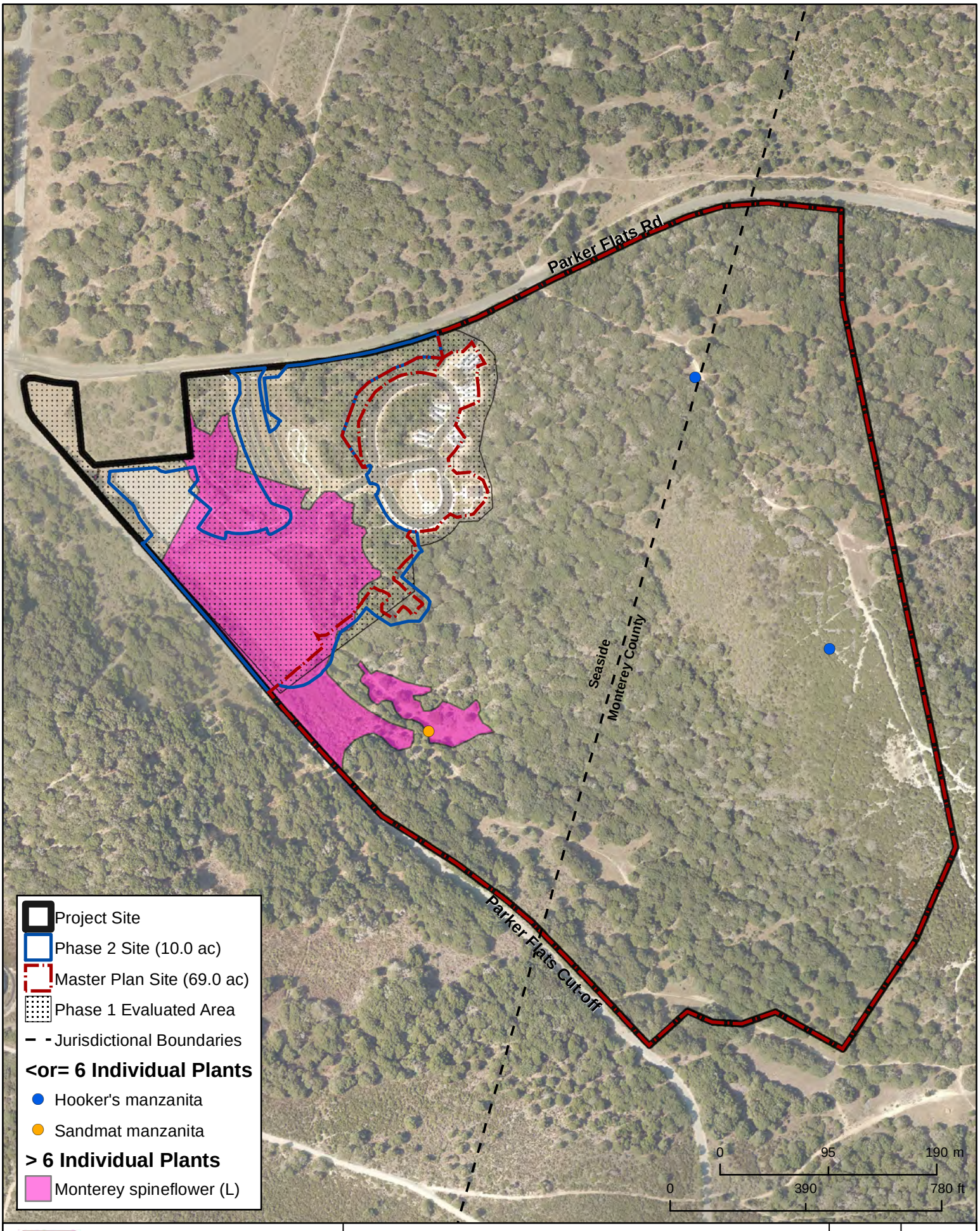
Central Maritime Chaparral

Central maritime chaparral is the second most dominant vegetation type within the 2015 Master Plan site (**Figure 3.4-1**), where it is dominated by shaggy-barked manzanita, dwarf ceanothus, coyote brush (*Baccharis pilularis*), chamise, and sticky monkey flower. Additional species within this vegetation type include California coffeeberry, fuchsia-flowered gooseberry, chaparral currant (*Ribes malvaceum*), poison oak, black sage (*Salvia mellifera*), sticky cinquefoil (*Drymocallis glandulosa*), and creeping snowberry (*Symphoricarpos mollis*). Central maritime chaparral does not occur within the Phase 2 site.

Common wildlife species that occur within central maritime chaparral include California quail (*Callipepla californica*), California towhee (*Melozone crissalis*), California thrasher (*Toxostoma redivivum*), common poorwill (*Phalaenoptilus nuttallii*), Anna's hummingbird (*Calypte anna*), wrentit (*Chamaea fasciata*), western scrub jay, northern pacific rattlesnake (*Crotalus oreganus* ssp. *oreganus*), coast range fence lizard (*Sceloporus occidentalis bocourtii*), gopher snake (*Pituophis catenifer catenifer*), coast gartersnake (*Thamnophis elegans terrestris*), and brush rabbit (*Sylvilagus bachmani*). Additional avian species that may be found within the central maritime chaparral are presented in Appendix D of the Biological Resources Report (**Appendix D**).

Hooker's manzanita (one individual) was the only special-status plant species identified within this vegetation type during focused botanical surveys in 2010 and 2011 (DD&A, 2013; **Figure 3.4-2**). However, suitable habitat for several other special-status plant species is present within this vegetation type (**Appendix D**). As discussed in **Survey Methodology**, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan, in compliance with CEQA, NEPA, ESA, and CESA.

No special-status wildlife species were observed within central maritime chaparral; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. Lawrence's goldfinch, wrentit, and spotted towhee may nest within this vegetation type, and



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2010 and 2011 Botanical Survey Results

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Date
04-09-2019

Scale
1 in = 0.1 mi

Figure
3.4-2

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 5 - Rare Plant Map.mxd

the Northern California legless lizard, horned lizard, Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, and rufous hummingbird may use this vegetation type for foraging and/or cover. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a portion of central maritime chaparral within the 2015 Master Plan site is within the known dispersal range for CTS and may be used as upland aestivation and dispersal habitat for this species (please refer to species discussion below).

Central Coastal Scrub

Central coastal scrub occurs within both the 2015 Master Plan and Phase 2 sites (**Figure 3.4-1**). Holland (1986) describes central coastal scrub as an area with dense shrubs, approximately one to two meters tall, which lacks grassy openings and is often integrated with other vegetation types. Dominant shrub species in the central coastal scrub include black sage, coyote brush, poison oak, mock heather (*Ericameria ericoides*), sticky monkey flower, and coast sagebrush (*Artemisia californica*).

Central coastal scrub communities provide cover and food for a number of wildlife species, including songbirds, snakes, lizards, rodents, and other small mammals. Common species that may occur within central coastal scrub include California quail, blue-gray gnatcatcher (*Polioptila caerulea*), Anna's hummingbird, coast range fence lizard, northern pacific rattlesnake, gopher snake, brush rabbit, and California ground squirrel. Additional avian species that may be found within the central coastal scrub community are presented in Appendix D of the Biological Resources Report (**Appendix D**).

Monterey spineflower was the only special-status plant species identified within this vegetation type during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014a) (**Figures 2.3-2** and **3.4-3**). As discussed in **Survey Methodology**, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to provide updated survey results; an addendum to the Biological Resources Report will be prepared to reflect the survey results and included in the Final EIR/EA. In addition, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan, in compliance with CEQA, NEPA, ESA, and CESA.

No special-status wildlife species were observed within this vegetation type; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. Lawrence's goldfinch, wrentit, spotted towhee, and Allen's hummingbird may nest within this vegetation type, and the Northern California legless lizard, coast horned, Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, and rufous hummingbird may use this vegetation type for foraging and/or cover. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a very small area of central coastal scrub within the 2015 Master Plan site occurs within the known dispersal range for CTS and may be used as upland aestivation and dispersal habitat for this species (please refer to species discussion below).

Non-Native Grassland

Throughout California, non-native grasslands typically occur in open areas of valleys and foothills, usually on fine-textured clay or loam soils that are somewhat poorly drained (Holland, 1986). This vegetation type is often dominated by non-native annual grasses and forbs along with scattered native grasses and wildflowers. Non-native grassland occurs within the 2015 Master Plan site (**Figure 3.4-1**). The dominant species observed within this community include slender oat, ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), rat-tail fescue (*Festuca myuros*), and long-beaked filaree (*Erodium botrys*).

Additional species found within this habitat include needlegrass (*Stipa* sp.), sky lupine (*Lupinus nanus*), California poppy (*Eschscholzia californica*), wedge-leaved horkelia (*Horkelia cuneata*), sheep sorrel, and telegraphweed (*Heterotheca grandiflora*). Non-native grassland does not occur within the Phase 2 site.



Map Features

- Phase 1 Area
- Impact Area

Monterey Spineflower Populations [1]

- Avoided
- Impacted

Virgate Eriastrum Populations [2]

- Impacted

Scale in Feet
0 150

[1] *Monterey spineflower occurs throughout the site. The occurrences mapped here represent only the largest and most dense groups observed on-site.*

[2] *Virgate eriastrum occurs throughout the site. The occurrences mapped here represent only the largest and most dense groups observed on-site.*

Source: Phase 1 IS/EA

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2014 ECORP Botanical Survey Results

N

Date
04-05-19

Figure
3.4-3

Non-native grasslands provide habitat to a number of common wildlife species. Botta's pocket gopher (*Thomomys bottae*), California ground squirrel, and several rodent species use non-native grasslands for foraging and cover. Raptors, including red-tailed hawk, are also known to forage in this habitat. Reptiles, such as northern pacific rattlesnake, gopher snake, and coast range fence lizard, are also common non-native grassland species. Avian species that may be found within non-native grassland include grasshopper sparrow (*Ammodramus savannarum*), savannah sparrow (*Passerculus sandwhicheneis*), western kingbird (*Tyrannus verticalis*), and red-tailed hawk. Additional avian species are presented in Appendix D of the Biological Resources Report (**Appendix D**).

Monterey spineflower and sandmat manzanita (one individual, observed along the boundary between this vegetation type and coast live oak woodland) were identified within this vegetation type during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014a) (**Figures 3.4-2 and 3.4-3**). However, suitable habitat for several other special-status plant species is present within this vegetation type (**Appendix D**). As discussed in **Survey Methodology**, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan, in compliance with CEQA, NEPA, ESA, and CESA.

No special-status wildlife was observed within the non-native grassland; however, special-status bats and protected avian species, including Townsend's big-eared bat, hoary bat, Cooper's hawk, and white-tailed kite, may forage within this vegetation type. Additionally, suitable nesting and foraging habitat for spotted towhee, California horned lark, obscure bumble bee, and western bumble bee is present within the non-native grassland. The Northern California legless lizard may use this vegetation type for foraging and cover while coast horned lizard may utilize open, sandy areas within non-native grassland for basking. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew.

Ruderal

Ruderal areas are those areas which have been disturbed by human activities and are dominated by non-native annual grasses and other "weedy" species. Ruderal areas within the Phase 2 site include areas disturbed by Phase 1 construction, including the detention basin (**Figure 3.4-1**). Ruderal areas include vegetation dominated by hottentot fig, ripgut grass, slender oat, cut-leaved plantain (*Plantago coronopus*), English plantain (*P. lanceolata*), sand mat (*Cardionema ramosissimum*), long-beaked filaree, and telegraphweed. Ruderal areas do not occur within the 2015 Master Plan site.

This vegetation type is considered to have low biological value as it is generally dominated by non-native plant species and consists of relatively low-quality habitat from a wildlife perspective. However, common wildlife species which do well in urbanized and disturbed areas, such as the American crow (*Corvus brachyrhynchos*), California ground squirrel, raccoon, striped skunk(*Mephitis mephitis*), western scrub jay, European starling (*Sturnus vulgaris*), coast range fence lizard, and rock pigeon (*Columba livia*), may forage within this vegetation type.

Monterey spineflower was identified within this vegetation type focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014a) (**Figures 3.4-2** and **3.4-3**). However, marginal habitat for several other special-status plant species is present within this vegetation type (**Appendix D**). As discussed in **Survey Methodology**, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to provide updated survey results; an addendum to the Biological Resources Report will be prepared to reflect the survey results and included in the Final EIR/EA.

Although ruderal areas represent relatively low-quality wildlife habitat, some special-status wildlife species may occur: coast horned lizards often occupy open, sandy areas; Northern California legless lizard may occur where loose, sandy soils are present; the spotted towhee may forage within this vegetation type; and obscure and western bumble bees may nest and forage within this vegetation type.

Developed

Developed areas within the Phase 2 site include paved roads, parking lots, and structures associated with the Phase 1 development of the site (**Figure 3.4-1**). No vegetation is present within these areas and they are considered to have little biological value. However, some common wildlife species that do well in urbanized areas, including American crow, California ground squirrel, raccoon, striped skunk, western scrub jay, European starling, and rock pigeon, may be found foraging within developed areas. Developed areas do not occur within the 2015 Master Plan site.

No special-status plant or wildlife species were observed within developed areas during biological surveys of the project site and none are expected to occur based on lack of suitable habitat.

Special-Status Species

Published occurrence data within the project area and surrounding USGS quadrangles were evaluated to compile a table of special-status species known to occur in the vicinity of the project site (please see "Methods" of **Appendix D**). Each of these species was evaluated for their likelihood to occur within and immediately adjacent to the project site (please see Appendix C of the Biological Resources Report [**Appendix D**]). The special-status species that are known to or have been determined to have a moderate or high potential to occur within or immediately adjacent the project site are discussed below. All other species are assumed unlikely to occur or have a low potential to occur based on the species-specific reasons presented in **Appendix D**, are therefore unlikely to be impacted by the project, and are not discussed further.

Special-Status Wildlife Species

Table 3.4-4 identifies the potential for special-status wildlife species to occur within the proposed project site. A discussion of each species is provided below.

Table 3.4-4. Potential for Special-Status Wildlife Species Presence within the Proposed Project Site

Species	2015 Master Plan	Phase 2
Townsend's big-eared bat	Moderate	Moderate
Hoary bat	Moderate	Moderate
Monterey dusky-footed woodrat	Present	Present
Monterey ornate shrew	Moderate	Moderate
Cooper's hawk	Present	Present
Oak titmouse	High	High
Lawrence's goldfinch	Moderate	Moderate
Wrentit	High	High
White-tailed kite	High	High
California horned lark	Moderate	Unlikely
Nuttall's woodpecker	Moderate	Moderate
Spotted towhee	High	High
Rufous hummingbird	Moderate	Moderate
Allen's hummingbird	Moderate	Moderate
California tiger salamander	Moderate	Unlikely
Northern California legless lizard	High	High
Coast horned lizard	High	High
Obscure bumble bee	Moderate	Low
Western bumble bee	Moderate	Low
***Bold** indicates a Fort Ord HMP Species.*		

Special-Status Bat Species

Special-status bat species, including Townsend's big-eared bat and hoary bat, have the potential to occur within the project site. These species may utilize some of the coast live oak trees within both the 2015 Master Plan and Phase 2 sites for night roosts and may forage over all undeveloped areas of the project site.

The CNDDB reports one occurrence of Townsend's big-eared bat within the seven quadrangles reviewed, located approximately 5.7 km from the project site. Suitable foraging and night roost habitat for this species is present within both the 2015 Master Plan and Phase 2 sites; however, suitable habitat for day, colonial, or maternal roots is not available.

The CNDDB reports two occurrences of hoary bat within the seven quadrangles reviewed, the nearest reported approximately 8.3 km from the project site. Suitable foraging and day and night roost habitat for this species is present within the both the 2015 Master Plan and Phase 2 sites; however, the project site is outside the known breeding range of this species.

Monterey Dusky-Footed Woodrat

The Monterey dusky-footed woodrat is a CDFW species of special concern. This is a subspecies of the dusky-footed woodrat *(Neotoma macrotis)*, which is common to oak woodlands and other forest types throughout California. Dusky-footed woodrats are frequently found in forest habitats with moderate canopy cover and a moderate to dense understory, including riparian forests; however, they may also be found in chaparral communities. Relatively large nests are constructed of grass, leaves, sticks, and feathers and are built in protected spots, such as rocky outcrops or dense brambles of blackberry and/or poison oak. Typical food sources for this species include leaves, flowers, nuts, berries, and truffles. Dusky-footed woodrats may be a significant food source for small- to medium-sized predators. Populations of this species may be limited by the availability of nest material. Within suitable habitat, nests are often found in close proximity to each other.

The CNDDB does not report any occurrences of Monterey dusky-footed woodrat within the seven quadrangles reviewed. However, this species is known to occur throughout the former Fort Ord and woodrat nests were observed within both the 2015 Master Plan and Phase 2 sites during field surveys. The Monterey dusky-footed woodrat is, therefore, assumed present within both sites.

Monterey Ornate Shrew

The Monterey ornate shrew, also known as the Salinas ornate shrew, is a CDFW species of special concern and HMP species. In general, this shrew is common in the southern two-thirds of California west of the Sierra Nevada, from Mendocino to Butte counties, south to the Mexican border. It occupies a variety of mostly moist or riparian woodland habitats and also occurs within chaparral, grassland, and emergent wetland habitats where there is thick duff or downed logs. The breeding season is long; while most pregnancies occur in March and April, they may occur from February through October. The litter size is about six and females may have more than one litter per year. Most individuals do not live to breed a second year. Foraging occurs under logs rocks and leaf litter, and prey items are mostly insects and some other invertebrates.

The CNDDB does not report any occurrences of the Monterey ornate shrew within the seven quadrangles reviewed; however, the HMP identifies the project site as containing potential habitat for this species. As with most shrews, little is known about their ecology since they are hard to locate and do not survive well in traps due to very high metabolic rates. However, recent field surveys on the University of California's Fort Ord Natural Reserve found that vegetation types within the project site (e.g., non-native grassland, coast live oak woodland, central coastal scrub, and central maritime chaparral) are likely considered

suitable habitat for the shrew. Therefore, there is a moderate potential for the Monterey ornate shrew to occur within these vegetation types in both the 2015 Master Plan and Phase 2 sites.

California Tiger Salamander

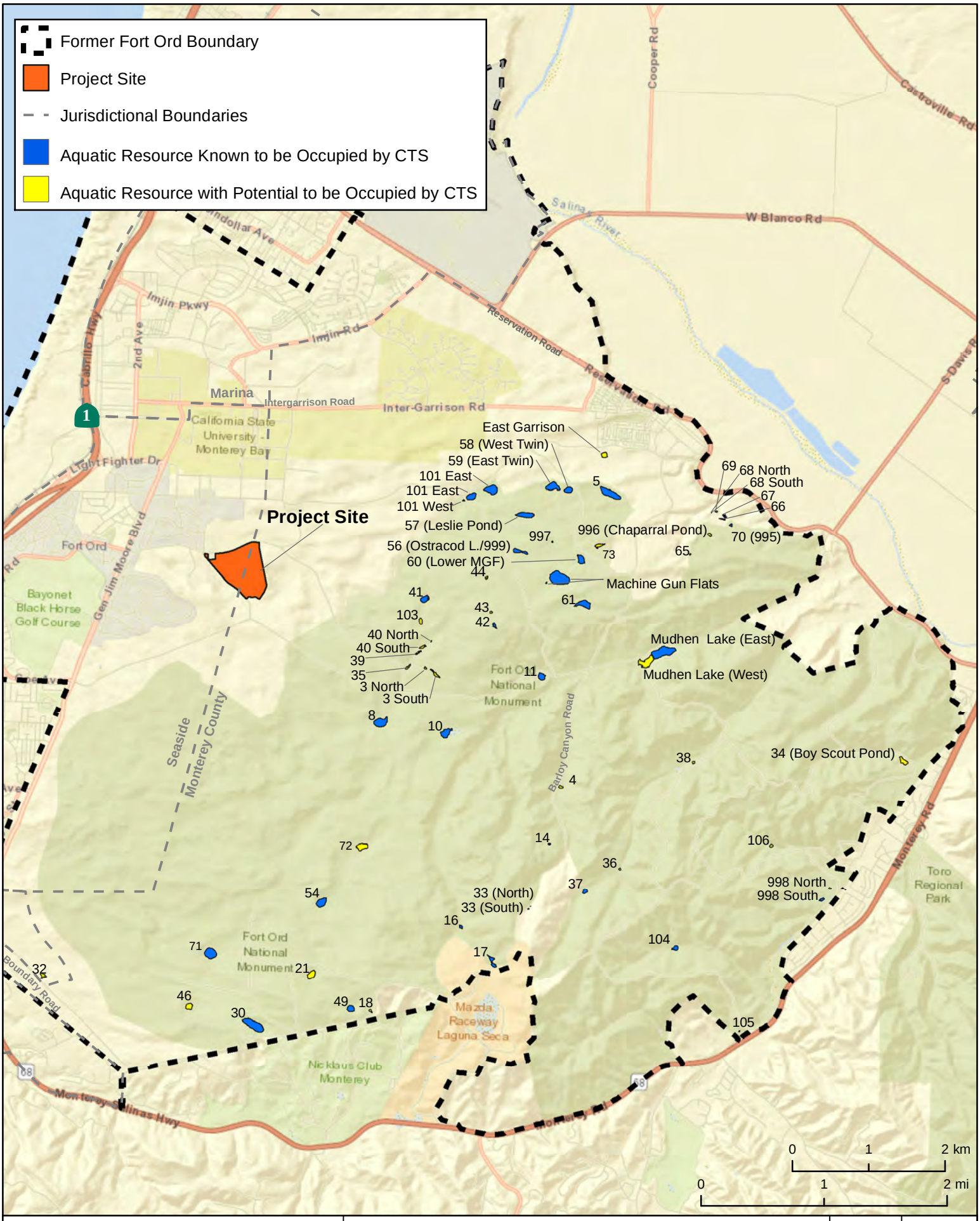
The CTS was listed as a federally threatened species on August 4, 2004 (69 FR 47211-47248). Critical habitat was designated for CTS on August 23, 2005 (70 FR 49379-49458), and went into effect on September 22, 2005. Additionally, CTS was listed as a state threatened species on March 3, 2010.

The CTS is a large, stocky salamander most commonly found in annual grassland habitat, but also occurring in the grassy understory of valley-foothill hardwood and chaparral habitats, and uncommonly along stream courses in valley-foothill riparian habitats. Adults spend most of their lives underground, typically in burrows of ground squirrels and other animals. The California tiger salamander has been eliminated from an estimated 55 percent of its documented historic breeding sites. Currently, about 150 known populations of California tiger salamanders remain. The CTS persists in disjunct remnant vernal pool complexes in Sonoma County and Santa Barbara County, in vernal pool complexes and isolated stockponds scattered along a narrow strip of rangeland on the fringes of the Central Valley from southern Colusa County south to northern Kern County, and in sag ponds and human-maintained stockponds in the coast ranges from the San Francisco Bay Area south to the Temblor Range, including within the Fort Ord National Monument.

Above-ground migratory and breeding activity may occur under suitable environmental conditions from mid-October through May. Adults may travel long distances between upland and breeding sites; adults have been found more than two kilometers (1.24 miles) from breeding sites (USFWS, 2004). Breeding occurs from November to February, following relatively warm rains. The CTS breeds and lays eggs primarily in vernal pools and other temporary rainwater ponds. Permanent human-made ponds are sometimes utilized if predatory fishes are absent; streams are rarely used for reproduction. Eggs are laid singly or in clumps on both submerged and emergent vegetation and on submerged debris in shallow water. Males typically spend six to eight weeks at breeding ponds, while females typically spend only one to two weeks. Eggs hatch within 10 to 14 days and a minimum of 10 weeks is required to complete development through metamorphosis; however, the larval stage may last up to six months and some larvae in Contra Costa and Alameda Counties may remain in their breeding sites over the summer (USFWS, 2004).

The CNDDB reports 51 occurrences of CTS within the seven quadrangles evaluated, 22 of which occur within the former Fort Ord. Extensive surveys have been conducted within the former Fort Ord to determine the aquatic resources that are known or have the potential to be occupied by CTS (**Figure 3.4-4**). The nearest known CTS-occupied pond, Pond 41, is located approximately 2.02 km from the 2015 Master Plan site (Burleson Consulting and DD&A, 2017).

USFWS considers suitable upland aestivation habitat within two kilometers of known or potential breeding locations for CTS as occupied habitat unless protocol-level surveys pursuant to the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* are conducted with negative results (USFWS and CDFW, 2003).



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Former Fort Ord CTS Aquatic Resources

Date: 01-07-2019
Scale: 1 in = 1 mi
Figure: 3.4-4

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The project site (i.e., 2015 Master Plan or Phase 2) is not located within two kilometers of any aquatic resources known or with the potential to be occupied by CTS (**Figure 3.4-5**).

In some instances, CDFW applies a four-zone methodology to in considering the relative impact of a proposed project to CTS and suitable upland habitat, as follows:

- Zone 1: 380 meters (0.24 mile) – the distance that greater than 50% of dispersing CTS adults and approximately 50% of dispersing CTS sub-adults will travel from the breeding pond;
- Zone 2: 630 meters (0.39 mile) – the distance within which greater than 95% of dispersing CTS are found;
- Zone 3: 1 km (0.62 mile) – the distance that ongoing studies have shown that adults and juveniles routinely move; and
- Zone 4: 2.2 km (1.3 miles) – the greatest distance adults have been found to move from a breeding site.

A portion of the 2015 Master Plan is located within 2.2 kilometers of known and potential CTS breeding ponds, specifically within Zone 4 (**Figure 3.4-5**). **Figure 3.4-5** and **Table 3.4-5** present the area of vegetation types within the site that fall within this zone. The Phase 2 site is outside the 2.2 km known dispersal range of CTS and this species is, therefore, unlikely to occur within this site. Based on this analysis, CTS is unlikely to occur within the Phase 2 site and has a moderate potential to occur within the 2015 Master Plan site.

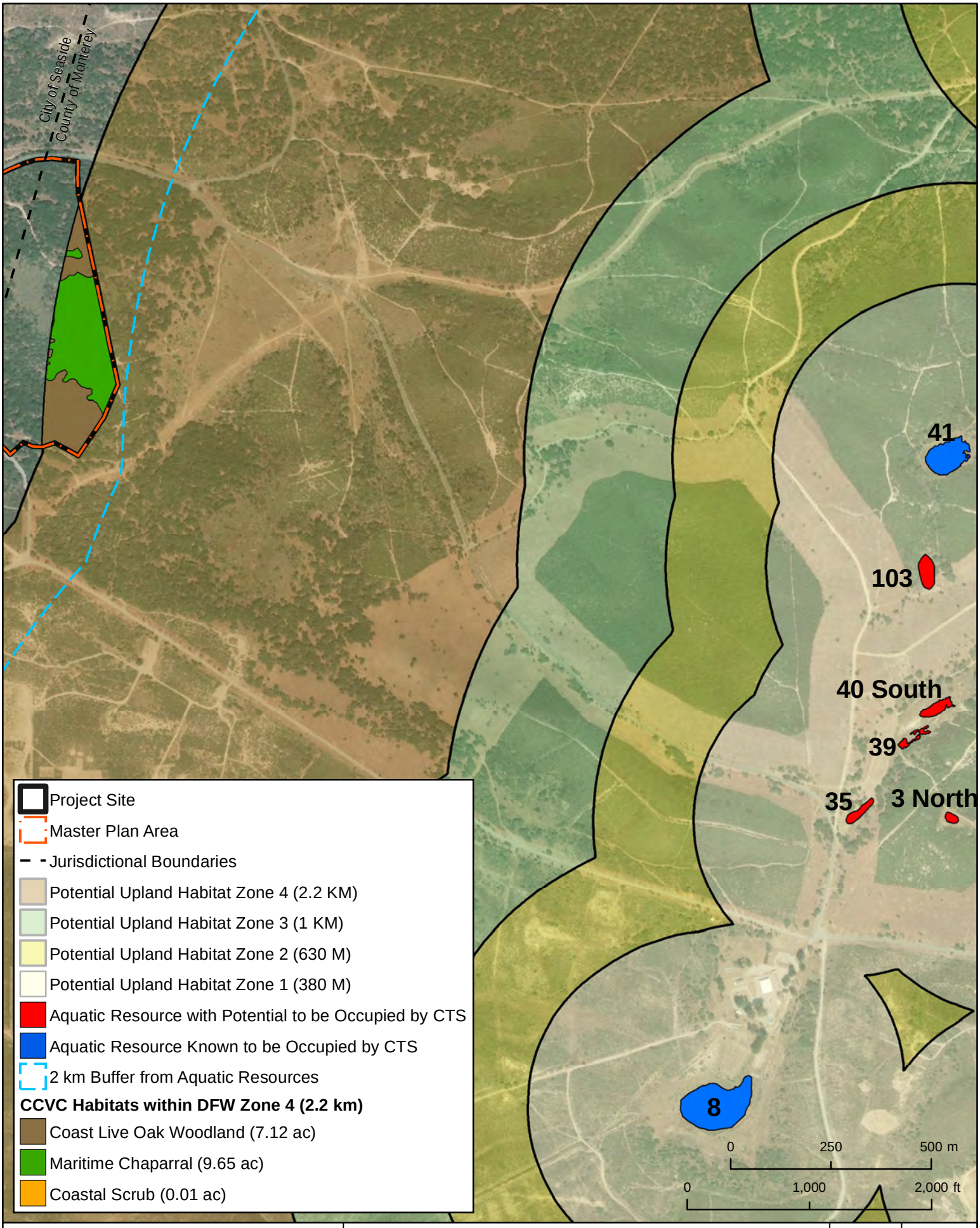
Table 3.4-5. Area of Potential CTS Habitat within the 2015 Master Plan Site

Vegetation Type	2015 Master Plan (Acres)		
	Buildout Area	Preserved Area	Total
Coast Live Oak Woodland	3.43	3.69	**7.12**
Central Maritime Chaparral	0.86	8.79	**9.65**
Central Coastal Scrub	0	0.01	**0.01**
Total	**4.29**	**12.49**	**16.78**

Northern California Legless Lizard

The Northern California legless lizard is a CDFW species of special concern, as well as an HMP species.[4] This fossorial (burrowing) species typically inhabits sandy or loose (friable) soils. Habitats known to support Northern California legless lizard include (but are not limited to) coastal dunes, valley and foothill grasslands, chaparral, and coastal scrub at elevations from near sea level to approximately 1,800 meters (6,000 feet). The Northern California legless lizard forages on invertebrates beneath the leaf litter or duff layer at the base of bushes and trees or under wood, rocks, and slash in appropriate habitats.

[4] The HMP identifies this species as black-legless lizard (*Anniella pulchra* ssp. *nigra*) in order to differentiate it from the previously identified silvery-legless lizard (*A. p.* ssp. *pulchra*). These subspecies are based primarily on phenotypic differences (black-legless lizard being much darker, having fewer scales on the back, and a relatively shorter tail) and very limited genetic work. Further, the range of the black-legless lizard has historically been classified as "restricted to coastal and interior dune sand other areas of sandy soils in the vicinity of Monterey Bay and the Monterey Peninsula", while the range of silvery-legless lizard has been classified as widespread throughout central California. However, recent genetic studies have revealed five lineages of this species that correspond with different geographic areas of California (Parham and Papenfuss, 2008). These studies do not, however, identify the legless lizards occurring on the coast of Monterey Bay (i.e. the currently designated black-legless lizard) as a separate lineage. Currently, CDFW identifies both subspecies as the Northern California legless lizard and this document, therefore, follows the current regulatory identification.



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Potential and Known CTS Upland and Aquatic Habitat

N

Date
03-01-2019

Scale
1 in = 0.2 mi

Figure
3.4-5

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The diet of this species likely overlaps to some extent with that of juvenile alligator lizards and perhaps some other salamanders. This species may be preyed upon by alligator lizards, snakes, birds, and small mammals. Little is known about the specific habitat requirements for courtship and breeding; however, the mating season for this species is believed to begin late spring or early summer, with one to four live young born between September and November.

The CNDDB reports 50 occurrences of Northern California legless lizard within the seven quadrangles reviewed, and this species has been observed in several areas of the former Fort Ord. Suitable habitat for Northern California legless lizard is present throughout all undeveloped areas of the project site where appropriate soil conditions occur. Therefore, there is a high potential for the Northern California legless lizard to occur within both the 2015 Master Plan and Phase 2 sites.

Coast Horned Lizard

The coast horned lizard is a CDFW species of special concern. Horned lizards occur in valley-foothill hardwood, conifer, and riparian habitats, as well as in pine-cypress, juniper, chaparral, and annual grass habitats. This species generally inhabits open country, especially sandy areas, washes, flood plains, and wind-blown deposits in a wide variety of habitats. Coast horned lizards rely on camouflage for protection and will often lay motionless when approached. Horned lizards often bask in the early morning on the ground or on elevated objects such as low boulders or rocks. Predators and extreme heat are avoided by burrowing into loose soil. Periods of inactivity and winter hibernation are spent burrowed into the soil or under surface objects. Little is known about the habitat requirements for breeding and egg-laying of this species. Prey species include ants, beetles, wasps, grasshoppers, flies, and caterpillars.

The CNDDB reports five occurrences of the coast horned lizard within the seven quadrangles reviewed, the nearest of which is approximately 3.2 km from the project site. Additionally, this species has been observed throughout Fort Ord by DD&A biologists. Suitable habitat for this species is present within the project site within central maritime chaparral and central coastal scrub habitats and within open, sandy areas of the non-native grassland and ruderal habitats. Therefore, there is a high potential for the coast horned lizard to occur within both the 2015 Master Plan and Phase 2 sites.

Obscure and Western Bumble Bees

The obscure bumble bee is on the CNDDB list of "special animals." Native to the west coast of the United States, this species occurs primarily along the coast in grassy prairies and meadows within the Coast Ranges. It can nest both under and above ground, and is found in areas which are relatively humid or frequently foggy. Recent data suggest that the obscure bumble bee is currently experiencing very high population decline throughout its entire range (Hatfield et al, 2014). However, this species can be easily overlooked because of its close resemblance to other common bees, which may be a factor in its apparent decline. Therefore, there is uncertainty if the species is truly experiencing a population decline.

The western bumble bee is on the CNDDB list of "special animals." This species occurs in open grassy areas, urban parks, urban gardens, chaparral, and meadows, and it generally nests underground. Like the obscure bumble bee, it has been experiencing recent population decline throughout most of its range, much of it caused by pathogens and parasites. Other stressors include habitat loss and alteration due to agricultural intensification, urban development, conifer encroachment, grazing, logging, and climate change.

Suitable habitat for these species is present within the non-native grassland in the 2015 Master Plan site. Only low-quality habitat for these species is present within the Phase 2 site where ruderal areas are dominated by non-native grasses and forbs. The CNDDB reports four occurrences of the obscure bumble bee and six occurrences of the western bumble bee within the quadrangles reviewed, the nearest

occurrences approximately 10 km and 8.3 km from the project site, respectively. Therefore, these species have a low potential to occur within the Phase 2 site and a moderate potential to occur within the 2015 Master Plan site.

Nesting Raptors and Other Protected Avian Species

Raptors, their nests, and other nesting birds are protected under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. While the life histories of these species vary, overlapping nesting (approximately February through August) and foraging similarities allow for their concurrent discussion. Most raptors are breeding residents throughout most of the wooded portions of the state. Stands of live oak, riparian deciduous, or other forest habitats, as well as open grasslands, are used most frequently for nesting. Breeding occurs February through August, with peak activity May through July. Prey for these species includes small birds, small mammals, and some reptiles and amphibians. Many raptor species hunt in open woodland and habitat edges.

Various species of raptors, such as red-tailed hawk, red-shouldered hawk, great horned owl, American kestrel, and turkey vulture, have a potential to nest within any of the large coast live oak trees present within the project site.

Several special-status avian species are known or have the potential to occur within the project site. Cooper's hawk has been observed on the project site and has the potential to nest within the coast live oak woodland. In addition, suitable nesting and foraging habitat is present for the white-tailed kite, oak titmouse, Nuttall's woodpecker, Lawrence's goldfinch, wrentit, Allen's hummingbird, spotted towhee, and California horned lark. The rufous hummingbird may also forage over any of the undeveloped areas within the site; however, this species does not nest in California.

Special-Status Plant Species

As identified in **Survey Methodology**, focused botanical surveys for special-status plant species were conducted within the entire project site in 2010 and 2011, and within the Phase 1 site (including a portion that overlaps with the Phase 2 site) in 2013 and 2014. Given the resources agencies' survey protocols and that Phase 1 was constructed in 2015, the results of biological surveys prior to 2015 do not reflect current conditions. This analysis utilizes the best scientific information available at the time of publication. The analysis of special-status plant species within the Phase 2 site and 2015 Master Plan area is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. To provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to provide updated survey results; an addendum to the Biological Resources Report will be prepared to reflect the survey results and included in the Final EIR/EA. As phases are proposed approximately every 10 years, future phases of the 2015 Master Plan will be required to conduct biological surveys and analyses.

Table 3.4-6 outlines the special-status plant species that were observed within the proposed project site during the previous survey efforts. In addition, **Table 3.4-6** identifies species with a high to moderate potential to occur within the project site that were not considered special-status by CNPS, CDFW, or USFWS at the time of the previous surveys (i.e., Fort Ord spineflower and northern curly-leaved monardella). A discussion of each of these species is also provided below. Suitable habitat for several other special-status plant species is present within the project site; however, because these species were not found within the project site during previous surveys, their potential to occur is low and they are not discussed within this section (**Appendix D**).

Table 3.4-6. Potential for Special-Status Plant Species Presence within the Proposed Project Site

Species	2015 Master Plan	Phase 2
Hooker's manzanita	Present	Low
Sandmat manzanita	Present	Low
Monterey ceanothus	High	Low
Fort Ord spineflower	High	High
Monterey spineflower	Present	Present
Virgate eriastrum	High	High
Northern curly-leaved monardella	Moderate	Low
***Bold** indicates Fort Ord HMP Species.*		

Hooker's Manzanita

Hooker's manzanita is a CNPS CRPR 1B and HMP species in the Ericaceae family. This evergreen shrub blooms from January to June and is associated with closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub habitats on sandy soils at a range of 85-536 meters in elevation.

Two Hooker's manzanita individuals were identified within the 2015 Master Plan site during focused botanical surveys in 2010 and 2011 (DD&A, 2013) (**Figure 3.4-2**). One individual was identified within the maritime chaparral while the other was observed within the non-native grassland on the margin of coast live oak woodland. This species was not observed within the Phase 2 site during surveys. Suitable habitat for Hooker's manzanita is present within the 2015 Master Plan and Phase 2 sites.

Sandmat Manzanita

Sandmat manzanita is a CNPS CRPR 1B and HMP species in the Ericaceae family. This evergreen shrub blooms from February to May and is associated with openings in chaparral, coastal scrub, closed cone coniferous forest, coastal dunes, and cismontane woodland habitats on sandy soils at elevations between 3-205 meters.

A CNDDB occurrence of sandmat manzanita includes most of the project site. One individual sandmat manzanita was identified within the non-native grassland on the margin of coast live oak woodland in the 2015 Master Plan site during focused botanical surveys in 2010 and 2011 (DD&A, 2013) (**Figure 3.4-2**). This species was not observed within the Phase 2 site during the surveys. Suitable habitat for sandmat manzanita is present within the 2015 Master Plan and Phase 2 sites.

Monterey Ceanothus

Monterey ceanothus is a CNPS CRPR 4 and HMP species in the Rhamnaceae family. This evergreen shrub blooms from February to April (sometimes through June) and is associated with closed-cone coniferous forests, chaparral, and coastal scrub on sandy soils at elevations between 3-550 meters.

The CNDDB does not report any occurrences of this species within the quadrangles reviewed; however, it is known to occur throughout the former Fort Ord. Monterey ceanothus was not identified within the project site during focused botanical surveys in 2010 or 2011 (DD&A, 2013); however, suitable habitat for Monterey ceanothus is present within the 2015 Master Plan and Phase 2 sites.

Fort Ord Spineflower

Fort Ord spineflower is a CNPS CRPR 1B species in the Polygonaceae family. This annual herb blooms from April to July and is associated with sandy openings of maritime chaparral and coastal scrub at elevations of 55-150 meters.

The CNDDB reports five occurrences of this species within the quadrangles evaluated, the nearest occurrence reported approximately 1.4 km from the project site. This species was first described in 2014

(Jepson Flora Project, 2019) and was added as a CRPR species in 2017 (CNPS, 2019). Therefore, it was not included in 2010 or 2011 surveys. However, Fort Ord spineflower is known to occur in other areas of the former Fort Ord and suitable habitat for this species is present within the maritime chaparral and central coastal scrub habitats within the 2015 Master Plan and Phase 2 sites.

Monterey Spineflower

Monterey spineflower and is a federally threatened, CNPS CRPR 1B, and HMP species. It is a small, prostrate annual herb in the Polygonaceae family that blooms from April to June. Monterey spineflower typically occurs on open sandy or gravelly soils on relic dunes in coastal dune, coastal scrub, and maritime chaparral habitats, though it can also be associated with cismontane woodlands and valley and foothill grasslands, within a range of 3-450 meters in elevation.

The CNDDB reports an occurrence of this species that includes most of the project site. Monterey spineflower was identified within the non-native grassland and central coastal scrub in the Phase 2 and 2015 Master Plan sites during the 2011 and 2014 botanical surveys (DD&A, 2013; ECORP, 2014a) (**Figures 3.4-2** and **3.4-3**). Suitable habitat for Monterey spineflower is present within the 2015 Master Plan and Phase 2 sites.

Virgate Eriastrum

Virgate eriastrum is a CNPS CRPR 4 species in the Polemoniaceae family. This annual herb blooms from May to July and is associated with chaparral, coastal scrub, and coastal dunes on sandy soils at elevations of 45-700 meters.

The CNDDB does not report any occurrences of this species; however, virgate eriastrum was observed within the Phase 1 site during 2014 botanical surveys, including a portion of the area that overlaps with the Phase 2 site (ECORP, 2014a). The Phase 1 IS/EA identifies the location of only the densest portion of the population but notes that this species was observed throughout the Phase 1 site as individuals. Suitable habitat for virgate eriastrum is present within the maritime chaparral and central coastal scrub habitats within the 2015 Master Plan and Phase 2 sites.

Northern Curly-leaved Monardella

Northern curly-leaved monardella is a CNPS CRPR 1B species in the Lamiaceae family. It is an annual herb which blooms from April to September and is associated with chaparral, coastal dunes, coastal scrub, and lower montane coniferous forests on sandy soils at elevations of zero to 300 meters.

The CNDDB reports a 2013 occurrence of northern curly-leaved monardella adjacent to the project site. This species was added as a CRPR species in 2013 and therefore was not included in the focused botanical surveys in 2010 or 2011. However, it was included in the ECORP surveys in 2014. It was not observed during the 2014 survey, but suitable habitat suitable habitat for this species is present within the maritime chaparral and central coastal scrub habitats within the 2015 Master Plan and Phase 2 sites.

Sensitive Habitats

The project site was evaluated for the presence of sensitive habitat. One sensitive habitat, central maritime chaparral, was identified within the 2015 Master Plan site (**Figure 3.4-1**). No sensitive habitats were identified within the Phase 2 site.

Central Maritime Chaparral

Central maritime chaparral habitat is identified as a sensitive habitat on the CDFW's *California Natural Communities List* (CDFW, 2018b) and in the HMP. Approximately 11 acres of central maritime chaparral

occurs within the 2015 Master Plan site, but this habitat does not occur within the Phase 2 site (**Figure 3.4-1**).

3.4.3 Regulatory Setting

Federal

Federal Endangered Species Act

Provisions of the ESA of 1973 (16 USC 1532 et seq., as amended) protect federally listed threatened or endangered species and their habitats from unlawful take. Listed species include those for which proposed and final rules have been published in the Federal Register. The ESA is administered by USFWS or National Oceanic and Atmospheric Administration's National Marine Fisheries Service. In general, the National Marine Fisheries Service is responsible for the protection of ESA-listed marine species and anadromous fish, whereas other listed species are under USFWS jurisdiction.

The Army's decision to close and dispose of the Fort Ord military base was considered a major federal action that could affect listed species under the ESA. USFWS issued a Final Biological Opinion (BO) on the disposal and reuse of former Fort Ord on October 19, 1993. USFWS issued five additional BOs and one amendment between 1999 and 2014 as a result of consultation reinitiated by the Army. On May 28, 2015, USFWS issued a Programmatic BO that superseded the previous BOs. Then on June 7, 2017, USFWS issued a reinitiated Programmatic BO that supersedes the 2015 Programmatic BO (USFWS, 2017a). The 2017 Programmatic BO is the current and relevant BO for activities at the former Fort Ord; the 2017 Programmatic BO contains additional conservation measures and recommendations relating to environmental cleanup actions at former Fort Ord cleanup sites.

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened. Take, as defined by ESA, is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the fish or wildlife…including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife." In addition, Section 9 prohibits removing, digging up, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. Section 9 does not prohibit take of federally listed plants on sites not under federal jurisdiction. If there is the potential for incidental take of a federally listed fish or wildlife species, take of listed species can be authorized through either the Section 7 consultation process for federal actions or a Section 10 incidental take permit process for non-federal actions. Federal agency actions include activities that are on federal land, conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits).

Recovery Plans

The ultimate goal of the ESA is the recovery (and subsequent conservation) of endangered and threatened species and the ecosystems on which they depend. A variety of methods and procedures are used to recover listed species, such as protective measures to prevent extinction or further decline, consultation to avoid adverse impacts of federal activities, habitat acquisition and restoration, and other on-the-ground activities for managing and monitoring endangered and threatened species. The collaborative efforts of USFWS and its many partners (federal, state, and local agencies, tribal governments, conservation organizations, the business community, landowners, and other concerned citizens) are critical to the recovery of listed species.

One recovery plan has been prepared for listed species known or with the potential to occur within the Project site: Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*) (USFWS, 2017b).

Migratory Bird Treaty Act

The MBTA of 1918 prohibits killing, possessing, or trading migratory birds except in accordance with regulation prescribed by the Secretary of the Interior. Most actions that result in permanent or temporary possession of a protected species constitute violations of the MBTA. USFWS is responsible for overseeing compliance with the MBTA and implements Conventions (treaties) between the United States and four countries for the protection of migratory birds – Canada, Mexico, Japan, and Russia. USFWS maintains a list of migratory bird species that are protected under the MBTA, which was updated in 2010 to: 1) correct previous mistakes, such as misspellings or removing species no longer known to occur within the United States; 2) add species, as a result of expanding the geographic scope to include Hawaii and U.S. territories and new evidence of occurrence in the United States or U.S. territories; and 3) update name changes based on new taxonomy (USFWS, 2013).

The Clean Water Act

The U.S. Army Corps of Engineers (USACE) and U.S. EPA regulate discharge of dredged and fill material into "Waters of the United States" (waters of the U.S.) under Section 404 of the CWA. Waters of the U.S. are defined broadly as waters susceptible to use in commerce (including waters subject to tides, interstate waters, and interstate wetlands) and other waters (such as interstate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds) (33 CFR 328.3). Potential wetland areas are identified as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils conditions."

Under Section 401 of the CWA, any applicant receiving a Section 404 permit from the USACE must also obtain a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB). A Section 401 Water Quality Certification is issued when a project is demonstrated to comply with state water quality standards and other aquatic resource protection requirements.

Executive Order 11990 - Protection of Wetlands

EO - Protection of Wetlands calls for no net loss of wetlands. For the regulatory process, the USACE and U.S. EPA jointly define wetlands as follows: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Federal agencies are required to implement the following procedures for any federal action that involves wetlands: 1) provide an opportunity for early public involvement; 2) consider alternatives that would avoid wetlands, and it avoidance is not possible, measures to minimize harm to wetlands must be included in the action; 3) prepare a "Wetlands Only Practicable Alternative Finding" for actions that require an EIS.

Executive Order 13112 - Invasive Species

EO 13112 - Invasive Species requires the prevention of introduction and spread of invasive species. Invasive species are defined as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Each federal agency whose actions may affect the status of invasive species on a project site shall, to the extent practicable and permitted by law, subject to the availability of appropriations, use relevant programs and authorities to: 1) prevent the introduction of invasive species; 2) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; 3) monitor invasive species populations accurately and

reliably; 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; 5) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and 6) promote public education on invasive species and the means to address them. A national invasive species management plan was prepared by the National Invasive Species Council and the Invasive Species Advisory Committee that recommends objectives and measures to implement the EO.

State

California Endangered Species Act

The CESA was enacted in 1984. The CCR (Title 14, §670.5) lists animal species considered endangered or threatened by the state. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. Section 2080 of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. “Take” is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." A Section 2081 Incidental Take Permit from the CDFW may be obtained to authorize “take” of any state listed species.

California Fish and Game Code

Birds. Section 3503 of the Fish and Game Code states that it is “unlawful to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Section 3503.5 prohibits the killing, possession, or destruction of any birds in the orders Falconiformes or Strigiformes (birds-of-prey). Section 3511 prohibits take or possession of fully protected birds. Section 3513 prohibits the take or possession of any migratory nongame birds designated under the federal MBTA. Section 3800 prohibits take of nongame birds.

Fully Protected Species. The classification of fully protected was the state's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish (§5515), mammals (§4700), amphibians and reptiles (§5050), and birds (§3511). Most fully protected species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Species of Special Concern. As noted above, the CDFW also maintains a list of animal “species of special concern.” Although these species have no legal status, the CDFW recommends considering these species during analysis of project impacts to protect declining populations and avoid the need to list them as endangered in the future.

Native Plant Protection Act

The CNPPA of 1977 directed the CDFW to carry out the legislature’s intent to “preserve, protect and enhance rare and endangered plants in the state.” The CNPPA prohibits importing rare and endangered plants into California, taking rare and endangered plants, and selling rare and endangered plants. The CESA and CNPPA authorized the Fish and Game Commission to designate endangered, threatened and rare species and to regulate the taking of these species (§2050-2098, Fish and Game Code). Plants listed as rare under the CNPPA are not protected under CESA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne) is California’s statutory authority for the protection of water quality and applies to surface waters, wetlands, and groundwater, and to both

point and nonpoint sources. Under the Porter-Cologne, the State Water Resources Control Board (State Board) has the ultimate authority over State water rights and water quality policy. However, Porter-Cologne also establishes nine RWQCBs to oversee water quality on a day-to-day basis at the local/regional level. The project site is located within Region 3 – Central Coast RWQCB. Porter-Cologne incorporates many provisions of the federal CWA, such as delegation to the State Board and RWQCBs of the NPDES permitting program.

Under Porter-Cologne, the state must adopt water quality policies, plans, and objectives that protect the state's waters for the use and enjoyment of the people. Regional authority for planning, permitting, and enforcement is delegate to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans. The Porter-Cologne sets forth the obligations of the State Board and RWQCBs to adopt and periodically update water quality control plans (basin plans). The act also requires waste dischargers to notify the RWQCBs of such activities through filing of Reports of Waste Discharge and authorizes the State Board and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to Reports of Waste Discharge requirements and WDRs for broad categories of "low threat" discharge activities that have minimal potential for adverse water quality effects, when implemented according to prescribed terms and conditions.

The term "Waters of the State" is defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state." The RWQCB protects all waters in its regulatory scope but has special responsibility for wetlands, riparian areas, and headwaters, including isolated wetlands, and waters that many not be regulated by the USACE under Section 404 of the CWA. Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program, which regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne.

Regional/Local

Fort Ord Habitat Management Plan

The Army's decision to close and dispose of the Fort Ord military base was considered a major federal action that could affect listed species under the ESA. In 1993, USFWS issued a BO on the disposal and reuse of former Fort Ord requiring that an HMP be developed and implemented to reduce the incidental take of listed species and loss of habitat that supports these species (USFWS, 1993, updated to USFWS, 2017a). The HMP was prepared to assess impacts on vegetation and wildlife resources and provide mitigation for their loss associated with the disposal and reuse of former Fort Ord (USACE, 1997).

The HMP establishes guidelines for the conservation and management of species and habitats on former Fort Ord lands by identifying lands that are available for development, lands that have some restrictions with development, and habitat reserve areas. The intent of the plan is to establish large, contiguous habitat conservation areas and corridors to compensate for future development in other areas of the former base. The HMP identifies what type of activities can occur on each parcel at former Fort Ord; parcels are designated as "development with no restrictions," "habitat reserves with management requirements," or "habitat reserves with development restrictions." The HMP sets the standards to assure the long-term viability of former Fort Ord's biological resources in the context of base reuse so that no further mitigation should be necessary for impacts to species and habitats considered in the HMP. This plan has been approved by USFWS; the HMP, deed restrictions, and Memoranda of Agreement between the Army and various land recipients provide the legal mechanism to assure HMP implementation. It is a

legally binding document, and all recipients of former Fort Ord lands are required to abide by its management requirements and procedures.

The HMP anticipates some losses to special-status species and sensitive habitats as a result of redevelopment of the former Fort Ord. With the designated reserves and corridors and habitat management requirements in place, the losses of individuals of species and sensitive habitats considered in the HMP are not expected to jeopardize the long-term viability of those species, their populations, or sensitive habitats on former Fort Ord. Recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and through deed covenants.

However, the HMP does not provide specific authorization for incidental take of federal or state listed species to existing or future non-federal land recipients under the ESA or CESA. In compliance with the ESA and CESA, FORA is currently in the process of obtaining a Section 10(a)(1)(B) Incidental Take Permit from USFWS and Section 2081 Incidental Take Permit from CDFW, which will provide base-wide coverage for the take of federal and state listed wildlife and plant species to all non-federal entities receiving land on the former Fort Ord. This process involves the preparation of an HCP. The Draft Fort Ord HCP (ICF International, Inc., 2017) is currently in draft form and being reviewed by the resource agencies. The base-wide incidental take permits are expected to be issued by USFWS and CDFW by the end of 2019.

The project site is located within designated development parcels. Parcels designated as "development" have no management restrictions. However, the Programmatic BO and HMP require the identification of sensitive biological resources within the development parcels that may be salvaged for use in restoration activities in reserve areas (USFWS, 2017a and USACE, 1997).

City of Seaside Municipal Code Chapter 8.54

The City of Seaside Municipal Code Chapter 8.54 (Trees) outlines the policies regarding tree removal and planting. The policies applicable to this project include Section 8.54.030 (Permit—Required for certain tree removal, alteration or planting), Section 8.54.060 (New construction, development, subdivisions and site plans), and Section 8.54.070 (Replacement of Trees). As outlined in Section 8.54.070, if removal of a tree from a site has been authorized on an undeveloped parcel, the developer shall replace the tree with a minimum five-gallon specimen tree of a species and in a location approved by the board of architectural review, if applicable, or other individual or body responsible for the approval of applicant's plans. This requirement may be modified or waived if it is determined that replacement on one-for-one basis constitutes an unreasonable hardship.

Monterey County Code

Title 16, Chapter 16.60, Monterey County Code, provides for the preservation of oaks and other protected tree species within the unincorporated areas of the County. As defined in Chapter 16.60.040 C, removal of more than three protected trees on a lot in a one-year period requires a Forest Management Plan and approval of a Use Permit by the Monterey County Planning Commission. The Forest Management Plan must be prepared by a qualified forester selected from the County's list of consultants. Chapter 16.060.040 D requires that the applicant relocate or replace each removed tree on a one-to-one ratio. This ratio may be varied upon showing that such a requirement will create a special hardship in the use of the site or such a replacement would be detrimental to the long-term health and maintenance of the remaining habitat.

Habitat Conservation Plans or NCCP

There are no adopted HCPs or Natural Community Conservation Plans (NCCP) associated with the project site. Please refer to the discussion of the Draft HCP currently in progress in the Fort Ord HMP section above.

Fort Ord Oak Woodland Conservation

The County and City are engaged in meeting their Fort Ord Reuse Plan policies and programs obligations related to oak woodland protection and conservation. Biological Resources Policy B-2 and Programs B-2.1 and B-2.2 of the Reuse Plan require the County and Seaside to designate an oak woodland conservation area within the specified areas of the former Fort Ord, and manage and monitor the conservation area. FORA, Seaside, and the County have identified a proposed oak woodland conservation area and are currently preparing a draft management and monitoring plan for the area. After public review, the jurisdictions will need to complete environmental and other tasks prior to any approvals. As a requirement of the Reuse Plan, it is anticipated that the process will be completed and the oak woodland conservation area established within the next 12 to 14 months.

3.4.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;

b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS;

c. Have a substantial adverse effect on State or Federally protected wetlands (including, but not limited to, march, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means;

d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites;

e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Approach to Analysis

The following impact analysis addresses direct and indirect impacts that may result from the construction and operation of the proposed project (i.e., 2015 Master Plan and Phase 2) and alternatives. Direct impacts are those effects of a project that occur at the same time and place of project implementation, such as removal of habitat from ground disturbance. Indirect impacts are those effects of a project that occur either later in time or at a distance from the project location but are reasonably foreseeable, such as loss of aquatic species from upstream effects on water quality. Direct and indirect impacts can also

vary in duration and result in temporary, short-term, and long-term effects on biological resources. A temporary effect would occur only during the activity. A short-term effect would last from the time an activity ceases to some intermediate period of approximately one to five years (i.e., repopulation of habitat following restoration). A long-term or permanent effect would last longer than five years after an activity ceases. Long-term effects may include the ongoing maintenance and operation of a project, or may result in a permanent change in the condition of a resource, in which case it could be considered a permanent impact.

The biological analysis herein includes a comprehensive, detailed analysis of the biological resources present, or with the potential to occur, within the proposed project site. As described in **Chapter 2, Proposed Project and Alternatives**, the proposed project is anticipated to be constructed in multiple phases. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in late 2019 or early 2020. Therefore, the potential impacts to biological resources are analyzed at a programmatic level for the build-out of the 2015 Master Plan, and at a project level for the implementation of Phase 2.

The project site is located within parcels designated by the HMP as "development." Through implementation of the HMP, impacts to HMP species and habitats occurring within the designated development parcels were anticipated and mitigated through the establishment of habitat reserves and corridors and the implementation of habitat management requirements within habitat reserve parcels on former Fort Ord. As described above, parcels designated as "development" under the HMP have no management requirements or development restrictions. However, the 2017 Programmatic BO and HMP require the identification of sensitive biological resources within these parcels that may be salvaged for use in restoration activities in reserve areas (USFWS, 2017a; USACE, 1997).

The HMP species that are known or have a moderate to high potential to occur within the proposed project site include Hooker's manzanita, sandmat manzanita, Monterey ceanothus, Monterey spineflower, CTS, Northern California legless lizard, and Monterey ornate shrew. With the designated habitat reserves and corridors and habitat management requirements of the HMP in place, the loss of these species is not expected to jeopardize the long-term viability of these species and their populations on the former Fort Ord (USFWS, 1993). This is such because the recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and deed covenants. In addition to the HMP species identified, impacts to sensitive central maritime chaparral habitat are also addressed in the HMP and, therefore, impacts to this habitat are also considered mitigated through the implementation of the HMP based on the same conclusions. The proposed project is 1) only proposing development activities within designated development parcels; 2) required to comply with the habitat management requirements identified in the HMP; and 3) would not result in any additional impacts to HMP species and habitats beyond those anticipated in the HMP. Therefore, no additional mitigation measures for these HMP species or central maritime chaparral habitat are required. Impacts to these special-status species and central maritime chaparral that would result from the proposed project and alternatives are less than significant. The HMP and 2017 Programmatic BO require the identification of sensitive biological resources within development parcels that may be salvaged for use in restoration activities in habitat reserve areas. CalVet is required to implement HMP requirements in accordance with the deed covenants, which apply to both parcels within the project site. Therefore, this analysis assumes that salvage of HMP species will be conducted in accordance with this requirement.

However, as described above, the HMP does not exempt existing or future land recipients, including CalVet, from the Federal and State requirements of ESA and CESA. Of the eight HMP species known or with a moderate to high potential to occur within the project site, one Federal and State listed wildlife

species, CTS, has a moderate potential to be impacted by the 2015 Master Plan and may require take authorization from USFWS and CDFW. Additionally, Monterey spineflower, a Federally listed plant species, is known to occur within the Phase 2 and 2015 Master Plan sites. As described in **Section 3.4.3, Regulatory Setting**, if there is the potential for incidental take of a Federally listed fish or wildlife species, take of listed species can be authorized through either the Section 7 consultation process for Federal actions, or a Section 10 incidental take permit process for non-federal actions. Federal agency actions include activities that are on Federal land, conducted by a Federal agency, funded by a Federal agency, or authorized by a Federal agency (including issuance of Federal permits). This analysis assumes that Phase 2 and future phases of the CCCVC would receive Federal funding, and, therefore, would be required to comply with Section 7 of the ESA. The ESA does not prohibit incidental take of Federally listed plant species. Authorization for the incidental take of State listed wildlife and plant species can be obtained through the Section 2018 permit process of CESA.

It is also important to note that CTS is a covered species in the Draft Fort Ord HCP. When the HCP is approved and the ESA and CESA incidental take permits are issued, the incidental take of this species for projects within development parcels would be authorized base-wide, and project-specific permits would not be required. It is anticipated that these base-wide Federal and State permits will be issued in late 2019 or early 2020, prior to the construction of Phases 3-11 of the 2015 Master Plan. In the event that base-wide permits are not issued, impacts resulting in take of CTS in future phases would need to be authorized by the USFWS and CDFW through the issuance of an incidental take permit from CDFW and Section 7 consultation with the USFWS to avoid violation of the ESA and CESA.

Where suitable habitat exists within the project site, the proposed project has the potential to impact special-status species that were not addressed in the HMP. The non-HMP species that are known or have a moderate to high potential to occur within and be impacted by the project include Fort Ord spineflower, virgate eriastrum, northern curly-leaved monardella, special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, obscure bumble bee, western bumble bee, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird).

Seaside Municipal Code and County Code regulate impacts to protected trees, including coast live oak trees. The project site is located with the limits of Seaside and the County; however, the property is owned by the State. Although the State is not required to comply with local ordinances and policies, it will do so when feasible. The State has decided to use a combination of local ordinances (i.e., Seaside and County) to reduce impacts associated with the loss of coast live oaks trees within the project site.

The 2015 Master Plan identifies guidelines that would reduce impacts to sensitive biological resources (see below). The impact analysis assumes that these guidelines would be implemented; however, additional mitigation measures may be required to reduce impacts to sensitive biological resources to a less-than-significant level and are identified herein where necessary. The 2015 Master Plan proposes the following guidelines related to biological resources:

> The landscape design incorporates the USDVA mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. The design strategy includes primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials, that require no irrigation once established (**Figure 2-12**). These plants reflect the character of Seaside and the surrounding region of the County and meet the necessary demand of low water usage. The cemetery has minimal water allocation that would not support the traditional lawns of most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and season variation.

Hardscape complements plant materials in areas where vehicular or heavy foot traffic is anticipated.

Areas of No Impact

Criterion "c" is not evaluated for construction or operational impacts to State or Federally protected wetlands as there are none present within or adjacent the project site, and thus, would not be impacted by the proposed project.

Summary of Impacts

Table 3.4-7 provides a summary of potential impacts to biological resources from the proposed project and alternatives.

Table 3.4-7. Summary of Impacts – Biological Resources

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	*Alternative 3: CCCVC Master Plan – Modified Phase 2*	No Action Alternative
	2015 Master Plan	Phase 2			
Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.	LSM	LSM	LSM	LSM	NI
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.	LS	NI	LS	NI	NI
Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites.	LS	LS	LS	LS	NI
Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LSM	LSM	LSM	LSM	NI
Impact BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

2015 Master Plan

As described in the **Approach to Analysis**, the 2015 Master Plan is evaluated at a programmatic level in this EIR/EA. Implementation of the 2015 Master Plan would result in direct and indirect impacts to special-status plant and wildlife species and their habitat, including special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, Monterey ornate shrew, California tiger salamander, Northern California legless lizard, coast horned lizard, obscure bumble bee, western bumble bee, nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird), Hooker's manzanita, sandmat manzanita, Fort Ord spineflower, Monterey spineflower, virgate eriastrum, and northern curly-leaved monardella.

Impacts to special-status species could include direct and indirect impacts associated with heavy equipment and construction activities and operation and maintenance activities that could result in the loss of individuals, soil compaction, dust, vegetation removal/loss of habitat, wildlife harassment or mortality, root damage, erosion, destruction or disturbance of nests, and introduction and spread of non-native, invasive species. These are potentially significant impacts that can be reduced to a less-than-significant level with implementation of the mitigation measures identified in below.

HMP Special-Status Species

Implementation of the 2015 Master Plan could result in impacts to the following HMP species: Hooker's manzanita, sandmat manzanita, Monterey spineflower, Monterey ornate shrew (i.e., within coast live oak woodland, central maritime chaparral, central coastal scrub, and non-native grassland habitats), CTS (i.e., within portions of the coast live oak woodland, central maritime chaparral, and central coastal scrub habitats), and Northern California legless lizard (i.e., within coast live oak woodland, central maritime chaparral, central coastal scrub, non-native grassland, and ruderal habitats). Because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional HMP species could disperse and colonize the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. As described in the **Approach to Analysis**, impacts to special-status plant and wildlife species addressed in the HMP are considered less-than-significant.

While not required to reduce a significant impact, **Mitigation Measures BIO-1** and **BIO-2** will be implemented to further reduce this less-than-significant impact. These measures would require that sensitive biological resources are identified in future phases of the CCCVC in advance of construction (**Mitigation Measure BIO-1**) and that compliance with the ESA and/or CESA occurs when necessary and in advance of construction of future phases of the CCCVC (**Mitigation Measure BIO-2**). Per the HMP and the 2017 Programmatic BO requirements in deed covenants**, Mitigation BIO-1** acknowledges that CalVet will identify sensitive biological resources within all future phases prior to any construction to determine whether salvage is feasible and if so, seed and topsoil salvage would occur to support reseeding and restoration efforts on- or off-site. Additionally, in the absence of an approved based-wide incidental take permit, impacts resulting from future phases to species listed as threatened or endangered by CDFW and/or the USFWS may also require agency consultation and/or incidental take permits. Therefore,

although these species are HMP species, **Mitigation Measures BIO-2** acknowledges that the take of these species is prohibited under the ESA and/or CESA and may require Section 7 consultation or other authorization. Impacts resulting in take of these species would need to be authorized by the USFWS and/or CDFW through the issuance of incidental take permits or Biological Opinions from the applicable agency to avoid violation of the ESA and/or CESA.

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat; HMP special-status species and habitats would also benefit from the implementation of these measures. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Please see the **Non-HMP Special-Status Species** discussion below for details regarding these measures.

Therefore, potential impacts to HMP special-status species and habitat resulting from implementation of the 2015 Master Plan are less than significant. Implementation of **Mitigation Measures BIO-1** through **BIO-5** would further reduce impacts to these species.

Non-HMP Special-Status Species

Non-HMP Special-Status Plant Species

Suitable habitat is present for several non-HMP special-status plant species within the 2015 Master Plan site (**Table 3.4-6**). The non-HMP plant species that are known or have a moderate to high potential to occur within and be impacted by future phases of the CCCVC include Fort Ord spineflower, virgate eriastrum, and northern curly-leaved monardella. However, because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional special-status plant species, including plants that are not currently designated as special-status, could disperse and colonize the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. It would be speculative to determine which special-status plant species may occupy the 2015 Master Plan site in the next 100 years. Therefore, programmatic mitigation measures have been identified to reduce potentially significant impacts to special-status species during the build-out of the 2015 Master Plan to a less-than-significant level. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, includes project-specific biological assessments for future development to determine presence/absence of special-status species and identification of measures necessary to avoid, minimize, and/or compensate for any identified impacts. Implementation of **Mitigation Measures BIO-3** through **BIO-6** would reduce impacts to non-HMP special-status plant species to a less-than-significant level.

Virgate eriastrum is designated as a CRPR 4 species. As described in **Survey Methodology**, CRPR 3 and 4 were not included within the analysis as they did not strictly meet the definitions of Section 2062 and 2067 of CESA. Therefore, potential impacts to virgate eriastrum from implementation of the 2015 Master Plan are less than significant.

Non-HMP Special-Status Wildlife Species

Suitable habitat is present for several non-HMP special-status wildlife species within the 2015 Master Plan site (**Table 3.4-4**). The non-HMP wildlife species that are known or have a moderate to high potential to occur within and be impacted by future phases of the CCCVC include special-status bat species (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, obscure

bumble bee, western bumble bee, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird). However, because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional special-status wildlife species, including wildlife that are not currently designated as special-status, could occupy and use the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. It would be speculative to determine which special-status wildlife species may occupy the 2015 Master Plan site in the next 100 years. Therefore, programmatic mitigation measures have been identified to reduce potentially significant impacts to special-status species during the build-out of the 2015 Master Plan to a less-than-significant level. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. Measures to avoid, minimize, and compensate for potential impacts will be recommended. Implementation of **Mitigation Measures BIO-3** through **BIO-6** would reduce impacts to non-HMP special-status wildlife species to a less-than-significant level.

The oak woodland within the 2015 Master Plan site provides suitable nesting habitat for tree-nesting raptors, including the special-status white-tailed kite and Cooper's hawk, and other nesting birds. In addition, several special-status avian species may nest or forage within the site, including coast horned lark (i.e., within non-native grassland, central coastal scrub, and central maritime chaparral habitats), oak titmouse and Nuttall's woodpecker (coast live oak woodland), Lawrence's goldfinch (coast live oak woodland, central coastal scrub, and central maritime chaparral), wrentit (central coastal scrub and central maritime chaparral), spotted towhee (all undeveloped areas of the site), and Allen's hummingbird (coast live oak woodland and central coastal scrub). In addition, rufous hummingbird may forage within undeveloped areas of the site; however, this species does not nest in California. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest would be a significant impact. Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law and would be a significant impact under CEQA.

The MBTA protects the majority of migrating birds breeding in the U.S., regardless of their official Federal or State listing status under the ESA or CESA. The law applies to the disturbance or removal of active nests occupied by migratory birds during their breeding season. It is specifically a violation of the MBTA to directly kill or destroy an occupied nest of any bird species covered by the MBTA. Fish and Game Code Section 3503 protects the nest and eggs of native non-game birds. Under this law, it is unlawful to take, possess, or destroy any such birds or to take, possess, or destroy the nests or eggs of any such bird. Fish and Game Code Section 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Most of the birds observed or with the potential to occur within the project site are protected under both the MBTA and Fish and Game Code Section 3503, and, in addition, birds may be designated as California species of special concern. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-7**, which includes surveys to identify the presence of active nests prior to construction and measures to avoid active nests if found.

Special-Status Species Habitat

Implementation of the 2015 Master Plan would result in impacts to approximately 37.3 acres of potential habitat for special-status species (**Table 3.4-2** and **Figure 3.4-1**). As discussed in **Section 3.4.3, Regulatory Setting**, the Fort Ord HMP establishes guidelines for the conservation and management of species and habitats on former Fort Ord lands by identifying lands that are available for development, lands that have some restrictions with development, and habitat reserve areas. The intent of the plan is to establish large, contiguous habitat conservation areas and wildlife corridors to compensate for future development in other areas of the former base. The HMP identifies what type of activities can occur on each parcel at former Fort Ord and parcels are designated as "development with no restrictions," "habitat reserves with management requirement," or "habitat reserves with development restrictions." The HMP sets the standards to assure the long-term viability of former Fort Ord's biological resources in the context of base reuse so that no further mitigation should be necessary for impacts to species and habitats considered in the HMP. This plan has been approved by USFWS; the HMP, deed restrictions, and Memoranda of Agreement between the Army and various land recipients provide the legal mechanism to assure HMP implementation. It is a legally binding document, and all recipients of former Fort Ord lands are required to abide by its management requirements and procedures.

The HMP anticipates some losses to special-status species and sensitive habitats as a result of redevelopment of the former Fort Ord. With the designated reserves and corridors and habitat management requirements in place, the losses of individuals of species and sensitive habitats considered in the HMP are not expected to jeopardize the long-term viability of those species, their populations, or sensitive habitats on former Fort Ord. Recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and through deed covenants. Approximately 18,500 acres of the former Fort Ord will be preserved in permanent open space through implementation of the HMP.

In addition, the proposed project includes the preservation of approximately 31.7 acres of habitat within the 2015 Master Plan site, which accounts for almost half of the 2015 Master Plan site.

The project is proposed within designated development parcels. Therefore, implementation of the 2015 Master Plan would not have a significant impact on special-status species habitat, particularly when taken into context with the over 18,500 acres of preserved habitat for special-status species within the former Fort Ord and approximately 31.7 acres of habitat being preserved within the CCCVC site. This is a less-than-significant impact. No mitigation is required.

Phase 2

As described in the **Approach to Analysis**, Phase 2 is evaluated at a project level in this EIR/EA. Implementation of Phase 2 would result in direct and indirect impacts to special-status plant and wildlife species and their habitat, including special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, Monterey ornate shrew, Northern California legless lizard, coast horned lizard, nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird), Fort Ord spineflower, Monterey spineflower, and virgate eriastrum.

HMP Special-Status Species

Implementation of Phase 2 could result in impacts to the following HMP species: Monterey ornate shrew, Northern California legless lizard, and Monterey spineflower. As described in the **Approach to Analysis**, impacts to special-status plant and wildlife species addressed in the HMP are considered less-than-

significant. While not required to reduce a significant impact, **Mitigation Measures BIO-1** and **BIO-2** described above will be implemented to further reduce this less-than-significant impact per HMP and the 2017 Programmatic BO requirements in deed covenants. These measures would require that sensitive biological resources are identified in future phases of the CCCVC, including Phase 2, in advance of construction (**Mitigation Measure BIO-1**), and that compliance with the ESA and/or CESA occurs when necessary and in advance of construction of future phases of the CCCVC, including Phase 2 (**Mitigation Measure BIO-2**).

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat; HMP special-status species and habitats would also benefit from the implementation of these measures. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Please see the **Non-HMP Special-Status Species** discussion below for details regarding these measures.

Therefore, potential impacts to HMP special-status species and habitat resulting from implementation of Phase 2 are less than significant. Implementation of **Mitigation Measures BIO-1** through **BIO-5** would further reduce impacts to these species.

Non-HMP Special-Status Species

Non-HMP Special-Status Plant Species

Suitable habitat is present for several non-HMP special-status plant species within the Phase 2 site (**Table 3.4-6**). The non-HMP plant species that are known or have a moderate to high potential to occur within and be impacted by Phase 2 include Fort Ord spineflower and virgate eriastrum. This is a potentially significant impact. As identified in **Survey Methodology**, focused surveys for special-status plants have not been conducted within the Phase 2 site since 2014. The analysis of special-status plant species within the Phase 2 site is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. However, given the resource agencies' protocols, and to provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to determine current site conditions; an addendum to the Biological Resources Report will be prepared to reflect the survey results and will be included in the Final EIR/EA. **Mitigation Measure BIO-8** requires special-status plant survey(s) be conducted during the appropriate identification period(s), identify potential impacts and appropriate mitigation, and prepare a report describing the results of the survey(s). The report will be included in the Final EIR/EA. This measure also requires the implementation of **Mitigation Measures BIO-1** and **BIO-2** if HMP plant species are observed and have the potential to be impacted by Phase 2. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat and would apply to Phase 2. While programmatic in nature, these measures will be applied at the project-level to reduce potential impacts to non-HMP special-status plant species. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Therefore, potentially significant impacts to non-HMP special-status plant species would be reduced to a less-than-significant level with implementation of **Mitigation Measures BIO-3** through **BIO-5** and **BIO-8**.

Virgate eriastrum is designated as a CRPR 4 species. As described in **Survey Methodology**, CRPR 3 and 4 were not included within the analysis as they did not strictly meet the definitions of Section 2062 and 2067 of CESA. Therefore, potential impacts to virgate eriastrum from implementation of Phase 2 are less than significant.

Non-HMP Special-Status Wildlife Species

Suitable habitat is present for several non-HMP special-status wildlife species within the Phase 2 site (**Table 3.4-4**). The non-HMP wildlife species that are known or have a moderate to high potential to occur within and be impacted by Phase 2 include special-status bat species (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird).

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat and would apply to Phase 2. While programmatic in nature, these measures will be applied at the project-level to reduce potential impacts to non-HMP special-status wildlife species. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls.

The Phase 2 site contains coast live oak woodland habitat that may provide roosting habitat for special-status species bats, such as the Townsend's big-eared bat and hoary bat. Removal of mature oak trees may result in direct impacts to special-status bats, if present at the time of removal. Construction noise, dust, and vibration adjacent to large trees could cause indirect impacts to special-status bats, including roost abandonment and death of young. It is unlikely that hoary bats birth and rear young in California. As a result, this species will not be breeding within the vicinity of the project site. Impacts to individuals and roosting habitat would be a potentially significant impact. **Mitigation Measure BIO-9** would reduce potential impacts to special-status bat species by requiring avoidance, preservation, and protection of bat species as feasible by requiring pre-construction surveys for potential roost sites and replacement of roost sites if avoidance is not feasible. Implementation of **Mitigation Measures BIO-3** through **BIO-5** and species-specific **Mitigation Measure BIO-9** will reduce potentially significant impacts to special-status bat species to a less-than-significant level through a combination of implementing protective measures during all phases of construction; education; monitoring; avoidance, preservation, and protection of bat species, as identified during pre-construction surveys for potential roost sites, if feasible; and replacement of roost sites if avoidance is not feasible.

The Phase 2 site contains suitable habitat for the Monterey dusky-footed woodrat (i.e., within coast live oak woodland and central coastal scrub habitats) and project implementation could result in direct impacts to individuals and loss of habitat. Construction noise, dust, and vibration adjacent to large trees could cause indirect impacts to Monterey dusky-footed woodrat such as nest abandonment and death of young. This is a potentially significant impact. **Mitigation Measure BIO-10** would reduce potentially significant impacts to Monterey dusky-footed woodrat through avoidance, preservation, and protection of nests, as identified during pre-construction surveys, if feasible; and/or dismantling of nests by qualified biologists if avoidance is not feasible. Implementation of **Mitigation Measures BIO-3** through **BIO-5** and species-specific **Mitigation Measure BIO-10** will reduce potentially significant impacts to Monterey dusky-footed woodrat to a less-than-significant level through a combination of implementing protective measures during all phases of construction; education; monitoring; and avoidance, preservation, and protection of active nests, as identified during pre-construction woodrat nest surveys.

The Phase 2 site contains suitable habitat for the coast horned lizard (i.e., within central coastal scrub and ruderal habitats). Phase 2 implementation could result in direct impacts to individuals and loss of habitat. This is a potentially significant impact. Implementation of **Mitigation Measures BIO-1**, **BIO-2, BIO-3**, which avoid and minimize impacts through implementing construction best management practices,

monitoring, and invasive species controls, would reduce potentially significant impacts to the coast horned lizard to a less-than-significant level.

The oak woodland within the Phase 2 site provides suitable nesting habitat for tree-nesting raptors, including the special-status white-tailed kite and Cooper's hawk, and other nesting birds. In addition, several special-status avian species may nest or forage within the site, including coast horned lark (i.e., within central coastal scrub and ruderal), oak titmouse and Nuttall's woodpecker (coast live oak woodland), Lawrence's goldfinch (coast live oak woodland and central coastal scrub), wrentit (central coastal scrub), spotted towhee (all undeveloped areas of the site), and Allen's hummingbird (coast live oak woodland and central coastal scrub). In addition, rufous hummingbird may forage within undeveloped areas of the site; however, this species does not nest in California. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest would be a significant impact. Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law and would be a significant impact under CEQA. As discussed above, the MBTA protects the majority of migrating birds breeding in the U.S., regardless of their official Federal or State listing status under the ESA or CESA. The law applies to the disturbance or removal of active nests occupied by migratory birds during their breeding season. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-7**, which includes surveys to identify the presence of active nests prior to construction and measures to avoid active nests if found.

Therefore, potentially significant impacts to non-HMP special-status wildlife species would be reduced to a less-than-significant level with implementation of **Mitigation Measures BIO-3** through **BIO-5, BIO-9**, and **BIO-10**.

Special-Status Species Habitat

Please refer to the discussion under **2015 Master Plan** above. In addition to the preservation areas on the former Fort Ord, Phase 2 would preserve approximately 1 acre of coast live oak woodland on-site.

Phase 2 is proposed within a designated development parcel under the HMP. Therefore, the implementation of Phase 2 would not have a significant impact on special-status species habitat, particularly when taken into context with the over 18,500 acres of preserved habitat for special-status species within the former Fort Ord and approximately 1 acre of habitat being preserved on-site. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would result in a decrease in impacts to special-status species and their habitat. Alternative 2 would result in the similar impacts to the same special-status species; however, impacts to special-status species would be reduced. Impacts to central maritime chaparral and coast live oak woodland would be significantly reduced (down to 1.1 acres from 1.3 acres and 23.4 acres from 31.1 acres, respectively). In addition, impacts to CTS potential upland habitat would also be significantly reduced (down to 0.78 acres from 4.3 acres). However, impacts to special-status species and their habitat would still be potentially significant and require implementation of **Mitigation Measures BIO-1** through **BIO-10** to reduce to a less-than-significant level.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 under Alternative 3 would generally be the same as the proposed project, but would have a larger footprint. Therefore, impacts to special-status species and their habitats

would be similar. Therefore, impacts to special-status species and their habitat would still be potentially significant and require implementation of **Mitigation Measures BIO-1** through **BIO-10** to reduce to a less-than-significant level.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Mitigation Measure BIO-1: HMP Species Salvage

Prior to each future phase of the 2015 Master Plan, including Phase 2, CalVet shall require that a biological survey of development sites be conducted by a qualified biologist to determine if the development could potentially impact HMP species or potential habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to 1) a description of the biological conditions at the site; 2) identification of the potential for HMP species to occur or HMP species observed, if any; and 3) maps of the locations of HMP species or potential habitat, if observed.

If HMP species that do not require take authorization from the USFWS or CDFW are identified within the development site, salvage efforts for these species will be evaluated by a qualified biologist in coordination with CalVet to further reduce impacts per the requirements of the HMP and Programmatic BO. Where salvage is determined feasible and proposed, seed collection should occur from plants within the development site and/or topsoil should be salvaged within occupied areas to be disturbed. Seeds should be collected during the appropriate time of year for each species by qualified biologists. The collected seeds and topsoil should be used to revegetate temporarily disturbed construction areas and reseeding and restoration efforts on- or off-site, as determined appropriate by the qualified biologist CalVet. For HMP species that require take authorization from the USFWS or CDFW, any additional salvage measures identified in the take authorization(s) shall be followed.

Mitigation Measure BIO-2: ESA and CESA Compliance

If HMP or other species that require take authorization from the USFWS and/or CDFW are identified within the development site, CalVet will comply with the ESA and CESA and obtain necessary authorizations prior to construction of each phase of the 2015 Master Plan, including Phase 2.

Due to the presence and potential presence of Federally listed species on the 2015 Master Plan site and Federal nexus (i.e., Federal funding), the USDVA, acting as the NEPA lead agency for the proposed project, shall be required to initiate a Section 7 consultation with the USFWS and prepare a written analysis in the form of a Biological Assessment (BA) to determine whether their actions may affect a listed or proposed species and designated and proposed critical habitat for each future phase. Based on the BA, the USFWS will issue a BO regarding likely impacts as a result of implementing the proposed future phase. Any further avoidance and minimization measures that may be required as a component of the BA will be implemented.

For potential impacts to State listed species, CalVet will comply with the CESA and consult with the CDFW to determine whether authorization for the incidental take of the species is required prior to construction. If it is determined that authorization for incidental take is required from the CDFW, CalVet will obtain an incidental take permit at the project-level prior to ground-disturbing activities. Permit requirements typically involve preparation and implementation of a mitigation plan and mitigating impacted habitat at a 3:1 ratio through preservation and/or

restoration, as described above. CalVet would be required to retain a qualified biologist to prepare a mitigation plan, which will include, but is not limited to, identifying avoidance and minimization measures; mitigation strategy, including a take assessment, compensatory mitigation lands, and success criteria; and funding assurances. CalVet would be required to implement the approved plan and any additional permit requirements.

Alternatively, if the State listed species is covered under the Fort Ord HCP, CalVet can wait to implement the phase, including any ground-disturbing activities, until the Fort Ord HCP is approved and base-wide state incidental take permits are issued. If CalVet chooses the base-wide permit alternative, project-specific, project-specific incidental take permits will not be necessary; however, all applicable requirements of the HCP will be implemented.

Mitigation Measure BIO-3: Construction Best Management Practices

The following best management practices will be implemented during all identified phases of construction (i.e., pre-, during, and post-) to reduce impacts to special-status plant and wildlife species for each phase of the 2015 Master Plan, including Phase 2:

- A qualified biologist will conduct an Employee Education Program for the construction crew prior to any construction activities. The qualified biologist will meet with the construction crew at the onset of construction at the project site to educate the construction crew on the following: 1) the appropriate access route(s) in and out of the construction area and review project boundaries; 2) how a biological monitor will examine the area and agree upon a method which will ensure the safety of the monitor during such activities, 3) the special-status species that may be present; 4) the specific mitigation measures that will be incorporated into the construction effort; 5) the general provisions and protections afforded by USFWS and CDFW; and 6) the proper procedures if a special-status species is encountered within the project site.
- Trees and vegetation not planned for removal or trimming will be protected prior to and during construction to the maximum possible through the use of exclusionary fencing, such as hay bales for herbaceous and shrubby vegetation, and protective wood barriers for trees. Only certified weed-free straw will be used to avoid the introduction of non-native, invasive species. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact.
- Protective fencing will be placed prior to and during construction to stop construction equipment and personnel from impacting vegetation outside of work limits. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact.
- Following construction, disturbed areas will be restored to pre-project contours to the maximum extent possible and revegetated using locally-occurring native species and native erosion control seed mix, per the recommendations of a qualified biologist.
- Grading, excavating, and other activities that involve substantial soil disturbance will be planned and implemented in consultation with a qualified hydrologist, engineer, or erosion control specialist, and will utilize standard erosion control techniques to minimize erosion and sedimentation to native vegetation (pre-, during, and post-construction).
- No firearms will be allowed on the project site at any time.

- All food-related and other trash will be disposed of in closed containers and removed from the project area at least once a week during the construction period, or more often if trash is attracting avian or mammalian predators. Construction personnel will not feed or otherwise attract wildlife to the area.

Mitigation Measure BIO-4: Construction-Phase Monitoring

The applicant will retain a qualified biologist to monitor all ground disturbing construction activities (i.e., vegetation removal, grading, excavation, or similar activities) to protect any special-status species encountered for each phase of the 2015 Master Plan, including Phase 2. Any handling and relocation protocols of special-status wildlife species will be determined in coordination with CDFW prior to any ground disturbing activities, and will be conducted by a qualified biologist with appropriate scientific collection permit. After ground disturbing project activities are complete, the qualified biologist will train an individual from the construction crew to act as the on-site construction biological monitor. The construction biological monitor will be the contact for any special-status wildlife species encounters, will conduct daily inspections of equipment and materials stored on site and any holes or trenches prior to the commencement of work, and will ensure that all installed fencing stays in place throughout the construction period. The qualified biologist will then conduct regular scheduled and unscheduled visits to ensure the construction biological monitor is satisfactorily implementing all appropriate mitigation protocols. Both the qualified biologist and the construction biological monitor must work through the State Inspector to cease construction contractor work and/or redirect project activities to ensure protection of resources and compliance with all environmental permits and conditions of the project. The qualified biologist and the construction monitor shall complete a daily log summarizing activities and environmental compliance throughout the duration of the project. The log will also include any special-status wildlife species observed and relocated.

Mitigation Measure BIO-5: Non-Native, Invasive Species Controls

The following measures will be implemented for each phase of the 2015 Master Plan, including Phase 2, to reduce the introduction and spread of non-native, invasive species:

- Any landscaping or replanting required for the project will not use species listed as noxious by the California Department of Food and Agriculture (CDFA) or invasive by the California Invasive Plant Council (Cal-IPC).
- Bare and disturbed soil will be landscaped with CDFA recommended seed mix or plantings from locally adopted species to preclude the invasion on noxious weeds in the project site.
- Construction equipment will be cleaned of mud or other debris that may contain invasive plants and/or seeds and inspected to reduce the potential of spreading noxious weeds, before mobilizing to arrive at the construction site and before leaving the construction site.
- All non-native, invasive plant species will be removed from disturbed areas prior to replanting.

Mitigation Measure BIO-6: Project-Specific Biological Resources Studies (Non-HMP Species)

CalVet shall require that a biological survey of each future phase of the 2015 Master Plan be conducted by a qualified biologist to determine if the development could potentially impact a special-status species or their habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to: 1) a description of the biological conditions at the site; 2) identification of the potential

for special-status species to occur or special-status species observed, if any; 3) maps of the locations of special-status species or potential habitat, if observed; and 4) recommended mitigation measures, if applicable.

- If special-status species are determined not to occur at the development site, no additional mitigation is necessary.
- If special-status species are observed or determined to have the potential to occur, the project biologist shall recommend measures necessary to avoid, minimize, and/or compensate for identified impacts. Measures may include, but are not limited to, revisions to the project design and project modifications, pre-construction surveys, construction buffers, construction best management practices, monitoring, non-native species control, restoration and preservation, and salvage and relocation.

Mitigation Measure BIO-7: Pre-Construction Surveys for Protected Avian Species

Construction activities that may directly (e.g., vegetation removal) or indirectly (e.g., noise/ground disturbance) affect protected nesting avian species will be timed to avoid the breeding and nesting season. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Specifically, vegetation and/or tree removal can be scheduled after September 16 and before January 31. Alternatively, a qualified biologist will be retained by the project applicant to conduct pre-construction surveys for nesting raptors and other protected avian species within 500 feet of proposed construction activities if construction occurs between February 1 and September 15. Pre-construction surveys will be conducted no more than 14 days prior to the start of construction activities during the early part of the breeding season (February through April) and no more than 30 days prior to the initiation of these activities during the late part of the breeding season (May through August). Because some bird species nest early in spring and others nest later in summer, surveys for nesting birds may be required to continue during construction to address new arrivals, and because some species breed multiple times in a season. The necessity and timing of these continued surveys will be determined by the qualified biologist based on review of the final construction plans and in coordination with the CDFW, as needed.

If raptors or other protected avian species nests are identified during the pre-construction surveys, the qualified biologist will notify the project applicant and an appropriate no-disturbance buffer will be imposed within which no construction activities or disturbance should take place (generally 500 feet in all directions for raptors; other avian species may have species-specific requirements) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist.

Mitigation Measure BIO-8: Pre-Construction Special-Status Plant Surveys

A qualified biologist shall be retained to conduct special-status plant survey(s) according to USFWS, CDFW, and CNPS protocols for during the appropriate identification period(s) to determine their presence within the Phase 2 site. The biologist shall prepare a report that provides the results of the survey, and, if found the number and locations of individuals/populations identified within the site. If no special-status plant species are found, no further mitigation is necessary. If special-status plant species are found, the following measures shall be implemented:

- Individuals shall be avoided to the maximum extent possible.
- For impacts to the HMP species within the development site that do not require take authorization from USFWS or CDFW, salvage efforts for these species will be evaluated by

a qualified biologist in coordination with the contractor to further reduce impacts per the requirements of the HMP and BO, in accordance with **Mitigation Measure BIO-1**.

- If non-HMP special-status plant species are observed and if avoidance is not feasible, species shall be replaced at a 1:1 success ratio for the acreage or individuals impacted (depending on species impacted) and a Rare Plant Restoration Plan shall be prepared by a qualified biologist and implemented. The plan shall include, but is not limited to, the following:
    - A description of the baseline conditions of the habitats within the work site, including the presence of any special-status species, their locations, and densities;
    - Procedures to control and/or eliminate non-native invasive species within the work site;
    - Provisions for ongoing training of facility maintenance personnel to ensure compliance with the requirements of the plan;
    - A detailed description of on-site and/or off-site restoration areas, salvage of seed and/or soil bank, plant salvage, seeding and planting specifications, including, if required by the CDFW, increased planting ratio to ensure the 1:1 success ratio; and
    - A monitoring program that describes annual monitoring efforts which incorporate success criteria and contingency plans if success criteria are not met.

Mitigation Measure BIO-9: Pre-Construction Surveys for Special-Status Bats

To avoid and reduce impacts to hoary bat and Townsend's big-eared bat, CalVet will retain a qualified bat specialist or wildlife biologist to conduct site surveys during the reproductive season (May 1 through September 15) to characterize bat utilization of the site and potential species present (techniques utilized to be determined by the biologist) prior to any vegetation removal. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Based on the results of these initial surveys, one or more of the following will occur:

- If it is determined that bats are not present at the site, no additional mitigation is required.
- If it is determined that bats are utilizing the site and may be impacted by the proposed project, pre-construction surveys will be conducted within 100 feet of construction limits no more than 30 days prior to any tree removal. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, tree removal may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night).
- If a single bat and/or only adult bats are roosting, removal of trees may proceed after the bats have been safely excluded from the roost. Exclusion techniques will be determined by the biologist and depend on the roost type; the biologist will prepare a mitigation plan for provision of alternative habitat to be approved by CDFW.
- If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) will be postponed until the biologist monitoring the roost(s) determines that the young have fledged and are no longer dependent on the roost. The monitor will ensure that all bats have left the area of disturbance prior to initiation of limbing and/or removal of trees. If avoidance is not possible and a maternity

roost must be disrupted, a depredation permit would be required prior to removal of the roost.

Mitigation Measure BIO-10: Pre-Construction Surveys for Monterey Dusky-Footed Woodrat

Not more than thirty (30) days prior to the start of construction (including vegetation removal), a qualified biologist shall conduct a survey of the project sites to locate existing Monterey dusky-footed woodrat nests. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. All Monterey dusky-footed woodrat nests shall be mapped and flagged for avoidance. Graphics depicting all Monterey dusky-footed woodrat nests shall be provided to the construction contractor. Any Monterey dusky-footed woodrat nests that cannot be avoided shall be relocated according to the following procedures:

Each active nest shall be disturbed by the qualified biologist to the degree that the woodrats leave the nest and seek refuge elsewhere. After the nests have been disturbed, the nest sticks shall be removed from the impact areas and placed outside of areas planned for impacts. Nests shall be dismantled during the non-breeding season (between October 1 and December 31), if possible. If a litter of young is found or suspected, nest material shall be replaced and the nest left alone for 2-3 weeks, after this time the nest will be rechecked to verify that young are capable of independent survival before proceeding with nest dismantling.

Impact BIO-2: Substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

2015 Master Plan

Habitats occurring within the 2015 Master Plan site that are listed as sensitive on the CDFW's *California Natural Communities List* include central maritime chaparral. Within the site, up to 1.3 acres of central maritime chaparral would be permanently removed as a result of project implementation and approximately 10 acres would be preserved.

As stated in the **Approach to Analysis**, the implementation of the HMP mitigates for the loss of central maritime chaparral by preserving this habitat within the habitat reserve areas on the former Fort Ord. Therefore, impacts to central maritime chaparral are considered less than significant with the implementation of the HMP. No additional mitigation is required.

Phase 2

No sensitive habitats occur within the Phase 2 site; the project would have no impact on sensitive habitats, and no mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would result in a decrease in impacts to central maritime chaparral. Impacts to central maritime chaparral would be slightly reduced by approximately 0.2 acres. Impacts to central maritime chaparral would still be mitigated by the implementation of the HMP. Therefore, this is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 under Alternative 3 would generally be the same as the proposed project. No sensitive habitats occur within the Alternative 3 site. Alternative 3 would have no impact on sensitive habitats, and no mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Wildlife movement corridors are pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or man-made factors, such as urbanization. The fragmentation of natural habitat creates isolated "islands" of vegetation that may not provide sufficient area or resources to accommodate sustainable populations for a number of species, and, therefore, adversely affect both genetic and species diversity. Corridors often partially or largely mitigate the adverse effects of fragmentation by 1) allowing animals to move between remaining habitats to replenish depleted populations and increase the gene pool available; 2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (e.g., fire and disease) will result in population or species extinction; and 3) serving as travel paths for individual animals moving throughout their home range in search of food, water, mates, and other needs, or for dispersing juveniles in search of new home ranges.

The 2010 Monterey County General Plan EIR identified a number of significant wildlife movement corridors and linkages within the vicinity of the former Fort Ord, including Linkage 308: Fort Ord – Ventana; Linkage 322: Highway 68 Western Crossing; Linkage 350: Sierra de Salinas – Toro Peak; Linkage 339: Salinas Valley Floor; and Linkage 378: Salinas River – Pinnacles National Monument (County, 2010b). Of particular importance for wildlife movement from the former Fort Ord lands to outlying areas are Linkages 308 and 322. Specifically, Linkage 322 runs along El Toro Creek in the southeastern portion of former Fort Ord and through a large, bridge undercrossing Highway 68. This corridor has been identified as a significant wildlife corridor for mammals, amphibians, and reptiles moving between former Fort Ord lands and connecting to the Sierra de Salinas and Santa Lucia Ranges.

The HMP considered conservation area connectivity as an essential component of the design of the conservation areas and corridors within the former Fort Ord. The HMP created conservation areas and corridors with the purpose of linking the plant and animal populations in the northern portion of the former base at the Marina Municipal Airport to the populations in the south to the Fort Ord National Monument and the El Toro Creek undercrossing of Highway 68. The implementation of the HMP preserves over 18,500 acres of a variety of habitats supporting a variety of common and special-status plant species, and maintains a north-south wildlife corridor across the former Fort Ord lands to connect with the primary, significant wildlife linkages.

The project site is located in the western portion of the former Fort Ord, adjacent to existing developed areas to the northwest and undeveloped land to the north, east, and south. These undeveloped areas are proposed for future development; however, the parcel to the southwest may be preserved as open space (see **Impact BIO-4** for more details). As discussed in **Section 3.4.2, Environmental Setting**, the project site is in undeveloped land that is comprised of five vegetation units: coast live oak woodland,

central maritime chaparral, central coast scrub, non-native grassland, and ruderal/disturbed/landscaped. In addition, the Phase 2 site consists of developed areas. The implementation of the proposed project would involve impacts to these habitat types; however, this location supports wildlife movement, as there are various vegetative communities, vegetative cover, and the adjacency of open space areas with high quality wildlife habitat (ECORP, 2014a). The presence of adjacent habitat would likely deter wildlife from concentrating in this area, as they are likely to utilize the adjacent quality habitat.

Barbed-wire fencing is currently in place in some locations around the perimeter of the project site. Vinyl fencing currently surrounds the existing retention basin. Deer were observed within the project site during the 2019 biological survey (**Appendix D**). Future phases of the 2015 Master Plan, including Phase 2, would include perimeter fencing to match the existing fencing; however, the existing fencing is not considered a significant structure that would impede wildlife movement. In addition, the site is surrounded by mostly undeveloped lands, which can be utilized by wildlife. Therefore, habitat within the project site supports species movement on-site and would not substantially interfere with wildlife movement across the site. The proposed project would impact only a small percentage of wildlife habitat within the former Fort Ord. The HMP preserves approximately 18,500 acres of large, contiguous areas of wildlife habitat that will remain on the former Fort Ord and will be preserved in perpetuity. As a result, the development of the 2015 Master Plan, including Phase 2, would not disconnect, fragment, or otherwise impeded wildlife movement in the primary, significant wildlife movement corridors between the former Fort Ord lands and other lands. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would result in a decrease in impacts to wildlife movement and corridors. Alternative 2 would not include significant structures or barriers that would impede movement. Potential impacts to wildlife movement and corridors would still be mitigated by the implementation of the HMP. Therefore, this is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. Phase 2 does not include the construction of any significant structures or barriers that would impede wildlife movement. Potential impacts to wildlife movement and corridors would still be mitigated by the implementation of the HMP. Therefore, this is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Criterion e)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The project site is located with the limits of the City and County; however, the property is owned by the State of California. As discussed in **Section 3.11, Land Use and Planning**, in most situations, the State is not subject to local ordinances, and, therefore, is not required to obtain permits from the County or Seaside. However, the State will comply with local ordinances when feasible. As a result, protected trees within City and County limits were inventoried in accordance with their respective codes in the effort to comply with local ordinances. Staub Forestry & Environmental prepared a Forest Resource Evaluation of the project site in November 2010 (2010 Staub Evaluation) (Staub, 2010). DD&A conducted a

Supplemental Forest Resource Evaluation of the 2015 Master Plan area in January 2019 to verify and update the data provided in the 2010 Forest Resource Evaluation, which is included in **Appendix D** (DD&A, 2019b).

The Supplemental Forest Resource Evaluation found that the oak woodland within the 2015 Master Plan area is limited in height both by heavy wind pressure and excessive soil drainage. The oak woodlands appear to be young but slowly maturing. Few or no oak seedlings or saplings were observed. The absence of oak regeneration is a statewide problem due to a variety of factors such as grazing, wildlife browsing, avian and rodent predation, and competition for moisture with annual grasses. All these abiotic stressors are consistent with the 2010 Staub Evaluation. The biotic stressors identified during the 2010 Staub Evaluation included California oak worm (*Phryganidia californica*) and pitch canker (*Fusarium circinatum*). Biotic stressors identified during the 2010 Staub Evaluation are still present within the 2015 Master Plan area; however, additional symptoms of biotic stressors were identified during the 2019 survey, including oak branch canker (*Diplodia quercina*), Phytophthora root/crown rot, oak ambrosia beetles (*Monarthrum species*) and oak bark beetles (*Pseudopityophthorus species*). No indicators or symptoms for sudden oak death (SOD) (*Phytophthora ramorum*) were observed. According to the California Oak Mortality Task Force (a task force under the California Forest Pest Council) (2019), the closest mapped SOD site is in Carmel Valley somewhere in the Quail Meadows area. As identified in the 2010 Staub Evaluation, dieback from California oak worm was the main stressor defoliating coast live oak trees in the area; however, many of the trees appear to be fully or partially recovered. Recovery from the defoliation is affected by minimal moisture on the site due to wind pressure and excessively drained sandy soils. The predominance of trees in fair or better condition is characteristic of native, unmanaged oak woodlands. In general, the trees appear to have recovered well from the oak worm defoliation of the past several years. Currently, most of the oak dieback observed appears to be from Phytophthora root/crown rot in combination with bark beetles. Overall, the oak woodland conditions are generally consistent with the findings of the 2010 Staub Evaluation.

The build-out of the 2015 Master Plan, including Phase 2, could result in permanent impacts to approximately 32.2 acres of coast live oak woodland. However, as described in **Chapter 2, Proposed Project and Alternatives** and **Section 3.2, Aesthetics**, oak trees would be preserved wherever possible, including locating columbaria within the oak woodland and preserving oak woodland between burial sections to reduce potential impacts. Where major grading is proposed, new oaks would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. In meeting with the project objective to "incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs," the layouts for Phase 2 and the 2015 Master Plan have been designed and sited to minimize impacts to oak woodland and the topography.

For Phase 2, the in-ground cremains and crypts are proposed in terraces to minimize grading, vegetation removal, and disturbance to the adjacent hillside. Site preparation for Phase 2 would primarily consist of improvements to the existing retention basin and vegetation removal, including approximately 1.3 acres of disturbed habitat associated with the existing retention basin and approximately 3.1 acres of native and non-native groundcover, shrubs, and trees. It is estimated that approximately 1.1 acres of coast live oak woodland would be impacted for the development of Phase 2 (**Figure 3.4-1**). Approximately 410 coast live oak trees occur within this development footprint (**Figure 3.4-1**).[5] The 1.2-acre preservation area associated with Phase 2 would be located along Parker Flats Road and contains 1 acre of coast live oak

[5] Please note that the 1.1 acres of oak woodland do not exclusively contain the 410 coast live oak trees that may be removed; the individual trees occur within the oak woodland and within the remaining development area.

woodland. The ground disturbance associated with construction activities for Phase 2 would be temporary and the Planting Plan includes the planting of 111 coast live oak trees as well as other trees, shrubs, and groundcover plantings, within disturbed areas. With 111 coast live oak trees proposed for planting on-site and an additional 1 acre of coast live oak woodland preserved on-site (please refer to **Figure 2-16**), the impacted acreage would be mitigated at a 1:1 ratio within the Phase 2 site. This is consistent with the 1:1 mitigation ratio outlined in the Seaside and County Code to mitigate for tree removal. This is considered a less-than-significant impact and no mitigation is required. However, construction activities could result in impacts to preserved coast live oak trees on-site as a result of equipment strike, soil compaction, and root exposure and damage. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-11**. With Phase 2 on-site preservation, replacement of oak trees on-site, and the implementation of the tree protection and replacement measures required in **Mitigation Measure BIO-11**, impacts to coast live oak trees and woodland as a result of implementation of Phase 2 of the CCCVC are less-than-significant.[6]

For the remaining phases of the 2015 Master Plan, each phase would also be designed and sited to minimize impacts to the native landscape. As discussed in **Chapter 2, Proposed Project and Alternatives**, and **Section 3.2, Aesthetics**, future phases would be designed to achieve several goals, including, but not limited to, respecting the natural drainage pattern, vegetation, and contours of the site to the extent feasible. In addition, approximately 17.1 acres of coast live oak woodland would be protected within the proposed preservation area and available as a mitigation area for future phases (please refer to **Figure 2-16**). Future phases would also include implementation of phase-specific planting plans with a focus of planting coast live oak trees and other native vegetation. Where major grading is proposed, new oak trees would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. The design of the crypts and columbarium would be similar to Phases 1 and 2 where the columbaria are set back within the existing oak woodland and preserving oak woodland between burial sections, and the crypts would be placed on terraces, minimizing impacts to the natural landscape.

As described in **Section 2.1, Project Background**, and **Section 3.11, Land Use and Planning**, the republished (however, never officially adopted by FORA) 2001 Reuse Plan Land Use Concept designates a 178-acre area in support of the construction of a CCCVC. The 2008 Master Plan proposed five land use areas within the 178-acre area, including the Development Area with Habitat Restoration Opportunity (DAHRO) site. The DAHRO site consists of approximately 26 acres (please refer to **Figure 2-1**) of coast live oak woodland within a 45-acre site located southeast of the 84.4-acre CCCVC site. The DAHRO parcel is currently proposed for inclusion in the Working Draft of the Fort Ord Oak Woodland Conservation Area (OWCA), which has not yet been approved. As discussed in Section **3.4.3, Regulatory Setting**, the establishment and management of the Fort Ord OWCA is required by the policies and programs in the Reuse Plan, which are considered a component of the mitigation strategy for impacts to coast live oak trees in the Reuse Plan EIR.

The Reuse Plan EIR identified that the implementation of the Reuse Plan would result in the loss of coast live oak woodland within an area of approximately 1,584 acres, due to new construction and development, which includes the CCCVC site (DD&A, 2018). The EIR identified applicable policies and programs that would establish the oak woodland conservation area and preserve oak woodland elements.

[6] As discussed in **Chapter 2, Proposed Project and Alternatives**, the Phase 1 IS/EA required the establishment of an off-site oak restoration area to further mitigate less-than-significant impacts to oak trees. CalVet has identified a potential off-site restoration area on County property and is currently negotiating the use of the area with the County to implement this mitigation measure. The State anticipates the restoration efforts to commence at the proposed site in Fall 2019. Due to the complexities experienced with off-site restoration efforts, on-site preservation is the preferred mitigation strategy for the proposed project. If on-site preservation is not feasible, off-site preservation would be established, as outlined in **Mitigation Measure BIO-13**.

The EIR found that large contiguous areas of oak woodland habitat would be retained through implementation of the Reuse Plan policies and programs that require the establishment of an oak woodland conservation area, and the preservation of oak woodland within the HMAs established by the HMP. The EIR further concluded that the BRP policies and programs would minimize loss of oak trees through careful site design in development areas and effectively requiring a 1:1 replacement for all trees removed (as called for in the Monterey County and Seaside ordinances, see Biological Resources Policy C-2.2 below). Therefore, with the establishment of an oak woodland conservation area, preservation of oak woodlands within the HMAs, and implementation of the policies and programs related to site design and tree replacement, potential impacts to oak woodlands resulting from implementation of the Reuse Plan were found to be less-than-significant.

The Reuse Plan Biological Resource Policy B-2 (for both the County and Seaside) states that as site-specific development plans for Polygon 21a and a portion of Polygon 20c are formulated and planning proceeds, the City and County shall coordinate with each other, CSUMB, FORA, and other interested entities in the designation of an oak woodland conservation area. The DAHRO and CCCVC sites fall within both of these polygons. As discussed above, the DAHRO site is proposed for inclusion in the Working Draft of the Fort Ord OWCA. As planning proceeds for the CCCVC, it is important to note that the establishment of the OWCA is in progress and the DAHRO site is being proposed for conservation consistent with the historic planning efforts for the CCCVC outlined in the 2008 Master Plan. Further, impacts to coast live oak trees on the CCCVC site were considered in the BRP EIR analysis.

The 2015 Master Plan would be implemented in several phases over an approximate 100-year period and the design of future phases. CalVet and USDVA do not anticipate proceeding with the development of Phase 3 through 11 of the 2015 Master Plan in the immediate future, nor does it have sufficient construction-level detail available to enable an analysis of phase-specific impacts at this time. Further, due to the long-term nature of the 2015 Master Plan, it is preferable not to speculate as to specific site plans or facilities at this time because these phases likely will evolve over the next 100 years, based on demand and funding availability. Additional environmental review under CEQA and NEPA for these phases will be undertaken, as appropriate, during subsequent implementation of the 2015 Master Plan.

There are approximately 31.1 acres of coast live oak woodland within the development areas of Phases 3-11. The 2015 Master Plan includes the preservation of approximately 17.1 acres of oak woodland within its 31.7-acre preservation area. In addition, it is reasonable to assume that future phases of the 2015 Master Plan (Phases 3-11) could avoid and minimize impacts to coast live oak trees through site design and replacement, and that future phases could mitigate at a 1:1 ratio within each phase footprint, similar to existing Phase 1 and proposed Phase 2. However, without detailed site plans for each future phase, coast live oak mitigation may not be feasible within the footprint of each phase. Alternatively, some future phases may be significantly reduced in size or possibly not be built, resulting in more oak woodland preservation on-site. Therefore, a programmatic mitigation measure has been identified to reduce potentially significant impacts to coast live oak trees and woodland during the build-out of the 2015 Master Plan to a less-than-significant level.

Mitigation Measure BIO-6, Project-Specific Biological Resources Studies, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. **Mitigation Measure BIO-12** requires that, as a component of the project-specific biological resources studies required for each future phase in **Mitigation Measure BIO-6**, potential impacts to coast live oak trees and woodland will be quantified to verify that the oak mitigation continues to meet a 1:1 mitigation ratio. If a future phase would exceed the 1:1 ratio of acreage preserved on-site, additional mitigation would be required. Construction activities in future phases could result in impacts to preserved coast live oak trees on-site as a result of equipment strike, soil compaction, and root

exposure and damage. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-11**. Therefore, with implementation of **Mitigation Measures BIO-6, BIO-11,** and **BIO-12**, impacts to coast live oak trees and woodland would be reduced to a less-than-significant level.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would result in a decrease in impacts to coast live oak woodland. Alternative 2 would result in the similar impacts to the coast live oak woodland but to a lesser degree. Impacts to coast live oak woodland would be reduced from 31.1 acres to 23.4 acres. However, impacts to coast live oak woodland would still be potentially significant and require implementation of **Mitigation Measures BIO-6**, **BIO-11**, and **BIO-12** to reduce to a less-than-significant level.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, the expanded area does not contain coast live oak woodland and, therefore, impacts would be very similar to the proposed project. Impacts to coast live oak woodland would still be potentially significant under Alternative 3 and require implementation of **Mitigation Measures BIO-6**, **BIO-11**, and **BIO-12** to reduce to a less-than-significant level.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Mitigation Measure BIO-11: Oak Tree Protection and Replacement Measures

For each phase of the 2015 Master Plan, including Phase 2, impacts to coast live oak trees shall be avoided and minimized through site design and protection during construction. To maximize tree retention and protection, a forester, arborist, or other tree care professional shall be involved with early planning and design of each phase and shall be involved in the review and development of final grading and construction plans wherever trees occur within the site or at the grading margins. To avoid unintended impacts to trees outside the construction area, the following tree protection measures shall be implemented:

- Temporary construction fencing shall be placed at approximately 10 feet from the trunk and no grading, trenching, or vegetative alteration shall occur within this environmental exclusion zone. Grading, vegetation removal, and other ground disturbing construction activities may not commence until the project forester has inspected and approved the protective fencing installed by the contractor. No equipment or materials, including soil, shall be stored within the established environmental exclusion zone. Prior to grading within 25 feet of retained trees, the project forester, arborist or other tree care professional shall be consulted to determine whether pruning is necessary to protect limbs from grading equipment.
- To avoid soil compaction from damaging the roots, heavy equipment shall not be allowed to drive over the root area. If deemed necessary and approved by the forester, equipment may drive across one side of the tree. To reduce soil compaction, wood chips shall be spread 6-12 inches deep to disperse the weight of equipment and plywood sheets shall be placed over the wood chips for added protection.

- Roots exposed by excavation must be pruned and recovered as quickly as possible to promote callusing, closure, and healthy regrowth.
- Retained trees shall be watered periodically in accordance with species need to promote tree health. Transplanted trees and their intended planting areas shall be pre-watered. Post planting watering shall be done as needed to assure establishment.
- When phase design is completed, an estimate of the appropriate number of replacement trees shall be made based on available planting space. These replacement trees (minimum five-gallon specimens) shall be planted along boundaries and within landscape areas. Planting density for replacement trees shall be accurately detailed to allow for some unavoidable mortality over time.
- Transplants are encouraged and shall be credited on a 3:1 basis. Final replanting numbers may be modified by additional tree retention and should be made part of the final landscaping plan.

Mitigation Measure BIO-12: Coast Live Oak Tree and Woodland Protection

Mitigation Measure BIO-6, Project-Specific Biological Resources Studies, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. During the implementation of **Mitigation Measure BIO-6**, a qualified biologist shall determine whether coast live oak trees/woodland would be impacted by each proposed phase. If coast live oak trees/woodland have the potential to be impacted, a qualified biologist will provide a description of the conditions of the trees and habitat that may be impacted and quantify the individuals and/or acreage that may be impacted for inclusion in the Project-Specific Biological Resources Study required by **Mitigation Measure BIO-6**. The impact analysis shall take into consideration tree retention, relocation, and replacement proposed for each phase. A qualified biologist will include a summary of coast live oak trees/woodland impacted by phase to date in the study and verify that the impacts that the oak mitigation continues to meet a 1:1 mitigation ratio. If impacts to coast live oak trees/woodland in a future phase would exceed a 1:1 mitigation ratio based on the available oak woodland that would be preserved on-site, the phase may either be redesigned to avoid or reduce impacts to meet a 1:1 mitigation ratio, or additional mitigation (e.g., including off-site preservation, on-site or off-site restoration, or payment of in-lieu fees) would be required. A qualified biologist will identify potential mitigation strategies to meet a 1:1 mitigation ratio in the study, and the appropriate mitigation strategy shall be determined and initiated prior to construction of the subject phase. Potential mitigation strategies may include, but are not limited to:

1. Off-site oak woodland preservation areas: opportunities may include coast live oak woodland habitat within or adjacent to the former Fort Ord. However, off-site preservation areas shall not include any lands conserved as part of the Fort Ord Oak Woodland Conservation Area, once approved. In addition, authorization to utilize the site by the land

owner would be required and the mitigation area must be preserved in perpetuity through a conservation easement or other appropriate land use restriction.

2. On-site or off-site restoration: opportunities may include restoration of coast live oak woodland habitat within or adjacent to the former Fort Ord. Off-site mitigation areas would be subject to the same conditions listed in mitigation strategy #1.
3. Payment of in-lieu fees to the County and/or Seaside to fund a "fair share" of the cost to manage and monitor the Fort Ord Oak Woodland Conservation Area, once approved. The fair share cost shall be based on the acreage required to meet the 1:1 mitigation ratio exceeded in the phase.

Impact BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The project site is not located within an approved HCP or NCCP area. However, it is located within the Fort Ord HMP boundaries and the plan area associated with the Draft HCP. The project site is designated for development (with no restrictions) in the HMP for Fort Ord and is located within a designated development area in the Draft HCP. As described in the **Approach to Analysis**, the proposed project is consistent with the approved HMP. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be located in the same parcels as the proposed project. Therefore, Alternative 2 would also be consisted with the approved HMP. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. Therefore, Alternative 3 would also be consisted with the approved HMP. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.5 CULTURAL AND TRIBAL RESOURCES

3.5.1 Introduction

This section evaluates the potential effects of the proposed project and alternatives on cultural resources, including historical, archaeological, tribal, and human remains. The information contained in this section is based on the results of the Archaeological Report prepared by Archeological Consulting in September 2010 for the proposed project, and the Cultural Resources Inventory Report prepared by ECORP Consulting, Inc. in May 2014 for the Phase 1 project[1] (ECORP, 2014b; **Appendix E, Cultural Reports**). Information contained in this section was also obtained from available documentation contained in the Phase 1 IS/EA (ECORP, 2014a), 2010 Monterey County General Plan (County, 2010a), and other applicable background documents. The following subsections include a brief discussion of the regional historic context and the findings of the technical resource evaluations.

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, or cultural importance. Significant cultural resources may be historical resources (i.e., cultural resources eligible for inclusion on the California Register of Historical Resources [CRHR]) or unique archaeological resource as defined in CEQA. Cultural resources encompass archaeological and historic resources as briefly summarized below:

- **Archaeological Resources:** Archaeology is the study of prehistoric human activities and cultures. Archaeological resources are associated with indigenous cultures and historic-era settlement and are less than 10,000 years old.
- **Historic Resources:** Historic resources (extant buildings and structures) are associated with the more recent past. In California, historic resources are typically associated with the Spanish, Mexican, and American periods in the state's history and are usually less than 200 years old.
- **Tribal Cultural Resources:** Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either eligible or listed in the California Register of Historical Resources or local register of historical resources (PRC Section 21074).

Public and agency comments were received during the public scoping period. To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. Comments from the Ohlone/Costanoan-Esselen Nation (OCEN) were received addressing cultural and tribal resources, which are summarized below:

- OCEN's objects to all excavation in known cultural lands even when they are described as previously disturbed and OCEN's priority is that ancestor's remains are protected and undisturbed.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. For a complete list of public comments received during the public scoping period, please refer to **Appendix A**, **NOP and Public Comment Letters.**

[1] Although the Cultural Resources Report was prepared for Phase 1, the Area of Potential Effects evaluated in the report included the Phase 2 project site.

3.5.2 Environmental Setting

Regional Setting

Archaeological evidence and radiocarbon dates establish human occupation of the California Coast dating back at least 10,000 years. Evidence from coastal areas of the County suggests settlement of this area by at least 5,000 B.C., and possibly earlier. Proto-Esselen foragers speaking Hokan represented the Sur Pattern,[2] dating to 5,000 B.C. They were replaced by proto-Costanoan peoples in the Monterey Pattern, which began about 500 B.C. and lasted up to the Historic Period.

The former Fort Ord is located within lands historically occupied by the Rumsen Indians who belonged to a branch of the Costanoan, or Ohlone, language family. Their closest village center to former Fort Ord was located at present day San Carlos. Rumsen/Ohlone traditional lifeways were largely destroyed when Euro-Americans began colonizing their territory in the 1770s. European contact began with the arrival of Spanish explorers in the 16th Century. In 1770, the Portola expedition established the first mission and the Royal Presidio in Monterey. In 1771, the Mission was moved to the Carmel Valley adjacent to arable land. By 1778, most of the remaining Rumsen and Esselen Indians in Carmel and Monterey were baptized and farming church lands, marking the beginning of the disintegration of Native American traditional lifeways in this area. By the turn of the century, vestigial Indian communities disappeared, and by 1935, the Ohlone language was extinct.

The former Fort Ord was created in 1917 from land designated as City of Monterey Tract No. 1 and several ranches. Originally named Gigling Reservation, the installation was renamed Camp Ord in 1933 after Major General Edward Ord, and later became known as Fort Ord. The former Fort Ord became an active military installation for the housing and training of Army troops just before World War II. Many facilities were built beginning in 1940 using funds from the Work Progress Administration. The former Fort Ord was used as an important staging area during World War II and as a training facility during the Korean and Vietnam wars.

This section includes generalized information related to the region's prehistoric, historic, and ethnographic setting. A detailed description of the proposed project's Archaeological Area of Potential Effects (APE)[3] is also described below.

Archaeological and Tribal Resources

Archaeological Resources

Three archaeological surveys were previously conducted within the boundaries of the former Fort Ord (USACE, 1993). The surveys found no archaeological resource potential in the active beach strand, low potential in the active dunes, and medium potential in the stabilized dunes. The dissected uplands were found to have a high potential for prehistoric archaeological resources along the streams that connect with the Salinas River floodplain. Areas of high archaeological sensitivity have been identified and a cultural resource survey was conducted in high and low probability areas, which found that there was little potential for cultural deposits or information at three identified sites and four isolated find localities (Waite, 1995). The areas of greatest archaeological sensitivity at Fort Ord include all terraces and benches adjacent to the Salinas River and El Toro Creek, the peripheries of the west cycle lakes, and

[2] Pattern refers to geographically and chronologically extended cultural unit within a region, characterized by similar technology, economy, and burial practices.

[3] The APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE was developed to identify all areas where construction-related ground-disturbance could occur and is further explained in the **Local Setting**.

lands adjacent to the streams that flow through Pilarcitos and Impossible Canyons. All other lands in the area were determined to have low to medium potential for possessing archaeological resources (EMC and EDAW, 1997).

Tribal Cultural Resources

Tribal cultural resources, as defined by PRC Section 21074, are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

- Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
- a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the criteria set forth in PRC Section 5024.2(c). In applying the criteria set forth in PRC Section 5024.1(c) for the purposes of this paragraph, the lead agency shall consider the significance of the resources to a California Native American tribe.

Historic Context

An Inventory Survey of Historic-Period Sites at Fort Ord was prepared for the former Fort Ord to identify historic sites that may be eligible for inclusion in the National Register of Historic Places (NRHP). The Army and the California State Historic Preservation Officer (SHPO) concluded that Stilwell Hall (2 miles northwest of the proposed project site), which has since been deconstructed due to coastal erosion, and 35 structures in the East Garrison area (2.9 miles northeast of the proposed project site) were the only former Fort Ord properties eligible for listing on the NRHP (EMC and EDAW, 1997).

Prehistoric Setting

The Central Coast is defined as the region south of San Francisco Bay stretching to the Southern California Bight, including the South or Central Coast Ranges west of the Central Valley and including the counties of Santa Clara, San Benito, Santa Cruz, Monterey, and San Luis Obispo, and portions of Kings, Merced, and Fresno counties.

Fort Ord lies within the northern half of this region and has a rich history of human settlement. The region was characterized by Moratto's California Archaeology (1984) and updated in California Prehistory (Jones and Klar, eds., 2007). Moratto's work relied heavily on a taxonomic framework developed by Fredrickson (1973, 1974) that outlines three basic periods: the Paleo-Indian, Archaic, and Emergent. Jones and Klar, eds. (2007) have compiled new data from the last 20 years and a regional culture history documents variability and continuity in Central Coast populations over the past 10,000 years. This occupation has been broken down into six broad periods: the Paleoindian period (pre-8,000 B.C.), Early Archaic or Millingstone (8,000 to 3,500 B.C.), and a Hunting Culture, which spans Early (3,500 to 600 B.C.), Middle (600 B.C. to A.D. 1,000), and Middle/Late Transition (A.D. 1,000 to 1,250) periods, followed by a Late period (A.D. 1,250 to 1769). Each of these periods is briefly summarized below.

Paleoindian Period (Pre-8,000 B.C.)

The Paleoindian period was a time of great climatic and environmental change. Very little is known about the environment of the region, due to a short and little studied pollen record. Evidence such as geomorphic soil studies, vertebrate fossils, and archaeology suggest a mosaic of oak woodland, chaparral, and coastal sage scrub communities replaced pine and juniper-cypress during this period. Archaeological evidence for this period is scarce and usually only dated by the presence of diagnostic

artifacts such as fluted Clovis projectile points. These have been found in Nipomo, at the southern end of the Central Coast. No other substantive components dating to this period have been identified.

Millingstone Culture or Early Archaic (8,000 to 3,500 Years B.C.)

The Millingstone phase is marked by large numbers of well-made handstones and milling slabs, crude core and cobble-core tools, and less flake tools and large side-notched projectile points. Pitted stones are also present along with a small number of contracting stemmed points. Occasional lanceolate points and crescents have been noted within this period as well, at sites within Monterey County. Millingstone sites have been identified in a range of settings, including open coastline, within estuaries, and near shore interior valleys. Few sites are found further inland (more than 15 miles from the coastline). Most of these interior sites exhibit marine shells indicating that inhabitants were still exploiting coastal resources and maintained a connection to the coast.

The so-called Millingstone people practiced a broad-spectrum hunting and gathering subsistence. While they exploited birds and mammals, diet consisted predominantly of shellfish and fish. Remains from deer and rabbit are commonly associated within this period, but stable isotope analysis from a site in Santa Cruz County indicated that 70-84 percent of the diet consisted of marine food.

Hunting Culture (3,500 Years B.C. to A.D. 1,250)

At the end of the Millingstone period, the Central Coast saw an increase in large projectile points most often associated with the establishment of new settlements. The so-called Hunting Culture typology has been refined over recent years and while small variances occur between Early and Middle periods, "splitting" approaches have proven less useful than "lumping" systems. During this period people retained a preference for coastal habitation, though an increasing number of sites have been located within interior valleys.

The Early Period is marked by the co-occurrence of contracting stemmed and Rossi square-stemmed points and large side-notched variants. Earlier handstones and milling slabs are retained within this period, but portable mortars and pestles appear for the first time in small numbers. Cobble-core tools are less frequent and fishing equipment is limited to bone gorges. On the Monterey Peninsula, this phase includes the Saunders. Burials during this period are flexed and are often accompanied by Rossi square-stemmed points, fish gorges, and square beads.

During the Middle Period, the Hunting Culture is represented by a number of sites throughout the Central Coast. During this time, contracting-stemmed points are retained and square-stemmed and large side-notched points disappear. Groundstone assemblages remain much the same with continued use of handstones, milling slabs, and portable mortars and pestles. Beads transition to saucers and circular shell fishhooks appear for the first time. Pitted stone artifacts and grooved stone net sinkers are also common at Middle Periods sites. Graves dating to this time show continued preference for a flexed position and often include bone tubes and large quantities of beads. Near the end of the period smaller leaf-shaped projectile points become more common, indicating the introduction of the bow and arrow.

Faunal assemblages from the Hunting Culture show variability of species, with Early Period sites mostly composed of deer, rabbits, and sea otters. Fish remains increased during the Early Period, but rises were most dramatic during the Middle Period. Shellfish remained an important dietary component, but their presence decreased as reliance on vertebrates increased.

Late Period (A.D. 1,250 to 1,769)

Dramatic changes occurred across the Central Coast after A.D. 1,000. The Hunting Culture transitioned gradually in some places and more rapidly in others, but is consistently marked by a clear shift in artifact assemblages.

An increase in Desert side-notched and Cottonwood arrow points, small bifacial bead drills, bedrock mortars, hopper mortars, lipped and cupped shell beads, and steatite disk beads set the Late Period apart from the preceding periods. Bead manufacture became increasingly important across the Central Coast and most sites from this period produce bead drills and *Olivella* bead manufacturing debris.

The Late Period is characterized by single-component sites. Many of these are located away from the shoreline and are within a variety of environmental settings. Typical sites are marked by small middens with associated or nearby bedrock mortars. While larger sites have been documented, Late Period middens tend to be small with several discrete deposits in one area. There is a remarkably strong consistency between Late Period assemblages, site types, and settlement patterns throughout the region.

Ethnographic Setting

The proposed project site is situated within the ancestral territory of the Ohlone, or Costanoan. The term Costanoan denotes a language family consisting of eight distinct languages: Karkin, Chochenyon, Ramaytush, Awaswas, Tamyen, Mutsun, Rumsen, and Chalon. The proposed project site falls within the center of the Rumsen language area. Costanoan territory spans the East and South Bay peninsula as far south as Big Sur. The eastern boundary is less well established, but was likely the interior Coast Range.

Due to varying accounts from a range of time periods, descriptions of Costanoan culture may not reflect all linguistic groups at all times. Great variance occurs between groups, terrain, and after-effects of contact. In 1770, the Costanoan-speaking people resided in approximately 50 separate, politically autonomous tribelets. Each of these had 50 to 500 members and one or more permanent village sites. The Costanoan recognized distinct ethnic groups by language and contiguous area. Often these differences were slight variances within dialects. Each branch of the Costanoan family was denoted by a different language. Linguistic evidence suggests that the ancestors of Costanoan speakers entered the San Francisco and Monterey Bay areas around A.D. 500, moving south and west from the Sacramento River delta system.

This roughly corresponds to the Late Period association, possibly explaining the dramatic shift in artifact assemblages at this time. Costanoan speakers were organized into small groups commonly referred to as tribelets; these autonomous groups consisted of a main village, several satellite villages, and temporary camps as throughout most of native California. Tribelet territories were well established and based on physiographic features. Leaders could be of either sex, but the office was inherited patrilineally. Elected by the community, leaders were responsible for feeding guests, providing for the poor, directing ceremonial gatherings, caring for captive grizzly bears and coyotes, and directing hunting, fishing, gathering, and warfare expeditions. Households were large, averaging 10 to 15 people, and consisted of several generations. Houses were often domed structures thatched with tule, grass, wild alfalfa, ferns, or carrizo. Other structures included sweat houses, dance enclosures, and assembly houses.

Ohlone used tule balsa watercraft propelled with double-bladed paddles to navigate the large network of waterways within their territory. Boats were used for transportation, hunting, and fishing. Bows were commonly used and made of sinew or vegetable fiber. Nets were used to hunt small birds and rabbits. Cordage was made from milkweed fibers, Indian hemp, or nettle. Sea otter, rabbit, and duck

skins were used to make blankets and bedding. Baskets were used in the collection, preparation, and storage of food and as such were made in a variety of shapes and sizes.

Ohlone people used a wide variety of resources in their diet, often improving yields through sustainable management of the land. Controlled burning was undertaken over extensive areas each fall to promote growth and prevent chaparral. Acorns were likely the most important food resource; and four species of oak are present within Costanoan territory. Buckeye, bay laurel, hazelnuts, and pine nuts were also commonly eaten along with a variety of berries and roots. Mammals consumed included black tailed deer, Roosevelt elk, antelope, grizzly bear, mountain lion, sea lion, whale, dog, wildcat, skunk, raccoon, rabbit, squirrel, rat, and mole. Waterfowl were also significant sources of food for Costanoan peoples. Several species of fish and shellfish were consumed as well, with mussels, clams, and abalone being among the most common.

Conflict was part of Costanoan life. Wars were waged between linguistic groups and tribelets, as well as with neighboring Esselen, Salinan, and Northern Valley Yokuts. Fighting usually arose over infringement of territorial rights and was conducted by surprise attack or by prearranged meeting. Trading between groups was common, with the main trading partners being the Plains Miwok, Sierra Miwok, and Yokuts. Costanoan people brought a variety of shellfish, salt, and *Olivella* shells to their inland neighbors and received piñon nuts in return.

The arrival of European missionaries and explorers greatly impacted Native people throughout California. Contact with Europeans came early within Costanoan history. The first contact was likely between the Vizcaíno expedition and Rumsen speakers in 1602. Costanoan populations were subject to the destructive forces of missionization, disease, displacement, and development that took place during California's early history. Seven missions were established within Costanoan territory between 1770 and 1797. Population estimates for the mission period suggest that less than 20 percent of their population remained by 1834. Cataclysmic changes took place within the native subsistence economy, ritual, and social activities as a result.

After mission secularization, the Costanoan experienced a second displacement as mission lands and property were supposed to be redistributed to native populations but few were designated and most of the land went to administrators and Rancherias. Most Costanoan gradually left the missions to work as manual laborers and some returned to native practices for a time. Multiethnic communities of displaced Indians were formed throughout the region, consisting of a diverse mix of Coast, Bay, and Plains Miwok, Patwin, Yokuts, and Esselen people. Several of these groups continue to petition the Federal government for reaffirmation as a federally recognized tribe.

Historical Setting

The Spanish were the first Europeans to explore the Monterey Peninsula, in the late 1760s and 1770s. After their initial exploration, the Spanish focused on the founding of presidios, missions, and secular towns. After the independence of Mexico and the secularization of the missions in the 1830s, the missions' property was divided into ranchos and distributed to private citizens. The following is a brief description of the various historic periods, as well as a discussion of the local historical context within the proposed project APE.

Early Exploration

The first documented exploration of the area took place as early as 1542 when Juan Rodríguez Cabrillo sailed up the coast of California. While Cabrillo reportedly just sailed past, Sebastían Rodríguez Cermeño entered the bay in 1595. It was not until 1602 that Sebastían Vizcaíno landed and took possession of the area for Spain. Gaspar de Portola's land expedition passed through the region in 1769

and returned in 1770 accompanied by a colonizing party and Franciscan fathers Crespí and Serra. The nearest mission to the APE was the Mission San Carlos Borroméo de Carmelo, commonly known as the Carmel Mission, located approximately nine miles southwest of the APE. The mission was established in 1771 by Father Junipero Serra. At the same time, the Presidio of Monterey was established and became a military and social capital of Alta California. Father Junipero Serra also established the Mission San Antonio de Padua near present day Fort Hunter Ligget, and Father Lasuen founded Mission Nuestra Señora Dolorsísima de la Soledad nearby.

The mission population of native Californians peaked in 1795 at 878 and dwindled to 397 by 1819, likely due to disease and desertion rates. Reports ceased during the fight for Mexican independence. When reports resumed in 1823, the population had slipped further to only 317 and the mission reported that portions of the complex were falling into ruin due to labor shortages. This trend continued until 1832 when the missions were secularized. After secularization, the Carmel Mission lost lands and herds as well as neophyte converts and the property fell into disrepair.

Mexican Period

The Spanish, and later Mexican government, encouraged settlement of territory within California through the establishment of large land grants called ranchos. Most grantees raised livestock. Laborers, including Native Californians (many of them former Mission residents), were pressured into service on ranchos after secularization in 1832. Land grants were often given to prominent figures as reward for services rendered to the government or as favors to connected relatives. Ranchos were frequently based on geography, with their boundaries following prominent watercourses, mountains, or valleys.

The United States declared war against Mexico in 1846 beginning with the Bear Flag Revolt in Sonoma on June 15th. The Treaty of Guadalupe Hidalgo, signed on February 2, 1848, ended the war and incorporated California as a territory of the United States. The treaty provided that Mexican land grants would be honored if they could be confirmed through proof of title. Land outside the land grants became federal public land, which was surveyed into sections, quarter-sections, and quarter-quarter sections.

American Period

Following the end of the Mexican-American War in 1848, the Presidio of Monterey became a U.S. Army post and developed into a large training facility for the Army. In the late 1800s, the training area consisted of sand dunes and open ranges surrounding Monterey. In 1917, a cavalry post and artillery training field were established on over 15,000 acres of land originally located within the Monterey City Land Tracts. This original plot of land was known as the Gigling Reservation, which was previously used as agricultural and grazing lands. This original Gigling Reservation consists of the eastern portion of the current Fort Ord. In the late 1930s, facilities such as barracks, mess halls, a sewage treatment plant, and administrative buildings were constructed in the Gigling Reservation. At this same time, wars within the Pacific were beginning and a stronger military presence was needed in the region. In 1939, the U.S. Army acquired additional lands to the west, known as Camp Clayton and Camp Ord. The following year, all three camps were combined and named Fort Ord.

During World War II and into the following decades, Fort Ord was established as the headquarters of the Seventh Infantry Division of the U.S. Army and one of the main facilities of basic training for the Army. As the base grew as a well-established major basic training ground, the surrounding towns of Seaside, Marina, and Monterey grew to provide services for the thousands of people who provided support functions for Fort Ord.

As a result of military installation reductions beginning in 1990, Fort Ord was deactivated in 1993, and the land was parceled out to various federal and state agencies.

Area of Potential Effect

For the purposes of the analysis in the EIR/EA, the proposed project APE consists of the horizontal and vertical limits of the CCCVC Project Site as shown on **Figure 2-16, Phase 2 Site Map**. The APE lies partly within the city limits of Seaside and partly within unincorporated Monterey County.

The horizontal APE consists of all areas where activities associated with the project are proposed. This includes areas proposed for construction, vegetation removal, grading, stockpiling, staging, paving, and other elements described in the official project description. The horizontal APE consists of the proposed project limits, which consists of approximately 84.4 acres on the former Fort Ord. The APE is bordered by Parker Flats Road to the north and Parker Flat Cut-Off to the west.

The vertical APE is described as the maximum depth below the surface to which excavations for the project will extend. Thus, the vertical APE includes all subsurface areas where archaeological deposits could be affected. The vertical APE extends to a maximum of 10 feet below the existing grade for construction of the proposed project and supporting infrastructure. The vertical APE also is described as the maximum height of structures, which could impact the physical integrity and integrity of setting of cultural resources, including districts and traditional cultural properties. The above-surface vertical APE is up to 50 feet above the surface in the case of the flag pole installation.

Only Phase 2 of the CCCVC is being funded by the USDVA and requires compliance with Section 106 at this time. Future phases of the CCCVC would be subject to the regulatory requirements of Section 106 if Federal funding or another Federal nexus exists for that phase. Therefore, for the purposes of consultation under Section 106, the APE is reduced to only include the Phase 2 project area as well as the associated temporary work spaces (**Figure 2-16, Phase 2 Site Map)**. The horizontal APE consists of all areas where activities associated with Phase 2 are proposed. This includes areas proposed for construction, vegetation removal, grading, stockpiling, staging, paving, and other elements described in the official project description. The horizontal APE consists of the proposed project limits, which consists of approximately 4.4 acres on the former Fort Ord. The APE is bordered by Parker Flats Road to the north and Parker Flat Cut-Off to the west. The vertical APE is described as the maximum depth below the surface to which excavations for the project will extend. Thus, the vertical APE includes all subsurface areas where archaeological deposits could be affected. The vertical APE extends to a maximum of 10 feet below the existing grade for construction of the proposed project and supporting infrastructure. The vertical APE also is described as the maximum height of structures, which could impact the physical integrity and integrity of setting of cultural resources, including districts and traditional cultural properties. The above-surface vertical APE is up to 10 feet above the surface to address the proposed signage, fencing, and grave markers.

Cultural Resources in the Vicinity of the Proposed Project

Four cultural resource studies from 1982 to 2014 have included either all or portions of the area proposed for development of the CCCVC 2015 Master Plan. Study results were negative for reported, recorded, known traditional and/or contemporary Native American resources and/or significant historic era isolates or sites. A current inventory for the Phase 2 APE was not undertaken due to previous efforts which have included the APE including a recent study in 2014. The prior studies have not identified any cultural resources within the CCCVC.

The NAHC and Native American individuals/groups recommended by the NAHC were consulted in 2010, 2012, and 2014. Basin Research Associates (Basin) completed additional consultation for the Phase 2

APE in 2019. None of the individuals/groups recommended by the NAHC are Federally Recognized Indian Tribes (U.S. Department of Interior Bureau of Indian Affairs [USDI/BIA], 2018) but are recognized by the State of California.

The information contained in this section is based on the results of *the Phase 1 Archaeological Survey for the Central Coast California Veterans Cemetery and Eastside Road Infrastructure Projects* prepared by Archeological Consulting (2010), the 2014 *Cultural Resources Inventory Report for the Central Coast California Veterans Cemetery Project at Fort Ord* prepared by ECORP (**Appendix E, Cultural Reports**), and a 2019 records search prepared by Basin. The survey methods and results of these studies are summarized below.

2010 Archeological Consulting Report

Methods

Archeological Consulting completed an archeological survey of the site in September 2010. The APE surveyed in the study included the entire proposed project site. Background research included an examination of the archaeological site records, maps, and project files of the Northwest Information Center of the California Historical Resources Information System (CHRIS), located at Sonoma State University. In addition, Archeological Consulting examined its own extensive files and maps for supplemental information, such as rumors of historic or prehistoric resources in the general project area.

A Sacred Lands search was initiated with the Native American Heritage Commission (NAHC). Following the search, the commission recommended consultation with locally affiliated Native Americans and provided a list of individuals from several bands to contact for such consultation. Contact was made by mail, email, and/or telephone.

Archeological Consulting conducted field surveys several days between August 19 and September 16, 2010. The pedestrian survey consisted of a general surface reconnaissance of all accessible project areas which could reasonably be expected to contain visible cultural resources, and which could be viewed without major vegetation removal. The project areas were surveyed using generally straight line transects, where possible. However, dense vegetation cover sometimes necessitated transition to a controlled intuitive survey method.

Results

Background research identified one recorded cultural resource located within one kilometer of the proposed project site. Historic resource P-27-2717, the Fort Ord Water Tank, is located on the ridge southwest of the site. No prehistoric resources have been recorded in the project vicinity. The project area contains no resources listed in the California Inventory of Historical Resources, California Historical Landmarks, and the NRHP. Two previous surveys may have included portions of the project area. In addition, Fort Ord has been the subject of two overviews and another large-scale survey for cultural resources.

The Sacred Lands file search through NAHC found no recorded resources in the project area. Correspondence and consultation with several of the Native Americans recommended by the commission resulted in no additional information about resources within the project area. Nevertheless, areas of general concern were noted (mainly that any pertinent discoveries during the project should be reported to local Native American groups).

None of the materials frequently associated with prehistoric cultural resources in this area (e.g., dark midden soil, marine shell fragments, flaked or ground stone, old bone fragments, and fire-affected rock)

were observed during field surveys. Surface soil within the proposed project site was mostly tan to golden sand with a light gray organic loam noted in densely wooded areas. In old dirt road tracks crossing the project area, sandstone bedrock was exposed. No evidence of significant historic resources which meet the NRHP/CRHR eligibility criteria was found during the field survey.

The Archeological Consulting report found no evidence of sacred or religious sites, Native American remains, anything of archeological significance, or findings of historical significance within the proposed project site.

2014 ECORP Report

Methods

ECORP completed a cultural resources inventory of the site on in May 2010. Although the study was completed in support of the Phase 1 project, which was completed under separate environmental review, the Phase 1 APE included the Phase 2 site.

Background research included a records search for the property was completed at the Northwest Information Center of CHRIS. The purpose of the records search was to determine the extent of previous surveys within a 0.5-mile (800-meter) radius of the proposed project location, and whether previously documented prehistoric or historic archaeological sites, architectural resources, or traditional cultural properties exist within this area.

ECORP contacted the NAHC in March 2014 to request a search of the Sacred Lands File (SLF) for the Phase 1 APE. The NAHC responded in April 2014 and provided a list of Native American contacts. Everyone on the list was contacted by letter and by phone in April 2014. A letter was also sent to the Monterey County Historical Society to solicit comments or obtain historical information that the repository might have regarding events, people, or resources of historical significance in the area.

In March 2014, the entire APE was subjected to an intensive pedestrian survey under the guidance of the Secretary of the Interior's Standards for the Identification of Historic Properties using parallel transects 15 meters apart. The ground surface was examined for indications of surface or subsurface cultural resources. The general morphological characteristics of the ground surface were inspected for indications of subsurface deposits that may be manifested on the surface, such as circular depressions or ditches. Whenever possible, the locations of subsurface exposures caused by such factors as rodent activity, water or soil erosion, or vegetation disturbances were examined for artifacts or for indications of buried deposits. No subsurface investigations or artifact collections were undertaken during the pedestrian survey.

Results

Background research found that four previous cultural resource investigations had been conducted within 0.5 miles of the Phase 1 APE; one of those studies included the 2010 Archaeological Consulting Report described above, which identified the presence of one historical site – the water tank. The review of historical aerial photographs and maps of the Phase 1 APE provided information on the past land uses of the property. Based on this information, the property was initially used as open space or training areas for the Fort Ord military reservation.

Correspondence and consultation with several of the Native Americans recommended by the commission resulted in requests for a Tribal Monitor during construction, and that any pertinent discoveries during the project be reported to local Native American groups. As of the date of the report, ECORP did not receive a response to the letters sent to the Monterey County Historical Society. In response, the State determined that due to the lack of known resources and the low potential for

unknown resources, a monitor was not required during construction. Mitigation measures were in place as required by the IS/EA in the chance of unanticipated discovery of resources and human remains discovery. No resources or human remains were encountered during construction of Phase 1.

One cultural resource, FO-001 (a berm which was likely constructed as part of training operations on Fort Ord), was identified during the field survey. This resource was in fair condition, with the northwestern end possibly having been impacted during construction of Parker Flats Road, while the southeastern end eroded into the landscape. Simple features such as berms typically do not individually contribute to the broad patterns of history as these features often leave no temporal indicators (NRHP Criterion A/CRHR Criterion 1). Earthen features such as berms are similarly difficult to associate with specific individuals due to their lack of association with standing structures and General Land Office maps and records, and no information exists in the archival record to associate this site with important individuals in history (NRHP Criterion B / CRHR Criterion 2). Archival and field efforts do not suggest that this berm embodies the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values (NRHP Criterion C/CRHR Criterion 3). Finally, berms in general do not provide important information in history or prehistory (NRHP Criterion D/CRHR Criterion 4). Therefore, site FO-001 does not meet the eligibility criteria for inclusion in the NRHP or CRHR as an individual resource. No other significant cultural resources were identified within the Phase 1 APE.

2019 Records Search

Basin contacted the NAHC in March 2019 to request a search of the SLF File for Phase 2 of the proposed project. The NAHC responded in March 2019 and provided a list of Native American contacts. The record search results were negative. Everyone on the list was contacted by letter and by phone in March 2019. The two responding parties replied either via email or responded to the follow-up telephone calls:

1. Valentin Lopez (Chairperson, Amah/Mutsun Tribal Band), via e-mail, noted that the project is outside their traditional territory and there would be no comment.
2. Irenne Zwierlein (Chairperson, Amah/Mutsun Tribal Band of Mission San Juan Bautista) responded to BASIN's telephone call and recommended that all construction crew receive cultural sensitivity training in areas with the potential of prehistoric cultural materials and any archaeologists on the project have experience with northern and central California archaeology. In addition, she recommended the retention of a qualified and trained Native American Monitor in the event of a discovery of Native American cultural materials.

In addition, during the scoping period of the EIR/EA, a letter was received from Louise J. Miranda Ramirez, Chairwoman of the Ohlone/Costanoan-Esselen Nation (OCEN) stating that Fort Ord is within the indigenous homeland of their people and that they would like copies of all surveys, subsurface testing results, mitigation and recovery programs, to be notified if ancestral remains are found, and to be notified of the placement of all cultural items. Additionally, Ms. Ramirez requested that a Native American monitor of the Ohlone/Costanoan-Esselen Nation be used within aboriginal territory. Ms. Ramirez was identified as a Native American who might have additional knowledge of the CCCVC by the NAHC and was contacted during the formal Native American outreach. No response was available as of March 15, 2019. Mitigation measures have been identified in the EIR/EA for the proposed project to conduct cultural sensitivity training and implement specific measures in the unlikely chance of the unanticipated discovery of resources and human remains discovery occurs (please refer to **Impacts and Mitigation Measures** below). Due to the lack of known resources and the low potential for unknown resources, the State determined that a monitor is not required during construction.

3.5.3 Regulatory Framework

Federal

National Historic Preservation Act

The NHPA, first adopted in 1966, has become the foundation and framework for historic preservation in the United States. The NHPA requires federal agencies to take into account the effects of their undertakings on historic properties; and makes the heads of all federal agencies responsible for the preservation of historic properties owned or controlled by their agencies. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP. Undertakings include federally funded, licensed, or permitted projects.

The NHPA established the NRHP, the official record of historical resources. Districts, sites, buildings, structures, and objects, including resources that are considered by Native Americans or other communities to have cultural and religious significance, are eligible for listing in the NRHP. Nominations are listed if they are significant in American history, architecture, archaeology, engineering, and culture. The NRHP is administered by the U.S. National Park Service (NPS). A property must have both historical significance and integrity to be eligible for listing in the NRHP. To be significant, a property must be "associated with an important historic context." The NRHP identifies four possible context types, of which at least one must be applicable to the property at the national, state, or local level. A property is considered significant if it meets the NRHP listing criteria, as stated below:

a. The property is associated with events that have made a significant contribution to the broad patterns of our history; or

b. The property is associated with the lives of persons significant in our past; or

c. The property embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

d. The property has yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

A property can be eligible for listing in the NRHP under these criteria as being significant at a national, state, regional, or local level depending on the historic context in which it is being evaluated. For a property to qualify under one or more of these Criteria for Evaluation, it must also retain "historic integrity of those features necessary to convey its significance." While a property's significance relates to its role within a specific historic context, its integrity refers to the "property's physical features and how they relate to its significance." To determine if a property retains the physical characteristics corresponding to its historic context, the National Register has identified seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Ordinarily, properties that have achieved significance within the past 50 years are not considered eligible for listing in the NRHP. However, such properties will be considered eligible if a property that achieved significance within the past 50 years is of exceptional importance.

Section 106 of the NHPA and its implementing regulations (36 CFR 800) require federal agencies, or those they fund or permit, to consider the effects of their actions on properties that may be eligible for listing or are listed in the NRHP. The Section 106 review process involves a four-step procedure, as outlined below:

1. Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.
2. Identify historic properties by determining the scope of efforts, identifying cultural resources, and evaluating their eligibility for inclusion in the NRHP.
3. Assess adverse effects by applying the criteria of adverse effect to historic properties (resources that are eligible for inclusion in the NRHP).
4. Assess adverse effects by applying the criteria of adverse effect to historic properties (resources that are eligible for inclusion in the NRHP).

Section 106 requires tribal consultation in all steps of the process when a Federal agency project or effort may affect historic properties that are either located on tribal lands, or when any Native American tribe of Native Hawaiian organization attaches religious or cultural significance to the historic property, regardless of the property's location.

The American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act (AIRFA) of 1978 states "…henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right and freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites." Under the act, Federal agencies should consult with tribes when projects, policy, or procedure may affect their religious practices.

State

California Register of Historical Resources

The CRHR is "an authoritative listing and guide to be used by state and local agencies, private groups and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The CRHR includes buildings, sites, structures, objects, and districts significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. The CRHR is maintained by California State Parks' Office of History Preservation (OHP).

The criteria for eligibility to the CRHR are based on NRHP criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for or listed in the NRHP. To be eligible for the CRHR, a prehistoric or historic-period resource must be significant at the local or State level under one or more of the following criteria:

a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
b. Is associated with the lives of persons important in our past;
c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
d. Has yielded, or may be likely to yield, information important in prehistory or history (CEQA Guidelines Section 15064.5 [a][3]).

For a resource to be eligible for the CRHR, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. The seven aspects of integrity are: location, design, setting, materials, workmanship, feeling, and association. A resource that does not retain sufficient integrity to meet the NRHP criteria may still be eligible for listing in the CRHR. A resource that has lost its historic character or appearance may still have sufficient integrity for the CRHR if it maintains the potential to yield significant scientific or historical information or specific data.

California's list of special considerations is shorter than the criteria considerations for the NRHP listed above. It includes some allowances for moved buildings, structures, or objects, as well as requirements for proving the significance of resources that are less than 50 years old and discussion of the eligibility of reconstructed buildings. Additionally, unlike the criteria considerations for the NRHP, cemeteries do not come under the scrutiny of special considerations for the CRHR. In addition to separate evaluations for eligibility for the CRHR, the State automatically lists in the CRHR resources that are listed or formally determined eligible for the NRHP.

California Public Resources Code

Several sections of the California PRC protect cultural resources located on public land. Under PRC Section 5097.5, no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site (including fossilized footprints), inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency that has jurisdiction over the lands. Violation of this section is a misdemeanor.

PRC Section 5097.98 states that if Native American human remains are identified within a project area, the landowner must work with the Native American Most Likely Descendant as identified by the NAHC to develop a plan for the treatment or disposition of the human remains and any items associated with Native American burials with appropriate dignity. These procedures are also addressed in Section 15064.5 of the State CEQA Guidelines. California Health and Safety Code Section 7050.5 prohibits disinterring, disturbing, or removing human remains from a location other than a dedicated cemetery. Section 30244 of the PRC requires reasonable mitigation for impacts on paleontological and archaeological resources that occur as a result of development on public lands.

California Health and Safety Code

California Health and Safety Code Section 7050.5 regulates the treatment of human remains. In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined that the remains are not subject to his or her authority. If the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact the NAHC by telephone within 24 hours.

California Environmental Quality Act

CEQA requires that public or private projects financed or approved by public agencies be assessed to determine the effects on historical resources. CEQA uses the term "historical resources" to include buildings, sites, structures, objects, or districts that may have historical, pre-historical, architectural, archaeological, cultural, or scientific importance. A resource is considered historically significant under three circumstances:

1. If it is CRHR-listed or determined to be eligible for such listing by the State Historical Resources Commission;
2. If it is included in a local register of historical resources (unless the preponderance of evidence demonstrates that it is not historically or culturally significant); or
3. If it meets at least one of the criteria for listing on the CRHR (CCR Section 15064.5(a)).

Properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR and, therefore, represent significant historical resources for the purpose of CEQA (PRC Section 5024.1(d)(1)). CEQA further identifies that the fact that a resource is not listed in or determined to be eligible for listing in the CRHR (or local register), or identified in an historical resource survey, does not preclude a lead agency from determining that the resource may be a historical resource as defined pursuant to PRC 5020.1(j) or 5024.1 (State CEQA Guidelines, CCR Section 15064.5(a)(3).

CEQA also provides further guidance regarding the treatment (and evaluation of impacts) of cultural and historic resources. Specifically, State CEQA Guidelines CCR Section 15064.5(b)(3) identifies that "projects that follow the Secretary of the Interior's Standards for the Treatment of Historic Property with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (NPS, 1995), Weeks and Grimmer, shall be considered as mitigated to a level of less than a significant impact on the historical resource." CEQA also requires the lead agency to identify feasible measures to mitigated significant adverse changes in the significance of a historical resource (State CEQA Guidelines, CCR Section 15064.5(b)(4)). CEQA further requires that if a project would affect a state-owned historical resource, and the lead agency is a state agency, the lead agency shall consult with the SHPO as provided in PRC Section 5024.5.

Assembly Bill 52

In September of 2014, the California Legislature passed AB 52, which added provisions to the PRC concerning the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, AB 52 now requires lead agencies to analyze a project's impacts on "tribal cultural resources" separately from archaeological resources (PRC Section 21074; 21083.09). The bill defines "tribal cultural resources" in a new section of the PRC, Section 21074. AB 52 also requires lead agencies to engage in additional consultation procedures with the respect to California Native American tribes, if the tribe has requested the lead agency to be notified of projects within its traditionally and culturally affiliated area (PRC Sections 21080.3.1, 21080.3.2, 21082.3). Finally, AB 52 required the Office of Planning and Research to update Appendix G of the CEQA Guidelines to provide sample questions regarding impacts to tribal cultural resources, which was approved on September 27, 2016 (PRC Section 21083.9). AB 52's provisions only apply to projects that have a notice of preparation filed on or after July 1, 2015.

Under AB 52, a project that may cause a substantial adverse change in the significance of a tribal cultural resource is defined as a project that may have a significant effect on the environment. "Tribal cultural resources" are defined as either (1) "sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe" that are included in the state register of historical resources or a local register of historical resources, or that are determined to be eligible for inclusion in the state register; or (2) resources determined by the lead agency, in its discretion, to be significant based on the criteria for listing in the state register. Where a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document must discuss the impact and whether feasible alternatives or mitigation measures could avoid or substantially lessen the impact.

3.5.4 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5;

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5;

c. Disturb any human remains, including those interred outside of dedicated cemeteries; or

d. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

   i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

   ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

CEQA requires review of potential adverse impacts to defined historical resources (PRC Section 21084.1). The State CEQA Guidelines in CCR Section 15064.5(a) defines "historical resources" as any of the following:

1. Resources listed in or determined eligible by the State Historic Resources Commission for listing in the CRHR (State CEQA Guidelines, CCR Section 15064.5(a)(1)).

2. Resources included in a local register as defined in PRC Section 5020.1(k), or that are identified as significant in surveys that meet the standards provided in PRC Section 5024.1(g) (State CEQA Guidelines, CCR Section 15064.5[a][3]) "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant." (State CEQA Guidelines, CCR Section 15064.5[a][2]).

3. Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence. Generally, a resource shall be considered by the lead agency to be "historically significant" if it meets criteria for listing in the CRHR, including:

   a. Is associated with events that made a significant contribution to the broad patterns of California's history and cultural heritage.

   b. Is associated with the lives of people important in our past.

c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

d. Has yielded or may be likely to yield information important in prehistory or history (State CEQA Guidelines Section CCR 15064.5(a)(3)).

4. The fact that a resource is not listed in, or determined to be eligible for listing in the CRHR, not included in a local register of historical resources, or identified in an historical resource survey does not preclude a lead agency under CEQA from determining that the resource may be an historical resource as defined in PRC Section 5020.1(j) or 5024.1 (State CEQA Guidelines, CCR Section 15064.5(a)(4)).

State CEQA Guidelines in CCR Section 15064.5(b) defines a "substantial adverse change" to an historical resource as: "physical demolition, destruction, relocation or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." The significance of an historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR or in registers meeting the definitions in PRC Section 5020.1(k) or 5024.1(g).

If it is determined that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 (of CEQA) and State CEQA Guidelines CCR Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the State CEQA Guidelines, then the site may be treated as a "unique" archaeological resource in accordance with the provisions of PRC Section 21083.2(h), in which a unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological resource is determined not to be a unique archaeological resource, the resource need not be given further consideration, other than the simple recording of its existence by the lead agency if it so elects (PRC Section 21083.2[h]). The State CEQA Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (14 CCR Section 15064.5[c][4]).

Impact Analysis Overview

Approach to Analysis

The APE for the proposed project was developed to identify all areas where construction-related ground disturbance could occur in order to evaluate the project's potential impacts on cultural resources. The APE was established based on input from the proposed project technical team, preliminary proposed project plans, and assessor parcel information. The APE for archaeological and tribal resources includes

all areas of ground disturbance, staging areas, access, and work areas within the 84.4-acre CCCVC Project Site shown in **Figure 2-16, Phase 2 Site Plan**.

Areas of No Impact

Due to the risk of unexploded ordinances on the site, grading operations in previously undisturbed areas of the site would require direct observation by UXO-trained personnel. To avoid the cost and delay of having UXO technicians on-site during excavation of each burial, all earthwork will be completed during construction of each phase of the proposed project. Operation of the project would, therefore, not involve earthwork, and thus, would not result in impacts to cultural and tribal resources. The significance criteria of cultural and tribal resources during operation of the proposed project are not applicable to the project, and are not discussed further.

Summary of Impacts

Table 3.5-1 provides a summary of potential impacts to cultural and tribal resources from the proposed project and alternatives.

Table 3.5-1. Summary of Impacts – Cultural and Tribal Resources

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	*Alternative 3: CCCVC Master Plan – Modified Phase 2*	No Action Alternative
	2015 Master Plan	Phase 2			
Impact CTR-1: Cause a substantial adverse change in the significance of a historical or archaeological resource.	LSM	LSM	LSM	LSM	NI
Impact CTR-2: Disturb any human remains, including those interred outside of dedicated cemeteries.	LSM	LSM	LSM	LSM	NI
Impact CTR-3: Cause a substantial adverse change in the significance of a tribal cultural resource.	LSM	LSM	LSM	LSM	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact CTR-1: Cause a substantial adverse change in the significance of a historical or archaeological resource. (Criteria a and b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The results of the 2010 Archeological Report, 2014 Cultural Resources Report, and 2019 records search did not identify any buildings, structures, sites, objects, or districts located within the project's APE that are significant historical resources or unique archeological resources. No historical resources, as defined by CEQA, and no historic properties, as defined by the regulations (35 CFR 800) implementing Section 106 of the NHPA, have been identified in the APE for proposed project. As a result, no historic properties under Section 106 of the NHPA would be affected. None of the individuals/groups recommended by the NAHC are Federally Recognized Indian Tribes (USDI/BIA, 2018), but are recognized by the State of California. Through its NCA State Cemetery Grants Program, the USDVA would provide

funds for the design and construction of Phase 2, thus necessitating compliance with Section 106. CalVet, delegated authority by the USDVA, has determined that Phase 2 would not affect historic properties. A letter dated April 9, 2019, indicating a determination of "No Historic Properties Affected" was sent to SHPO for review and concurrence. If future phases of the 2015 Master Plan would receive Federal funds, compliance with Section 106 would be required prior to grant issuance.

The proposed project site does not contain known cultural resources, including pre-historic and historic archaeological sites, and, therefore, the implementation of the proposed project would be expected to have no significant impacts to cultural resources. However, although significant cultural resources are not anticipated to occur within the proposed project site and although unlikely, there always remains a possibility that unrecorded cultural resources are present beneath the ground surface, and that such resources could be exposed and damaged during construction for Phase 2 and future phases of the 2015 Master Plan. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** below.

Alternative 2: Reduced CCCVC 2015 Master Plan

Since Alternative 2 is located within the same APE as the proposed project, the potential to impact cultural and historic resources would be the same as described under Alternative 1 above. However, under Alternative 2, the 2015 Master Plan footprint would be smaller and would involve less earthwork, thereby reducing the possibility of exposing unrecorded cultural resources. Nevertheless, there remains a possibility that these resources are present beneath the ground surface and could be exposed and damaged during construction of future phases of this alternative. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** below.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Since Alternative 3 is located within the same APE as the proposed project, the potential to impact cultural and historic resources would be the same as described under Alternative 1 above. However, under Alternative 3, the Phase 2 footprint would be slightly larger and would involve more earthwork, thereby increasing the possibility of exposing and damaging unrecorded cultural resources. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** below.

Alternative 4: No Action Alternative

Alternative 4 would not include any physical changes to the project site and would not involve earthwork. Alternative 4 would, therefore, have no impact on historical or archeological resources.

Mitigation Measure CTR-1: Unanticipated Discovery

A. If subsurface deposits believed to be cultural or human in origin are discovered during construction, then all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgement. A Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, shall be required if the nature of the unanticipated discovery is prehistoric.

Work cannot continue within the no-work radius until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either: 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR.

B. If a potentially-eligible resource is encountered, then the archaeologist and lead agency shall arrange for either: 1) total avoidance of the resource, if possible; or 2) test excavations to evaluate eligibility. If found to be eligible for either the NRHP or CRHR, then adverse effects (under Section 106) and significant impacts (under CEQA) would be resolved/mitigated through data recovery excavations to the extent of obtaining enough information to address applicable research questions. If data recovery is necessary, a data recovery plan will be prepared, reviewed by the lead agency, and implemented. Determinations of eligibility and completion of data recovery (if necessary) shall be formally documented in writing and submitted to the lead agency as verification that the provisions in CEQA/NEPA for managing unanticipated discoveries have been met.

Mitigation Measure CTR-2: Cultural Sensitivity Training

A *Worker Awareness Training* will be developed and conducted prior to any construction operations for future phases, including Phase 2. The training program will inform crew members of the potential for archaeological finds and the protocols to be followed in the event of the discovery of archaeological materials. The program will be presented by a Professional Archaeologist and include an ALERT Sheet with visual aids with a focus on archaeological objects and other cultural materials that could be present within the project site. The training will also provide protocols in the event of an unexpected discovery and points of contact in the event of an unexpected find including Native American burials. The training will include a briefing to supervisory construction personnel and "tailgate" training to field personnel.

Impact CTR-2: Disturb any human remains, including those interred outside of dedicated cemeteries. (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Based on the cultural investigations described above, with the exception of the existing Phase 1 of the CCCVC, no formal cemeteries are presently located in or near the project area and no human remains have been reported in the project vicinity. While there is no reason to suspect the presence of human remains within or near the project site (aside from the Phase 1 site, which will not be disturbed by earthwork during construction of Phase 2 or the 2015 Master Plan), it is possible that currently unknown human remains may be presence within the area. In the event that evidence of human remains is discovered, the requirements of **Mitigation Measure CTR-3** below shall be implemented to reduce this potentially significant impact to a less-than-significant level.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact on human remains as the impact described under Alternative 1 above. However, under Alternative 2, the 2015 Master Plan footprint would be smaller and would involve less earthwork, thereby reducing the possibility of exposing undiscovered human remains. Nevertheless, there remains a possibility that human remains are present beneath the ground surface and could be exposed and damaged during construction of future phases of this alternative. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measure CTR-3** below.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact on human remains as the impact described under Alternative 1 above. However, under Alternative 3, the Phase 2 footprint would be slightly larger and would involve more earthwork, thereby increasing the possibility of exposing and damaging undiscovered human remains. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measure CTR-3** below.

Alternative 4: No Action Alternative

Alternative 4 would not include any physical changes to the project site and would not involve earthwork. Alternative 4 would therefore have no impact on human remains.

Mitigation Measure CTR-3: Discovery of Human Remains

In the event that evidence of human remains is discovered, construction activities within 100 meters of the discovery shall be halted or diverted and the requirements of Mitigation Measure CTR-1 will be implemented. In addition, the County Coroner shall be notified in accordance with provisions of PRC Sections 5097.98-99. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four hours of the determination, as required by California Health and Safety Code Section 7050.5(c) and PRC 5097. The NAHC shall identify the person or persons it believes to be most likely descended (MLD) from the deceased Native American (PRC Section 5097.98). The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a document with the county in which the property is located (AB 2641).

Impact CTR-3: Cause a substantial adverse change in the significance of a tribal cultural resource. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The results of the updated SLF search through the NAHC in March 2019 did not indicate any newly inventoried Native American cultural resources in the project area. However, the NAHC results also noted that the absence or resource information in the SLF inventory does not preclude the discovery of cultural resources within any project area.

At the time of the publication of the NOP for the proposed project, CalVet had not received a written request from any tribe indicating its wish to be notified of projects within its traditionally and culturally affiliated areas, as required by PRC Section 21080.3.1(b). However, three California Native American tribes were sent the NOP for the proposed project. One response was received during the public scoping period from the OCEN. The response did not identify any known tribal cultural resources that may be affected by the proposed project, but did express that OCEN "objects to all excavation in known cultural lands, even when they are described as previously disturbed and of no significant archaeological value" and that the project site is located within its ancestral territory. Based on the results of the two cultural reports, no tribal cultural resources are present within the proposed project site. In addition,

previous consultation with Native Americans recommended by the NAHC did not result in identification of tribal cultural resources within the site.

Neither the 2015 Master Plan site nor the Phase 2 site is located within or near any known tribal cultural resources. Build-out of the 2015 Master Plan and Phase 2 would, therefore, not impact any known tribal cultural resources. However, although unlikely, there always remains a possibility that unrecorded tribal cultural resources are present beneath the ground surface, and that such resources could be exposed and damaged during construction of Phase 2 and future phases of the 2015 Master Plan. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** above.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to tribal cultural resources as the impact described under Alternative 1 above. However, under Alternative 2, the Master Plan footprint would be smaller and would involve less earthwork, thereby reducing the possibility of exposing unrecorded tribal cultural resources. Nevertheless, there remains a possibility that these resources are present beneath the ground surface and could be exposed and damaged during construction of future phases of this alternative. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** above.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to tribal cultural resources as the impact described under Alternative 1 above. However, under Alternative 3, the Phase 2 footprint would be slightly larger and would involve more earthwork, thereby increasing the possibility of exposing and damaging unrecorded cultural resources. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2** above.

Alternative 4: No Action Alternative

Alternative 4 would not include any physical changes to the project site and would not involve earthwork; Alternative 4 would therefore have no impact on tribal cultural resources.

3.6 ENERGY

3.6.1 Introduction

This section describes existing energy use at the State and regional level and evaluates the extent to which the proposed project and alternatives could result in wasteful consumption of energy resources or conflict with regulations related to energy use. This section is based on review of the Phase 2 35% Schematic Design Plans and 2015 Master Plan, as well as information contained in the air quality impact analysis prepared by Ambient (**Appendix C**).

Public and agency comments were received during the public scoping period. To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. No comments concerning energy were received. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.6.2 Environmental Setting

Energy consumption is analyzed in an EIR/EA because of the environmental impacts associated with its production and usage. Such impacts include the depletion of nonrenewable resources (e.g., oil, natural gas, coal, etc.) and emissions of pollutants during both the production and consumption phases of energy use.

Energy usage is typically quantified using the British thermal unit (Btu).[1] As points of reference, the approximate amount of energy contained in a gallon of gasoline, a cubic foot of natural gas, and a kilowatt hour (kWh) of electricity are 123,000 Btus, 1,000 Btus, and 3,400 Btus, respectively. Utility providers measure natural gas usage in therms. One therm is approximately equal to 100,000 Btus.

Electrical energy is expressed in units of kilowatts (kW) and kWh. One kilowatt, a measurement of power (energy used over time), equals one thousand joules[2] per second. A kilowatt-hour is a measurement of energy. If run for one hour, a 1,000 watt (one kW) hair dryer would use one kilowatt-hour of electrical energy. Other measurements of electrical energy include the megawatt (1,000 kW) and the gigawatt (1,000,000 kW).

Total energy usage in California was approximately 7,830 trillion Btus in the year 2016 (the most recent year for which this specific data was available). The breakdown by sector was approximately 17.7 percent for residential uses, 18.9 percent for commercial uses, 23.7 percent for industrial uses, and 39.8 percent for transportation (EIA, 2019).

Existing energy use in California primarily consists of natural gas (2,248.9 trillion Btu in 2016), electricity (797.8 trillion Btu in 2016), and fuel for vehicle trips (1,713 trillion Btu in 2016) (EIA, 2019). Therefore, remainder of this discussion will focus on the most relevant sources of energy: natural gas, electricity and gasoline for vehicle trips.

Electricity supply in California involves a complex grid of power plants and transmission lines. In 2014, California produced approximately 75 percent of the electricity it consumed; it imported the remaining

[1] A Btu is the amount of energy that is required to raise the temperature of one pound of water by one degree Fahrenheit.
[2] As defined by the International Bureau of Weights and Measures, the joule is a unit of energy or work. One joule equals the work done when one unit of force (a Newton) moves through a distance of one meter in the direction of the force.

25 percent from 11 western states, Canada, and Mexico. Decreases in hydroelectric generation resulting from lower precipitation in California and the northwest was made up for by an increase in renewable energy generation, specifically utility-scale solar photovoltaic, solar thermal, and wind generation.

Electricity

In 2017, 34 percent the State's electricity was generated by natural gas, nine percent by nuclear, 15 percent by large hydroelectric, and four percent by coal. Renewable sources such as photovoltaic systems, biomass power plants, and wind turbines, accounted for 29 percent of California's electricity. Nine percent of California's power comes from unspecified sources (California Energy Commission [CEC], 2017a).

In 2017, total system electric generation for California was 292,039 gigawatt-hours (GWh), up 0.5 percent from 2016's total generation of 290,567 GWh. California's non-CO_2 emitting electric generation categories (nuclear, large hydroelectric, and renewable generation) accounted for more than 56 percent of total in-State generation for 2017, compared to 50 percent in 2016. California's in-state electric generation was up by four percent to 206,336 GWh compared to 198,227 GWh in 2016 while net imports were down by seven percent or 6,638 GWh to 85,703 GWh. The overall modest increase observed in California's total system electric generation for 2017 is consistent with the recently published California Energy Demand 2018 – 2030 Revised Forecast:

"Annual growth from 2016 – 2027 for the CED 2017 Revised forecast averages 1.64 percent, 1.32 percent, and 1.02 percent in the high, mid, and low cases, respectively, compared to 1.02 percent in the CEDU 2016 mid case" (CEC, 2018a).

Factors contributing to the increase in total system electric generation include growth in the number of light duty electric vehicles registered in the State, increased manufacturing electricity consumption, and reductions in savings from energy efficiency programs, this last point suggesting that population growth is the primary driver of increased electricity consumption (CEC, 2018a).

Starting in 2018, all PG&E customers within Monterey, San Benito, and Santa Cruz Counties were automatically enrolled in Monterey Bay Community Power (MBCP). MBCP is a locally-controlled public agency providing carbon-free electricity to residents and businesses. Formed in February 2017, MBCP is a joint powers authority, and is based on a local energy model called community choice energy. MBCP partners with PG&E, which continues to provide billing, power transmission and distribution, customer service, grid maintenance services and natural gas services to Monterey County. MBCP's standard electricity offering, is carbon free and is classified as 30 percent renewable. Of the electricity provided by MBCP in 2018, 40 percent was hydroelectric, and 30 percent was solar and wind (eligible renewables) (MBCP, 2019).

Electricity usage for differing land uses varies substantially by the type of uses in a building, the type of construction materials used, and the efficiency of the electricity-consuming devices used. Electricity in Monterey County in 2017 was consumed primarily by the non-residential sector (73 percent), the residential sector consuming 27 percent. In 2017, approximately 2,589 GWh of electricity were consumed in Monterey County (CEC, 2017b).

Natural Gas

California continues to depend upon out-of-state imports for nearly 90 percent of its natural gas supply, approximately 10 percent of California's natural gas supply came from in-state production (CEC, 2018b). In 2015, approximately 36 percent of the natural gas delivered for consumption in California was for electricity generation, 35 percent for industrial uses, 18 percent for residential uses, 10 percent for

commercial uses, and less than one percent for transportation. As with electricity usage, natural gas usage depends on the type of uses in a building, the type of construction materials used, and the efficiency of natural gas-consuming devices. In 2015, the State of California consumed approximately 2.3 trillion cubic feet of natural gas, or 2.36 quads (1015 Btu) (EIA, 2018a and 2018b).

Overall demand for direct-service natural gas in the commercial residential sectors California is expected to flatten or decrease as a result of overall energy efficiency. Demand for natural gas at power plants for electricity generation is also expected to decrease by one percent by 2025 (as compared to 2013 demand rates). This decrease is a result of increases in renewable power generation (CEC, 2013).

Gasoline for Motor Vehicles

Excluding federal offshore areas, California was the third-largest producer of petroleum among the 50 states in 2016, after Texas and North Dakota, and, as of January 2017, third in oil refining capacity, with a combined capacity of almost 2 million barrels per calendar day at the State's 18 operable refineries. In 2015, California accounted for one-fifth of the nation's jet fuel consumption (CEC, 2017a).

The average fuel economy for light-duty vehicles (autos, pickups, vans, and SUVs) in the U.S. has steadily increased from about 13.1 miles-per-gallon (mpg) in the mid-1970s to 23.9 mpg in 2015 (U.S. Bureau of Transportation Statistics, 2015). Federal fuel economy standards have changed substantially since the Energy Independence and Security Act was passed in 2007. That 2007 standard, which originally mandated a national fuel economy standard of 35 miles per gallon by the year 2020, was subsequently revised to apply to cars and light trucks of Model Years 2011 through 2020 (U.S. Department of Energy, 2007). In 2012, the federal government raised the fuel economy standard to 54.5 miles per gallon for cars and light-duty trucks by Model Year 2025.

3.6.3 Regulatory Framework

Federal

At the federal level, energy standards set by the U.S. EPA apply to numerous consumer and commercial products (e.g., the EnergyStar™ program). The U.S. EPA also sets fuel efficiency standards for automobiles and other modes of transportation.

Federal Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 was established in response to the oil crisis of 1973, which increased oil prices due to a shortage of reserves, and sought to ensure all vehicles sold in the U.S. would meet certain fuel economy standards. The Act established the first fuel economy standards for on-road motor vehicles in the U.S. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to fuel economy standards.

State

California Renewable Energy Standards

In 2002, California established its Renewables Portfolio Standard (RPS) Program, with the goal of increasing the percentage of renewable energy in the State's electricity mix to 20 percent of retail sales by 2010. In 2006, California's 20 percent by 2010 RPS goal was codified under Senate Bill (SB) 107. Under the provisions of SB 107 (signed into law in 2006), investor-owned utilities were required to generate 20 percent of their retail electricity using qualified renewable energy technologies by the end of 2010. In 2008, EO S-14-08 was signed into law and requires that retail sellers of electricity serve 33

percent of their load with renewable energy by 2020. As described previously, PG&E's (the electricity provider to the project site) 2015 electricity mix was 30 percent renewable.

In October 2015, SB 350 was passed, which codified California's climate and clean energy goals. A key provision of SB 350 for retail sellers and publicly owned utilities, requires them to procure 50 percent of the State's electricity from renewable sources by 2030.

California Building Codes

At the State level, the Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the CCR (Title 24), was established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 is updated approximately every three years; the 2016 standards became effective January 1, 2017. The 2019 Title 24 updates were adopted May 9, 2018 and will go into effect on January 1, 2020 (BSC, 2018a). Compliance with Title 24 is mandatory at the time new building permits are issued by city and county governments (CEC, 2015).

In January 2010, the State of California adopted the CalGreen standards that establish mandatory green building standards for all buildings in California. The code covers five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and indoor environmental quality (BSC, 2018b).

3.6.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or

b. conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Impact Analysis Overview

Approach to Analysis

The following impact analyses address the short-term (construction-related) and long-term (operations and maintenance-related) impacts related to energy usage of the proposed project and alternatives. Energy impacts related to construction could occur due to transport of materials to the site as well as use of petroleum-based fuels associated with construction equipment. Operational impacts due to energy usage could result from maintenance activities at the site and increased vehicle trips. Long-term operational emissions for Phase 2 were quantified based on vehicle trip-generation rates provided in the air quality analysis (**Appendix C**). Operational emissions for future phases are anticipated to be similar to Phase 2 and are qualitatively discussed.

The evaluation is based on review of energy use of the proposed project during construction or operation. Each potential impact is assessed in terms of the applicable regulatory requirements, such as mandatory compliance with various Federal and State regulations that would serve to prevent significant impacts from occurring.

Areas of No Impact

All of the significance criteria outlined above are applicable to the proposed project and thus are evaluated below.

Summary of Impacts

Table 3.6-1 provides a summary of potential impacts related to energy from the proposed project and alternatives.

Table 3.6-1. Summary of Impacts – Energy

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
ENG-1: Result in Wasteful, Inefficient, or Unnecessary Consumption of Energy.	LS	LS	LS	LS	NI
ENG-2: Conflict with State or Local Plans.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact ENG-1: Result in Wasteful, Inefficient, or Unnecessary Consumption of Energy (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction of the proposed project would require the use of energy for the manufacture and transportation of building materials, preparation of the site (e.g., demolition, excavation, and grading), and project construction. Petroleum-based fuels such as diesel fuel and gasoline would be the primary sources of energy for these tasks. In addition, operation of the proposed project would involve the use of energy associated with daily trips for operational maintenance and visitors. However, the project would not cause inefficient, wasteful, or unnecessary consumption of energy. First, the overall construction schedule and process is already designed to be efficient in order to avoid excess monetary costs. That is, equipment and fuel are not typically used wastefully on the site because of the added expense associated with renting the equipment, maintaining it, and fueling it. Therefore, the opportunities for future efficiency gains during construction are limited.

In addition, there would be no electrical and natural gas use consumed during operation of the Phase 2 and minimal electricity consumed during the operation of future phases since Phase 1 included construction of the buildings and most of the infrastructure to support future phases. Phase 2 would result in an increase of approximately 400 total daily traffic trips for weekend days and 160 vehicle trips for weekdays. The total annual vehicle miles traveled (VMT) for the project is approximately 810,920 miles, assuming an average trip length of 9.7 miles per trip (Ambient, 2019a).[3] Using the U.S. EPA's estimated average fuel economy of 23.2 mpg, Phase 2 would result in the consumption of approximately 34,953 gallons of gasoline per year. In addition, Phase 2 is in close proximity to major transit services. The Monterey-Salinas Transit (MST) agency currently provides regular transit service throughout Monterey County and in the general vicinity of the Project site. Two standard transit routes and one specialized transit route (e.g. paratransit) currently provide transit services in this area. Future

[3] 160 daily trips (260 weekdays) + 400 daily trips (105 weekend day) = 83,600 yearly trips (9.7 miles) = 810,920 annual VMT/23.2 mpg = 34,953 gallons of gasoline per year

phases of the 2015 Master Plan are anticipated to be similar to Phase 2. As a result, implementation of the Phase 2 and future phases of the 2015 Master Plan would not result in a substantial increase on transportation-related energy use.

Further, sustainability is an important feature of the cemetery design. High efficiency mechanical equipment would be provided as well as low usage high-efficiency plumbing features. Finishes would be selected to contain low VOCs, rapidly renewable materials, and recycled content.

Given the lack of electrical or natural gas and minimal increase in fuel consumption, as well as the sustainable aspects incorporated into the proposed project design during construction and operation, impacts associated with energy usage would be less than significant and the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be located at the same site as the proposed project, but would have a reduced development footprint, and, therefore, would also not result in wasteful, inefficient, or unnecessary consumption of energy. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Alternative 3 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would also not result in wasteful, inefficient, or unnecessary consumption of energy. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact ENG-2: Conflict with Local or State Plans. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As stated above in **Impact ENG-1**, the construction and operation of the proposed project would have a less-than-significant impact due to energy usage and efficiency and, thus, would not conflict with local or state plans for energy efficiency. Furthermore, design of the proposed project has incorporated sustainable features energy usage would be minimal (no natural gas or electricity usage). State Building Codes pertaining to energy usage would not be applicable as there are no buildings associated with the proposed project. As a result, this impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, and, therefore, would not conflict with a local or state plan. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Alternative 3 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would not conflict with a local or state plan. A less-than-significant impact would occur. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.7 GEOLOGY AND SOILS

3.7.1 Introduction

This section describes the geology, soils, and seismicity conditions in the vicinity of the proposed project site and evaluates the extent to which the proposed project and alternatives could expose people or structures to potential seismic, liquefaction, landslide, and expansive soil impacts, and the extent to which the project could result in substantial soil erosion or loss of topsoil. This section summarizes the *Geotechnical Investigation for the California Central Coast Veterans Cemetery, Phase 2* prepared by SCST (2018) and the *Geotechnical Investigation and Percolation Testing for the Proposed California Central Coast Veterans Cemetery Site* prepared by Kleinfelder (2010); these reports are contained in **Appendix F** of this EIR/EA.

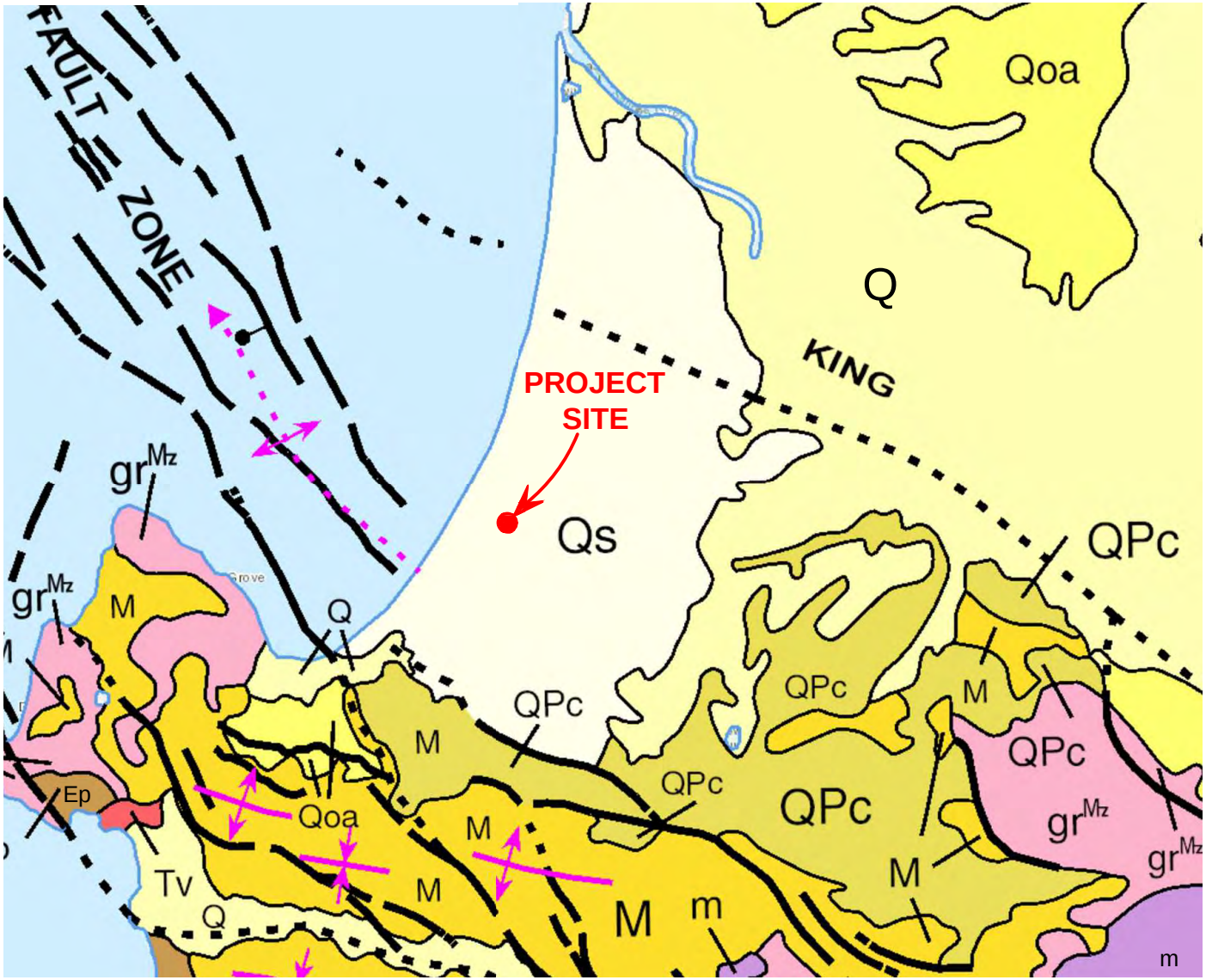
To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. No public or agency comments related to geology, soils, and seismicity conditions were received during the public scoping period. For a complete list of public comments received during the public scoping period, please refer to **Appendix A**, **NOP and Public Comment Letters.**

3.7.2 Environmental Setting

Geologic structure in central California is primarily the result of tectonic events that have occurred during the past 30 million years. It is widely believed that the numerous faults in this area are related to movements along the boundary between the Pacific and North American tectonic plates. The relative motion between these two tectonic plates is taken up largely along the northwest-trending San Andreas Fault system, which defines the regional boundary between the two plates. Changes in sea level and tectonic uplift resulted in a complicated depositional environment that produced the complex geology of the Monterey Bay region. Faulting and folding have deformed and displaced the geologic units in the region, and the granitic basement and overlying Tertiary deposits have been juxtaposed along many of the northwest/southeast-trending faults. The proposed project site lies within the Coast Ranges Geomorphic Province, a discontinuous series of northwest-southeast trending mountain ranges, ridges and intervening valleys characterized by complex folding and faulting. A Regional Geology Map is provided in **Figure 3.7-1**.

Geomorphic Setting

The proposed project site is located within the former Fort Ord property in the City of Seaside in Monterey County, California. Monterey County is located in the central coast of California within the Coast Ranges geomorphic province and is bordered by Santa Cruz County on the north, San Benito, Fresno and King Counties on the east, San Luis Obispo on the south, and the Pacific Ocean on the west. The Santa Lucia Range provides the mountainous coastline on the western boundary of the County and the Gabilan and Diablo Ranges provide rolling hills on the eastern boundary of the County. The area is characterized by northwest-trending mountain ranges, broad basins, and elongated valleys paralleling major geologic structures.



EXPLANATION:

Qs	Quaternary sand deposits
QPc	Pilo-Pleistocene and Pliocene loosely consolidated deposits
Q	Quaternary alluvium and marine deposits
Qoa	Older alluvial flood plain deposits
Tv	Tertiary volcanic flow rocks
M	Miocene marine rocks
Ep	Paleocene marine rocks
m	Pre-Cenozoic metasedimentary and metavolcanic rocks undivided
gr^{Mz}	Mesozoic granitic rocks

Anticline Fold - Solid where well defined; short dash where inferred

Syncline Fold - Solid where well defined; short dash where inferred

Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

70 U D

0 15,000' 30,000'

SCALE (feet)

Reference:
Jennings, C.W., updated by Gutierrez, C., Bryant, W., Saucedo, G., and Willis, C. (2010), Geologic Map of California, California Geologic Survey, Scale 1:750,000

Source: SCST, LLC, 2018

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Regional Geology Map

N

Date 03-08-2019

Figure 3.7-1

Regional Seismicity and Fault Zones

There are several active faults zone within the project vicinity. The City of Seaside is subject to primary and secondary seismic hazards such as ground shaking, ground rupture and ground failure, including liquefaction and lateral spreading. The risk of ground shaking within the City is considered moderately high; however, risk varies at different locations within the City (City of Seaside and Cotton/Bridges/Associates, 2004). The risk of ground rupture within the project area is considered low; however, due to the proximity of several faults to the project site, a major seismic event could cause severe ground shaking in the project area (Kleinfelder, 2010). Table 3.7-1 provides a list of active or potentially active faults within the Monterey Bay area and their proximity to the project site.

Table 3.7-1. Active Faults in the Project Vicinity

Fault/Fault Zone	Approximate Distance from Project Site (miles)	Direction from Project Site
San Andreas Fault one	21	Northeast
Zayante-Vergeles Fault	16	Northeast
Monterey Bay-Tularcitos Fault Zone	5	Southwest
San Gregorio-Palo Colorado (Sur Region) Fault Zone	11	Southwest
King City-Reliz-Rinconada Fault	2.5	North and Northeast
Chupines and Navy Faults (Old Terrace Fault and Seaside Fault)	2.5	South
Source: Kleinfelder, 2010.		

Soils

One soil type, Oceano loamy sand, 2 to 15 percent slopes, is mapped within the project area (Natural Resources Conservation Service [NRCS], 2019). The ocean loamy sand, 2 to 15 percent slopes soil unit is part of the Oceano series. The Oceano series consists of excessively drained soils that formed in eolian sands and old stabilized dunes (NRCS, 1978). The ocean loam sand, 2 to 15 percent slope soil unit occurs at elevations ranging from 30 to 1,100 feet. This soil unit occurs in areas with average annual temperatures ranging from 57 to 59 degrees Fahrenheit with a frost-free period of 200 to 250 days. The average annual precipitation ranges from 10 to 20 inches. Runoff is slow to medium and the erosion hazard is slight to medium. Common vegetation present with this soil unit includes annual grasses, forbs, and some scatter scrub oak or brush. Typical uses of this soil unit consist of range land, irrigated row crops, and grain.

Subsurface Soil Conditions

The site is located along the central coast of California and is underlain by Quaternary-age sand deposits. A description of the subsurface material encountered is presented below.

Sand Deposits (Qs)

The dune and drift sand deposits encountered in the borings consists primarily of fine-grained sands with silt to silty sands to the maximum depths explored. The materials were loose in the upper two feet and becoming medium dense to dense with increasing depth.

Groundwater

Groundwater was not encountered in the borings. Historic high groundwater levels at a nearby monitoring well (Monterey Peninsula Water Management District [MPWMD] Well #FO-08) indicates the groundwater level is on the order of 400 feet below existing ground surface at the site. The permanent groundwater table is expected to be below a depth that would influence project construction.

Geologic Hazards

Faulting and Surface Rupture

The closest known active fault is the Rinconada Fault and Monterey Bay Fault located about 3.4 miles (5.5 kilometers) to the northeast and 5.1 miles (8.2 kilometers) to the southwest of the site, respectively. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active faults are known to underlie or project toward the site. Therefore, the probability of fault rupture is low.

Liquefaction and Dynamic Settlement

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, resulting in large total and differential ground surface settlements and possible lateral spreading during an earthquake. Due to the lack of shallow groundwater and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is low.

Landslides and Slope Stability

Evidence of landslides or slope instabilities was not observed during the geotechnical investigation. The potential for landslides or slope instabilities to occur at the site is considered low.

Flooding, Tsunamis, and Seiches

A portion of the project site is designated within Flood Hazard Zone AH with a flood elevation of 286.1. (please refer to **Section 3.10, Hydrology and Water Quality**). The site is not located within a mapped area on the State of California Tsunami Inundation Maps (California Emergency Management Agency [Cal EMA] et al, 2009). Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water. Therefore, the potential for flooding, tsunamis, or seiches to affect the site is considered low.

Subsidence

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered low.

Hydro-Consolidation

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are aeolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater causing the material to consolidate. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

Paleontological Resources

Significant paleontological resources are fossils or assemblages of fossils that are unique, unusual, rare, uncommon, diagnostically or stratigraphically important, and those that add to an existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally. They include fossil remains of large to very small aquatic and terrestrial vertebrates, remains of plants and animals previously not represented in certain portions of the stratigraphy, and assemblages of fossils that might aid stratigraphic correlations, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, paleoclimatology, and the relationships of aquatic and terrestrial species.

According to the Monterey County General Plan EIR, most of the fossils found in the County are of marine life forms and form a record of the region's geologic history of advancing and retreating sea

levels (ICF, 2010). Because of the marine origin of these deposits, they lack the large, terrestrial fossils found in other regions such as the dinosaur fossils of the southwestern U.S. Most of County's fossils are microorganisms such as foraminifers or diatoms or assemblages of mollusks and barnacles most commonly found in sedimentary rocks ranging from Cretaceous age (138 to 96 million years old) to Pleistocene age (1.6 million to 11 thousand years old).

Fossils are found throughout the county because of the widespread distribution of marine deposits (ICF, 2010). A review of nearly 700 known fossil localities was conducted by paleontologists in 2001 and 12 fossil sites were identified as having outstanding scientific value. It was determined that, for the most part, the fossils at these 12 sites reflect the type of assemblages found throughout the county (microorganisms or invertebrates); however, each has special characteristics that make them unique or rare, or in some way provide important stratigraphic or historic information.

A paleontological records search, a review of geologic maps from the California Geological Survey, and a review of existing literature on paleontological resources of Monterey County was conducted for Phase 1 (ECORP, 2014b). No fossil records are cataloged in or around the project area. However, it should be noted that not all specimens have been cataloged, and other specimens may be recorded in the project vicinity. The closest recorded sites containing specimens are in the towns of Monterey and Salinas. According to the Geologic Atlas of California – Santa Cruz Sheet, the geologic features that underlies the project area is classified as Dune Sand (Qs). The geology within the project area was created during the Holocene epoch, approximately 11,700 years ago to present day, which is the most recent epoch within the Quaternary period (approximately 2.6 million years ago to present). The Holocene is the time since the last major glacial epoch, or "ice age." In general, the Holocene has been a relatively warm period in between ice ages. Young sediments (Quaternary, or less than 1.8 million years old) have mostly not had time to be transformed into rock, and the youngest sediments (Holocene, including dune sand) are usually found in their original environment of deposition. Because dune sand is relatively recent in geologic age, these deposits are too young to contain paleontological resources. As a result, the geology on-site is considered to have a low potential for paleontological resources (ECORP, 2014b).

3.7.3 Regulatory Framework

Federal

The Federal Disaster Mitigation Act of 2000 (Public Law 106-390), which was adopted by Congress in October 2000, requires state and local governments to develop hazard mitigation plans in order to apply for federal grant assistance for disaster relief. Monterey County, in coordination with all of its incorporated municipalities, has prepared the Multi-Jurisdictional Hazard Mitigation Plan, which was approved by FEMA in March of 2016 (Monterey County Hazard Mitigation Planning Team and AECOM, 2015). The plan, which was initially developed and adopted in 2007, is intended to identify local policies and actions to reduce the risk and future losses from natural hazards such as flooding, severe storms, earthquakes, and wildland fires. The plan also serves to meet key federal planning regulations which require local governments to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for hazard mitigation projects. The County of Monterey and the cities of Carmel-by-the-Sea, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, Sand City, Seaside, and Soledad have each adopted the plan by resolution. The 2016 Multi-Jurisdictional Hazard Mitigation Plan will expire in March 2021. The next update of the Monterey County Multi-Jurisdictional Hazard Mitigation Plan will commence in May 2019.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and published maps showing these zones. Within these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Because many active faults are complex and consist of more than one branch, each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace.

Title 14 of the CCR, Section 3601(e), defines buildings intended for human occupancy as those that would be inhabited for more than 2,000 hours per year. The proposed project does not cross an Alquist-Priolo Earthquake Fault Zone and does not include buildings that meet this criterion for human occupancy within the vicinity of any mapped fault trace. Therefore, these provisions of the act do not apply to the project.

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690 to 2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong groundshaking, liquefaction and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act. The State is charged with identifying and mapping areas at risk of strong groundshaking, liquefaction, landslides, and other corollary hazards. Cities and counties are required to regulate development within mapped Seismic Hazard Zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within Seismic Hazard Zones until appropriate site-specific geologic and/or geotechnical investigations have been conducted and measures to reduce potential damage have been incorporated into the development plans. There are no jurisdictions within Monterey County that are included within the State Seismic Hazards Mapping Act.

California Building Codes

The CBC, which is codified in CCR Title 24, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. In addition, the CBC contains necessary California amendments that are based on the American Society of Civil Engineers Minimum Design Standards 7-05, which provides requirements for general structural design and includes means for determining earthquake loads, as well as other loads (e.g., flood, snow, wind) for inclusion in building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy

categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

Storm Water Pollution Prevention Plan

Construction activity that disturbs one or more acres of soil, or less than one acre but is part of a larger common plan of development that in total disturbs one or more acres, must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a SWPPP. The SWPPP includes construction best management practices (BMPs) such as desilting basins, silt fences, hydroseeding of slopes, and monitoring and clean-up requirements.

3.7.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in:

a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

   ii. Strong seismic ground shaking.

   iii. Seismic-related ground failure, including liquefaction.

   iv. Landslides.

b. Result in substantial soil erosion or the loss of topsoil;

c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property;

e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water; or

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Impact Analysis Overview

Approach to Analysis

The potential for impacts related to geology, soils, and seismicity are evaluated according to the significance criteria listed above. Phase 2 and the full build-out of the 2015 Master Plan were evaluated with respect to existing published data; the analysis of project effects is based upon the technical reports listed above.

The geotechnical investigation prepared for Phase 2 identifies seismic, geologic and geotechnical hazards and constraints as well as the types of measures and engineering criteria that can be incorporated into project designs to prevent damages to facilities or properties or injury to people. The geotechnical investigation concluded that construction of Phase 2 is feasible from a geotechnical perspective, provided appropriate design, engineering and construction considerations are incorporated into the project once detailed design information is developed.

As with Phase 2, all subsequent phases of the 2015 Master Plan would have site-specific geotechnical investigations completed for all facilities requiring foundations and specialized soils engineering work. Geotechnical studies are essential for facility design because it is the information that informs the structural design of foundations and determines whether the geologic materials underlying the proposed facilities are capable of supporting the proposed uses without risk of detrimental effects from potential hazards associated with problematic soils, liquefaction, or excessive seismic shaking. Geotechnical investigations are required under the CBC for most structures intended for human occupancy and by the County and most municipal grading ordinances. Based on field observation and laboratory testing, the geotechnical engineer can assess whether the soils are adequate to support a structure under static (non-earthquake) or seismic conditions. If corrective work is necessary to remedy the problem soils or otherwise unstable ground condition, the geotechnical engineer would recommend approaches to correct the condition. Geotechnical engineering recommendations are typically standard engineering practices that have been proven elsewhere to increase the geotechnical performance of an underlying soil or bedrock material. This impact analysis assumes that the project proponents would incorporate all geotechnical recommendations set forth by the project geotechnical engineer for both Phase 2 and the full build-out of the 2015 Master Plan.

Areas of No Impact

The entire project site is comprised of one soil type, Oceano loamy sand, 2 to 15 percent slopes (NRCS, 2019). Oceano loamy sand, 2 to 15 percent slopes is excessively drained, has no plasticity, and has low shrink/swell potential (NRCS, 1978). Therefore, the project site would not be located on an expansive soil and the following significance criterion is not discussed further:

d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

In addition, Phase 2 and the full build-out of the 2015 Master Plan would not include the use of septic tanks nor alternative waste water disposal systems. Therefore, the following significance criterion is not discussed further:

e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

Summary of Impacts

Table 3.7-2 provides a summary of potential impacts from the proposed project and alternatives.

Table 3.7-2. Summary of Impacts – Geology and Soils

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. ii. Strong seismic ground shaking. iii. Seismic-related ground failure, including liquefaction. iv. Landslides.	LS	LS	LS	LS	NI
Impact GEO-2: Result in substantial soil erosion or the loss of topsoil.	LS	LS	LS	LS	NI
Impact GEO-3: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LS	LS	LS	LS	NI
Impact GEO-4: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LSM	LSM	LSM	LSM	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, strong seismic ground shaking, seismic-related ground failure including liquefaction, or landslides. (Criteria a.i through a.iv)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The project site is located within the seismically active Monterey Bay Area; however, the project site is not located within a designated Alquist-Priolo Earthquake Fault Zone. **Table 3.7-1** above lists the faults within the project vicinity. The risk of ground rupture within the project area is considered low; however, due to the proximity of the project site to active faults, a major seismic event could cause severe ground shaking in the project area (Kleinfelder, 2010). Therefore, the project area is considered to have a moderately high risk to ground shaking (EMC and EDAW, 1997).

The geotechnical studies for Phase 2 and the 2015 Master Plan recommend that all structures should be designed and constructed in accordance with applicable seismic provisions contained in the most current CBC (Kleinfelder, 2010 and SCST, 2018). The risk of structural damage caused by strong seismic shaking would be substantially lowered by adhering to the CBC. The proposed project would be required to follow the recommendations of the geotechnical studies and all structures would adhere with the CBC. Thus, a less-than-significant impact would occur.

Liquefaction is a phenomenon where water-saturated granular soil loses shear strength during strong ground shaking produced by earthquakes. The loss of soil strength occurs as a consequence of cyclic pore water pressure increases below the groundwater surface. Potential hazards due to liquefaction include loss of bearing strength beneath structures, possibly causing foundation failure and/or significant settlements and differential settlements. Liquefaction generally occurs in areas where the ground water table is less than 50 feet below the surface. Soils most susceptible to liquefaction are clean, loose, fine-grained sands, and silts that are saturated and uniformly graded. Silty sands have also been proven to be susceptible to liquefaction. According to the geotechnical investigations, groundwater at the project site is at least 50 feet below the existing grade and deep soils are medium dense to sense. Therefore, the potential for liquefaction to occur in the project area is considered low. A less-than-significant impact would occur.

Landslides are common in Monterey County due to the combination of uplifting mountains, fractured and weak rocks, and periodic intense rainfall along the coast. The level of susceptibility of an area is dependent on the local geologic conditions. The geotechnical investigations prepared for proposed project did not identify the area as being highly susceptible to landslides. The geotechnical investigations provide site-specific recommendations that address site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade. Implementation of the geotechnical investigation's recommendations would reduce risk of landslides occurring on-site. A less-than-significant impact would occur.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a less-than-significant impact.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a less-than-significant impact.

Alternative 4: No Action Alternative

The proposed project would not be construction and no physical changes to the site would occur. Therefore, no impact would occur.

Impact GEO-2: Result in substantial soil erosion or the loss of topsoil. (Criterion b)

Alternative 1: Proposed Project CCCVC 2015 Master Plan and Phase 2

The soil type, Oceano loamy sand, 2 to 15 percent slopes, has slow to medium runoff and erosion hazard is slight to moderate. A SWPPP listing BMPs would be prepared for the proposed project. BMPs would be implemented to manage erosion and loss of topsoil during construction-related activities.

In addition, the geotechnical study prepared for the proposed project provides recommendations to prevent on-site erosion and loss of topsoil. These recommendations include implementation of erosion control vegetation and proper site drainage design to minimize erosion on-site due to runoff (Kleinfelder, 2010 and SCST, 2018). A SWPPP would be prepared for Phase 2, as well as future phases, and would require implementation of erosion control BMPs. The proposed project would also be required to adhere to the geotechnical investigation's recommendations in order to minimize erosion and loss of topsoil. This analysis assumes that site-specific geotechnical investigations would be prepared for all subsequent phases of the 2015 Master Plan and that all recommendations included in the investigation would be incorporated into project design. Therefore, a less-than-significant impact would occur. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would result in a lower level of impact compared to the proposed project; however, phases under this alternative would still be required to prepare site-specific geotechnical investigations, prepare SWPPPs, and implement the recommendations of the SWPPPs and geotechnical studies. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would result in a higher level of impact compared to Phase 2; however, this alternative would still be required to prepare a SWPPP and implement the recommendations of the SWPPP and geotechnical study. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be construction and no physical changes to the site would occur. Therefore, no impact would occur.

Impact GEO-3: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As stated above in **Impact GEO-1**, the project area could be subject to severe ground shaking; however, the project site has low potential for liquefaction and landslides to occur. The geotechnical investigation for Phase 2 provides site-specific recommendations that address site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade. Future phases will require site-specific geotechnical investigations. Implementation of the geotechnical investigation's recommendations would reduce risk of soil

becoming unstable and landslides, lateral spreading, subsidence, liquefaction or collapse to occur. The proposed project would adhere to all of the geotechnical investigation recommendations; therefore, a less than significant impact would occur.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a less-than-significant impact.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a less-than-significant impact.

Alternative 4: No Action Alternative

The proposed project would not be construction and no physical changes to the site would occur. Therefore, no impact would occur.

Impact GEO-4: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (Criterion f)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As described above in **Section 3.7.2, Environmental Setting**, no fossil specimens are cataloged in or around the project area. The geology within the project area is comprised of young sediments (Quaternary, or less than 1.8 million years old) have mostly not had time to be transformed into rock, and the youngest sediments (Holocene, including dune sand) are usually found in their original environment depositions. Because dune sand is relatively recent in geologic age, these deposits are too young to contain paleontological resources. As a result, the geology on-site is considered to have a low potential for paleontological resources.

However, deeper excavations that extend down into older deposits may encounter significant vertebrate fossils (ECORP, 2014b). This is a potentially significant impact. Impacts to unique paleontological resources or geologic features would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2**, which reduces impacts to resources if accidentally discovered.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2**.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would be in the same location at the proposed project. The impacts described above for the proposed project would not change under Alternative 2. This is a potentially significant impact than would be reduced to a less-than-significant level with implementation of **Mitigation Measures CTR-1** and **CTR-2**.

Alternative 4: No Action Alternative

The proposed project would not be construction and no physical changes to the site would occur. Therefore, no impact would occur.

3.8 GREENHOUSE GAS EMISSIONS

3.8.1 Introduction

This section presents background information on GHG emissions, a summary of existing GHG conditions, and a summary of the regulatory framework that pertains to the proposed project. The section then provides an assessment of potential GHG emissions and related impacts that may result from construction and operation of the proposed project and alternatives. This section is based on the GHG analysis of the proposed project prepared by Ambient Air Quality and Noise Consulting (Ambient, 2019a; Appendix **C**).

No public or agency comments related to GHG emissions were received during the public scoping period. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.8.2 Environmental Setting

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

- **Carbon Dioxide**. Carbon dioxide (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA, 2018b).
- **Methane**. Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (U.S. EPA, 2018b).

- **Nitrous Oxide**. Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years (U.S. EPA, 2018b).
- **Hydrofluorocarbons.** Hydrofluorocarbons (HFCs) are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 270 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA, 2018b).
- **Perfluorocarbons.** Perfluorocarbons (PFCs) are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F1_4). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for PFCs ranges from 2,600 to 50,000 years (U.S. EPA, 2018b).
- **Nitrogen Trifluoride**. Nitrogen trifluoride (NF_3) is an inorganic, colorless, odorless, toxic, nonflammable gas used as an etchant in microelectronics. Nitrogen trifluoride is predominantly employed in the cleaning of the plasma-enhanced chemical vapor deposition chambers in the production of liquid crystal displays and silicon-based thin film solar cells. It has a global warming potential of 16,100 carbon dioxide equivalents (CO_2e). While NF_3 may have a lower global warming potential than other chemical etchants, it is still a potent GHG. In 2009, NF_3 was listed by California as a high global warming potential GHG to be listed and regulated under AB 32 (Section 38505 Health and Safety Code).
- **Sulfur Hexafluoride**. Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Leaks of SF_6 occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years (U.S. EPA, 2018b).
- **Black Carbon**. Black carbon is the strongest light-absorbing component of PM emitted from burning fuels such as coal, diesel, and biomass. Black carbon contributes to climate change both directly by absorbing sunlight and indirectly by depositing on snow and by interacting with clouds and affecting cloud formation. Black carbon is considered a short-lived species, which can vary spatially and, consequently, it is very difficult to quantify associated global-warming potentials. The main sources of black carbon in California are wildfires, off-road vehicles (locomotives, marine vessels, tractors, excavators, dozers, etc.), on-road vehicles (cars, trucks, and buses), fireplaces, agricultural waste burning, and prescribed burning (planned burns of forest or wildlands) (Climate and Clean Air Coalition, 2018 and U.S. EPA, 2018b).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in CO_2e, which weight each gas by its global warming potential (GWP). Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. **Table 3.8-1** provides a summary of the GWP for GHG emissions of typical concern with regard to community development projects, based on a 100-year time horizon. As indicated, methane traps over 25 times more heat per molecule than CO_2, and N_2O absorbs roughly 298 times more heat per molecule than CO_2. Additional GHG with high GWP include nitrogen trifluoride, sulfur hexafluoride, perfluorocarbons, and black carbon.

Table 3.8-1. Global Warming Potential for Greenhouse Gases

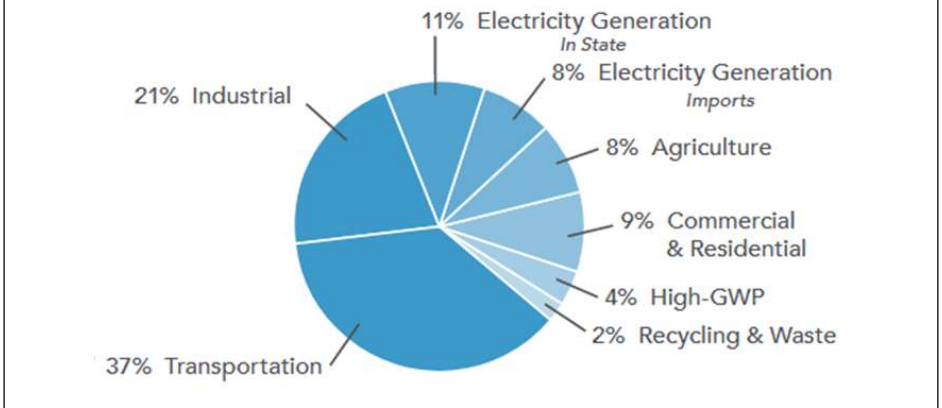
Greenhouse Gas	Global Warming Potential (100-year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
**Based on the International Panel on Climate Change's GWP values for 100-year time horizon* *Source: International Panel on Climate Change, 2007*	

Sources of Greenhouse Gas Emissions

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions (U.S. EPA, 2018b).

In 2015, GHG emissions within California totaled 440.4 million metric tons (MMT) of CO_2e. GHG emissions, by sector, are summarized in **Figure 3.8-1**. Within California, the transportation sector is the largest contributor, accounting for approximately 37 percent of the total state-wide GHG emissions. Emissions associated with industrial uses are the second largest contributor, totaling roughly 21 percent. Electricity generation totaled roughly 19 percent (ARB, 2018d).

Figure 3.8-1. California GHG Emissions Inventory by Scoping Plan Sector



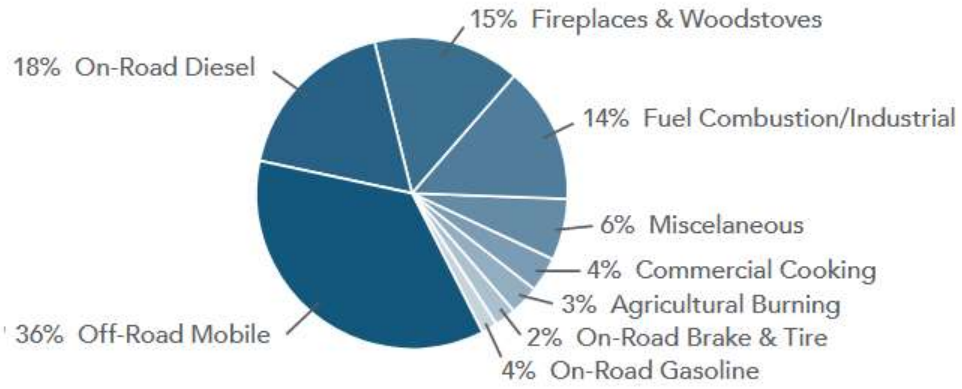
Source: ARB, 2018d.

Short-Lived Climate Pollutants

Short-lived climate pollutants (SLCPs), such as black carbon, fluorinated gases, and methane also have a dramatic effect on climate change. Though short lived, these pollutants create a warming influence on the climate that is many times more potent than that of carbon dioxide.

As part of the ARB's efforts to address SLCPs, the ARB has developed a statewide emission inventory for black carbon. The black carbon inventory will help support implementation of the SLCP Strategy, but it is not part of the State's GHG Inventory that tracks progress towards the State's climate targets. The most recent inventory for year 2013 conditions is depicted in **Figure 3.8-2**. As depicted, off-road mobile sources account for a majority of black carbon emissions totaling roughly 36 percent of the inventory. Other major anthropogenic sources of black carbon include on-road transportation, residential wood burning, fuel combustion, and industrial processes (ARB, 2017a).

Figure 3.8-2. California Black Carbon Emissions Inventory (Year 2013)



Source: ARB, 2018d.

Effects of Global Climate Change

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snow pack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of

California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry (California Climate Change Center, 2012; Planning and Conservation League, 2018).

3.8.3 Regulatory Framework

Federal

Executive Order 13514

EO 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in Massachusetts v. U.S. EPA, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the FCAA and that the U.S. EPA has the authority to regulate GHG. The court held that the U.S. EPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's "Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles," which was published on September 15, 2009. On May 7, 2010 the final "Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards" was published in the Federal Register.

U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA

and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

State

Assembly Bill 1493

AB 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the ARB to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply; an increase in air pollution caused by higher temperatures; harm to agriculture; an increase in wildfires; damage to the coastline; and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the FCAA, to allow the State to require reduced tailpipe emissions of CO_2. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

In 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order No. S-3-05

EO S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The EO directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the EO, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32 - California Global Warming Solutions Act of 2006

AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, NF_3, and SF_6. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that were phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions (ARB, 2018c).

Climate Change Scoping Plan

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by ARB on December 11, 2008, and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals., The most recent update released by ARB is the *2017 Climate Change Scoping Plan*, which was released In November 2017 (ARB, 2017b). The *2017 Climate Change Scoping Plan* incorporates strategies for achieving the 2030 GHG-reduction target established in SB 32 and EO B-30-15.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

SB 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice

aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This SB will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed EO S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. EO S-14-08 was later superseded by EO S-21-09 on September 15, 2009. EO S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superseded this EO in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

ARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The CEC and California Public Utilities Commission (CPUC) serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

Mandatory Reporting of Greenhouse Gas Emissions

The California Global Warming Solutions Act (AB 32, 2006) requires the reporting of GHGs by major sources to the ARB. Major sources required to report GHG emissions include industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013, and apply to large electric power plants and large industrial plants. In 2015, fuel distributors, including distributors of heating and transportation fuels, also became subject to the cap-and-trade rules. At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total GHG emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions to 1990 levels by the year 2020 and would achieve an approximate 80 percent reduction from 1990 levels by 2050.

Senate Bill 32

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs

regional transportation plan. ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

California Building Code

The CBC contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The CBC is adopted every three years by the BSC. In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both standards are contained in the CBC and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

AB 32, which mandates the reduction of GHG emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In its scoping plan for the implementation of AB 32, ARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, ARB estimated that green building standards would reduce GHG emissions by approximately 26 MMT of CO_2e by 2020. Most recently, the CEC adopted new building energy efficiency standards that amends the building code to require improvements in building insulation, use of energy-efficient lighting, and the incorporation of renewable energy technology (e.g., solar photovoltaic systems) for newly constructed residential dwellings. These standards are anticipated to reduce energy usage by approximately 50 percent for residential buildings and 30 percent for nonresidential buildings (CEC, 2018c).

Senate Bill 97

SB 97 was enacted in 2007. SB 97 required the Office of Planning and Research to develop, and the California Natural Resources Agency to adopt, amendments to the CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those CEQA Guidelines amendments clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects and must reach a conclusion regarding the significance of those emissions.
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions.
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change.

- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria.
- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply and ways to reduce energy demand, including through the use of efficient transportation alternatives.

As part of the administrative rulemaking process, the California Natural Resources Agency developed a Final Statement of Reasons explaining the legal and factual bases, intent, and purpose of the CEQA Guidelines amendments. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Short-Lived Climate Pollutant Reduction Strategy

In March 2017, ARB adopted the "Short-Lived Climate Pollutant Reduction Strategy" (SLCP Strategy) establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities, and manure methane at dairies, and using the methane as a renewable source of natural gas to fuel vehicles or generate electricity. The SLCP Strategy also identifies steps to reduce natural gas leaks from oil and gas wells, pipelines, valves, and pumps to improve safety, avoid energy losses, and reduce methane emissions associated with natural gas use. Lastly, the SLCP Strategy also identifies measures that can reduce HFC emissions at national and international levels, in addition to State-level action that includes an incentive program to encourage the use of low-GWP refrigerants, and limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment (ARB, 2017a).

3.8.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and

b. conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

As of June 2018, the MBARD Board of Directors has not adopted recommended GHG significance thresholds applicable to development projects (MBARD, 2014). However, it is important to note that other air districts within the State of California have recently adopted recommended CEQA significance thresholds for GHG emissions. For instance, on March 28, 2012, the San Luis Obispo Air Pollution Control District (SLOAPCD) Board approved thresholds of significance for the evaluation of project-related increases of GHG emissions. The SLOAPCD's significance thresholds include both qualitative and quantitative threshold options, which include a bright-line threshold of 1,150 $MTCO_2e$/year. The Sacramento Metropolitan Air Quality Management District (SMAQMD) the Mendocino County Air Quality Management District (MCAQMD) have adopted similar significance thresholds of 1,100 $MTCO_2e$/year and the Placer County Air Pollution Control District (PCAPCD) is currently considering adoption of a proposed mass-emissions threshold of 1,100 $MTCO_2e$/year. The GHG significance

thresholds are based on AB 32 GHG emission reduction goals, which take into consideration the emission reduction strategies outlined in ARB's Scoping Plan. Development projects located within these jurisdictions that would exceed these thresholds would be considered to have a potentially significant impact on the environment which could conflict with applicable GHG-reduction plans, policies and regulations. Projects with GHG emissions that do not exceed the applicable threshold would be considered to have a less-than-significant impact on the environment and would not be anticipated to conflict with AB 32 GHG emission-reduction goals (PCAPCD, 2016; SLOAPCD, 2016; SMAQMD, 2014; and MCAQMD, 2010).

As noted above, MBARD has not yet adopted recommended GHG significance thresholds applicable to development projects. In the interim, the MBARD recommends use of other thresholds, such as those adopted by the SLOAPCD. For purposes of this analysis, project-generated emissions in excess of 1,100 $MTCO_2e$/year would be considered to have a potentially significant impact. This mass-emission threshold is based on thresholds adopted by SMAQMD and MCAQMD, which is slightly more conservative than the threshold recommended by SLOAPCD.

Impact Analysis Overview

Approach to Analysis

Short-term construction emissions associated with construction of Phase 2 of the proposed project were quantified using the CalEEMod, version 2016.3.2. Emissions were quantified based on project-specific data provided and default modeling parameters contained in the model for Monterey County. Emissions modeling assumptions are summarized in **Table 3.3-3, Construction Information – CCCVC Phase 2** in **Section 3.3, Air Quality**. Construction emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed (please refer to **Appendix C** for emissions modeling assumptions and results).

Long-term operational emissions for Phase 2 of the proposed project were quantified using CalEEMod, version 2016.3.2, based on vehicle trip-generation rates provided. To be conservative, a maximum of 80 vehicles (160 vehicle trips) was assumed for weekdays and a maximum of 200 vehicles (400 vehicle trips) was assumed for weekend days. Vehicle trip lengths were based on the maximum daily trip length identified in the model of 9.7 miles per trip. The fleet mix was assumed to be predominantly light-duty vehicles. Other modeling assumptions, including energy usage rates, water usage rates, and waste-generation rates were based on CalEEMod model defaults. Operational emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed (please refer to **Appendix C** for emissions modeling assumptions and results).

Areas of No Impact

All of the Threshold of Significance criteria outlined above are applicable to the proposed project and alternatives.

Summary of Impacts

Table 3.8-2 provides a summary of potential impacts related to GHG emissions from the proposed project and alternatives.

Table 3.8-2. Summary of Impacts – Greenhouse Gas Emissions

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, and conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, and conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. (Criteria a and b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Short-Term/Construction

Estimated increases in GHG emissions associated with construction of Phase 2 of the proposed project are summarized in **Table 3.8-3**. As depicted, construction of Phase 2 would generate a total of approximately 612 $MTCO_2e$. Amortized GHG emissions, when averaged over an assumed 100-year life of the project, would total approximately 6.1 $MTCO_2e$/year. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. Construction-generated emissions would vary, depending on the final construction schedules, equipment required, and activities conducted. Construction activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, construction emissions for future phases would be similar to Phase 2 emissions. Construction-generated emissions were included with operational emissions for determination of impact significance.

Long-Term/Operation

Operational GHG emissions for Phase 2 operational years 2020 and 2030 are summarized in **Table 3.8-4**. With the inclusion of amortized construction-generated emissions, Phase 2 of the proposed project would generate a total of approximately 374 $MTCO_2e$/year under year 2020 conditions and approximately 289 $MTCO_2e$/year under year 2030 conditions. Mobile sources are projected to account for roughly 99% of the total operational GHG emissions. Remaining GHG operational emissions would be predominantly associated with energy use, water use, and waste generation. Project-generated GHG emissions are projected to decrease in future years due largely to improvements in vehicle fleet emissions.

As noted in **Table 3.8-4**, annual GHG emissions for Phase 2 would not exceed the significance threshold of 1,100 $MTCO_2e$/year. Operational activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, operational GHG emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed the significance threshold of 1,100 $MTCO_2e$/year. As a result, the proposed project would not result in GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with applicable GHG-reduction plans, policies or regulations. This impact would be less than significant. No mitigation is required.

Table 3.8-3. Construction GHG Emissions – CCCVC Phase 2

Construction Activity	Annual Emissions ($MTCO_2e$/Year)[1]
Demolition	245.1
Site Preparation	95.9
Grading	222.6
Paving	48.8
Total Construction Emissions:	**612.4**
Amortized Net Change in Construction Emissions[1]:	**6.1**
*1. Amortized emissions are quantified based on an estimated 100-year project life. Refer to **Appendix C** for emissions modeling assumptions and results.*	

Table 3.8-4. Operational GHG Emissions – CCCVC Phase 2

Source	Annual Emissions ($MTCO_2e$/year) [1]	Percent Contribution
Year 2020		
Energy Use	1.0	0.3%
Mobile	362.4	98.6%
Waste	0.2	0.1%
Water	4.1	1.1%
Total:	367.7	
Total with Amortized Construction Emissions:[2]	373.8	
Significance Threshold:	1,100	
Exceeds Significance Threshold?:	No	
Year 2030		
Energy Use	0.8	0.3%
Mobile	278.4	98.6%
Waste	0.2	0.1%
Water	3.1	1.1%
Total:	282.4	
Total with Amortized Construction Emissions:[2]	288.5	
Significance Threshold:	1,100	
Exceeds Significance Threshold?:	No	
1. GHG emissions quantified for buildout conditions. *2. Refer to **Table 3.8-3** for amortized construction emissions.* *Refer to **Appendix C** for emissions modeling assumptions and results.*		

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have generally the same construction and operation activities as the proposed project, but would have a reduced development footprint. Therefore, Alternative 2 would not result in GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with applicable GHG-reduction plans, policies or regulations. This impact would be less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would not result in GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with applicable GHG-reduction plans, policies or regulations. This impact would be less than significant. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

3.9 HAZARDS AND HAZARDOUS MATERIALS

3.9.1 Introduction

This section provides the setting, regulatory framework, and impacts analysis related to hazards, including the past use and/or storage of chemicals and other hazardous materials. The section is based on review of regulatory agency databases and other published reports, such as the Phase 1 IS/EA, to identify potential hazardous materials releases that may affect the proposed project including workers and the public. The assessment of hazards and hazardous materials focuses on the following issues:

- The potential for encountering hazardous substances in soil and groundwater during construction at any of the proposed project sites;
- Potential public safety hazards associated with project construction;
- Potential hazards associated with the use of chemicals during construction and operation of the proposed project; and
- Whether the proposed project would result in, or be subject to, adverse effects related to the use, transportation, disposal, or release of hazardous materials or wastes during construction, operation, or maintenance.

For the purposes of this analysis, the term "hazardous materials" refers to both hazardous substances and hazardous wastes.[1] Under Federal and State law, materials and wastes may be considered hazardous if they are specifically listed by statute or if they are toxic, ignitable, corrosive, or reactive.

If improperly handled, hazardous materials and wastes can cause public health hazards when released to the soil, groundwater, or air. The four basic exposure pathways through which an individual can be exposed to a chemical agent include: inhalation, ingestion, bodily contact, and injection. Exposure can come as a result of an accidental release during transportation, storage, or handling of hazardous materials. Disturbance of subsurface soil during construction can also lead to exposure of workers or the public from stockpiling, handling, or transportation of soils contaminated by hazardous materials from previous spills or leaks.

This section assesses the potential public health and safety impacts of the proposed project. Hazards, such as flooding and seismic/geologic hazards, are discussed in **Section 3.7**, **Geology and Soils**, and **Section 3.10**, **Hydrology**.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. Public and agency comments related to potential public health and safety impacts were received during the public scoping period and are summarized below:

- project consistency with UXO Training and Construction Support requirements should be evaluated to ensure safety during construction; and

[1] The California Health and Safety Code define a hazardous material as "a material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment" (Health and Safety Code, Section 25501).

- evaluate potential alternative locations due to potential impacts associated with buried munitions at proposed project location.

For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.9.2 Environmental Setting

Regional Setting

As a former military installation, the use and disposal of hazardous materials, including but not limited to automotive oils and chemicals, military munitions, asbestos containing material, lead-based paint, and other materials associated with on-going military operations at Fort Ord has been extensive. Due to the historical use of hazardous materials, numerous environmental hazards have been documented throughout Fort Ord. As part of the base closure and realignment process, the issue of hazardous materials usage and disposal has been the subject of extensive evaluation as part of on-going remediation efforts conducted by the Army. The following section provides a general overview of hazardous materials usage at the former Fort Ord, as well as on-going remediation efforts currently being undertaken to address hazardous materials contamination.

As identified above, hazardous and toxic waste materials at the former Fort Ord consist of a wide variety of materials including industrial chemicals, petrochemicals, domestic and industrial wastes (landfills), asbestos and lead paint in buildings, above- and underground storage units, and ordnance and explosives. Due to the extent of hazardous materials usage and associated presence of hazardous waste, the former Fort Ord was added to the U.S. EPA's National Priorities List of Hazardous Waste Sites (commonly referred to as "Superfund" List) in February 1990. Remediation conducted as part of the Superfund process is regulated by numerous regulatory requirements, including the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), the Superfund Amendments and Reauthorization Act, the Conservation and Recovery Act (RCRA), the CCR Title 22 and Title 23, the California Water Code, and other regulations.

The Army, as part of the Superfund process, is responsible for completing remediation activities at the former Fort Ord prior to the final conveyance of property to local jurisdictions. The identification, remediation, and disposal of hazardous waste associated with the Superfund cleanup process was initiated as part of the Federal Facility Agreement (U.S. EPA et al., 1990). The Federal Facility Agreement is meant to "ensure that the environmental impacts associated with past and present activities at the site [former Fort Ord] are thoroughly investigated and appropriate remedial actions are taken as necessary to protect the public health, welfare, and the environment." The Federal Facility Agreement was also intended to develop requirements for the performance of the Remedial Investigation/Feasibility Study (RI/FS) to determine the nature and extent of the threat to the public health and the environment caused by the release of hazardous substances, pollutants, or contaminants at the site, in addition to the fulfillment of remediation requirements pursuant to CERCLA and applicable State law.

A base-wide RI/FS was conducted in 1995 to evaluate environmental contamination (Harding Lawson Associates [HLA], 1995). This process consisted of a review and evaluation of past investigative and removal actions, and made recommendations for future response actions deemed necessary to protect human health and the environment. The base-wide RI/FS was approved by the regulatory agencies party to the Federal Facility Agreement and a subsequent ROD identified the Army as responsible for the long-term monitoring and cleanup of Fort Ord. According to the information contained in the base-wide RI/FS, individual sites were classified based on site characteristics and the potential for hazardous

conditions. The 43 sites identified in the RI/FS were subsequently classified into three categories: 1) Base-wide Remedial Investigation (RI) Sites; 2) Interim Action sites; and 3) No Action sites. These classifications are defined as follows:

- RI Sites: RI sites have sufficient contamination to warrant a full RI, Baseline Risk Assessment (BRA), Ecological Risk Assessment (ERA), and Feasibility Study (FS).
- Interim Action Sites: Interim Action sites have limited volume and extent of contaminated soil and, as a result, are easily excavated, as an interim action.
- No Action Sites: No Action sites do not warrant remedial action under CERCLA.

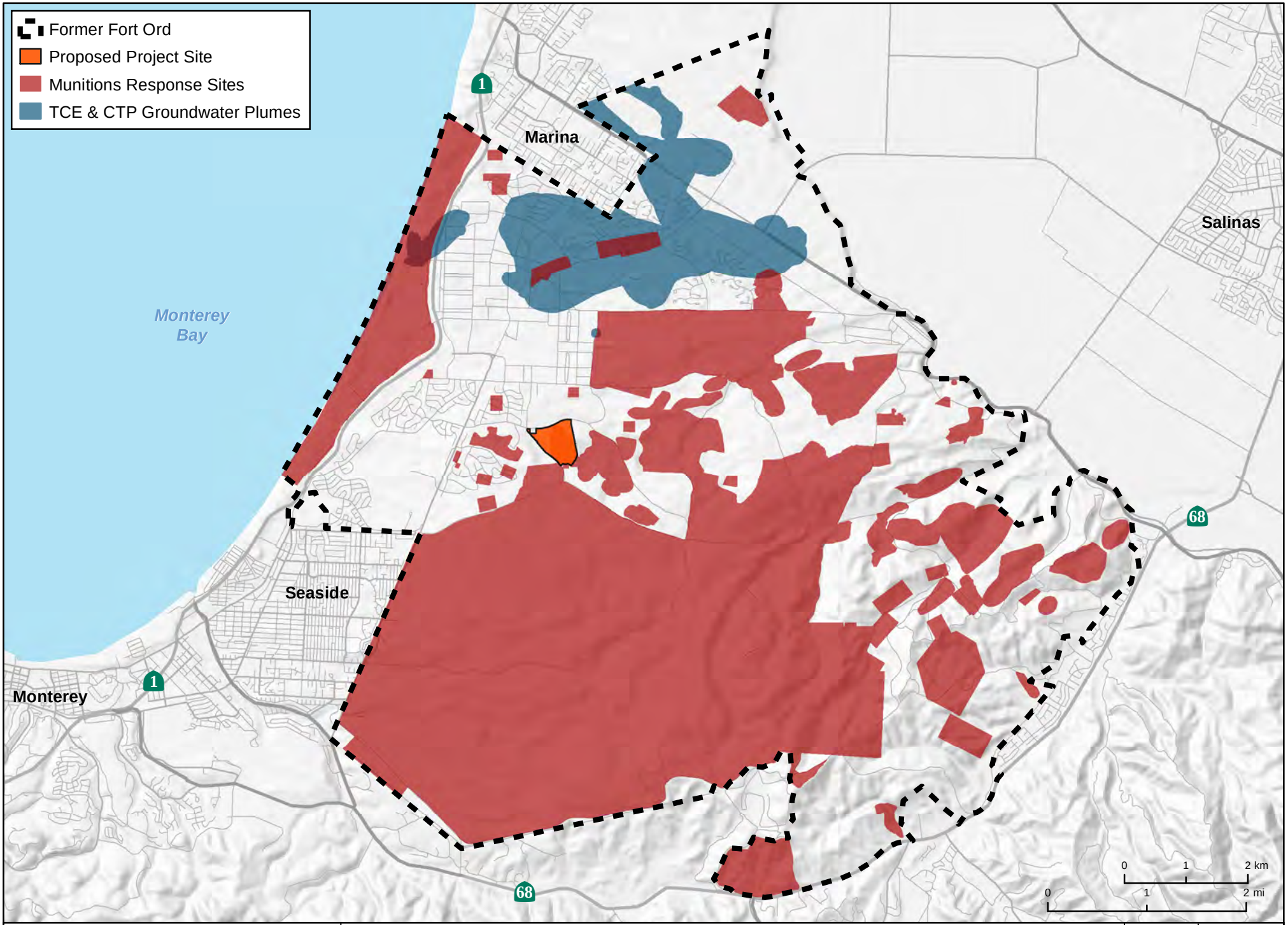
The above classifications were utilized in order to expedite the review, clean-up, and conveyance of former Fort Ord lands to local municipalities. Once the Army has determined that the properties are suitable to transfer under CERCLA, Findings of Suitability to Transfer (FOST) or Findings of Suitability of Early Transfer (FOSET) are prepared. In accordance with CERCLA, the FOST or FOSETS document that either the property is uncontaminated or that all necessary remediation has been completed or is in place and operating properly and successfully. Hazardous sites are identified in **Figure 3.9-1 Hazardous Materials Sites Map.**

Site History and Characteristics

The nearest buildings are homes to the northwest approximately 400 feet away and buildings to the west approximately 550 feet away. Historic land use within the proposed project site can be associated with the use, generation, or disposal of hazardous materials. The proposed project site is located within a parcel on the former Fort Ord known as the Parker Flats Munitions Response Area (MRA), see **Figure 3.9-2 Parker Flats MRA**. Parker Flats MRA consists of several munitions response sites (MRS); the proposed project site is within the MRS-50 expansion (MRS-50 EXP) boundary. In the 1940s, 1950s and 1960s, this area was known as Artillery Hill and was reportedly open space used for training military personnel with equipment and munitions. During these military training activities, MEC, specifically UXO and DMM, were discarded at the project site (ECORP, 2014a).

As a result of this historical use, property reuse and transfer required the property to be assessed for hazards and cleaned up prior to the proposed use. This clean up and removal process spanned many years, from 1998 when the Army completed its initial subsurface investigation of MRS-50 to August 31, 2006 when MEC removal of MRS-50 EXP was completed and the Final Track 2 Parker Flats Munitions Response RI/FS was submitted to the U.S. EPA and California Department of Toxic Substance Control (DTSC). The site has been evaluated for the presence of UXO, including a geophysical survey and the site has been cleared for non-residential development (EMC and EDAW, 1997).

The After Action Report (AAR) indicated that it is possible, but not probable, that DMM buried beyond detection capabilities remains buried within MRS-50 EXP. The AAR also stated that there was a strong indication that penetrating military munitions could be beneath the surface of Parker Flats Cut-Off and Eucalyptus Road. The RI/FS evaluated the risks related to remaining MEC within the Parker Flats MRA Phase I based upon the intended future uses. On August 26, 2008, the Army and the U.S. EPA, in consultation with the DTSC, recorded the final decision in the Record of Decision (ROD) documenting the preferred remedial alternative of Land Use Controls (LUCs) for managing the risk to future land users from MEC that potentially remain in the Parker Flats MRA Phase I. The LUCs described in the ROD include (1) MEC recognition and safety training for workers that will conduct ground-disturbing or intrusive activities, (2) construction monitoring for ground-disturbing or intrusive activities to address MEC that potentially remains in the subsurface, and (3) restrictions against residential use (Army, 2008 and FORA, 2009).



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Hazardous Materials Sites Map

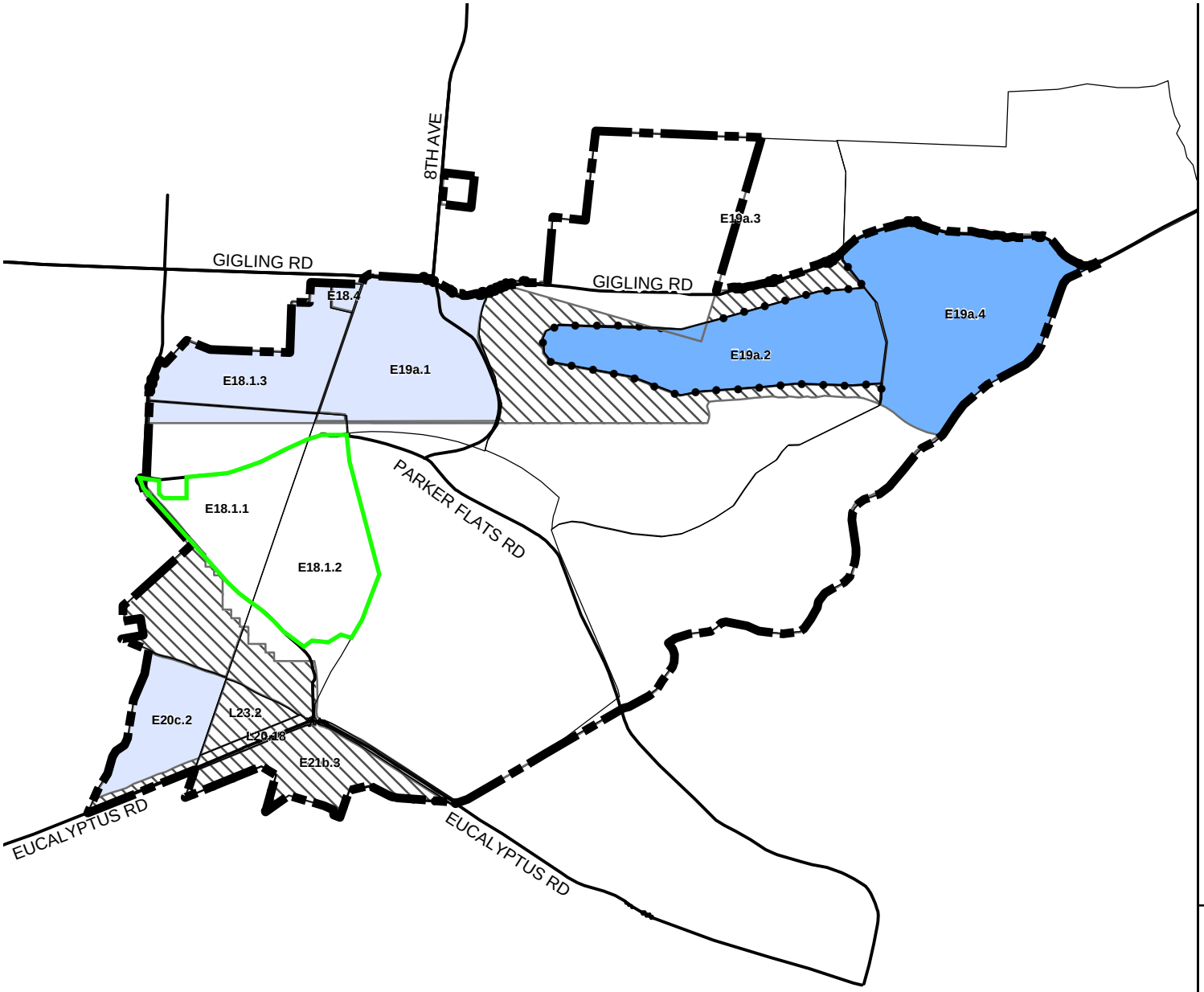
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Figure
3.9-1

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Proposed Project Site

Phase II Habitat Reserve Reuse Area
(area subject to Land Use Controls including munitions recognition and safety training, construction support, access management measures, residential use restriction, and restrictions prohibiting inconsistent use)

Phase II Residential Reuse Area
(area subject to Land Use Controls including munitions recognition and safety training, and construction support)

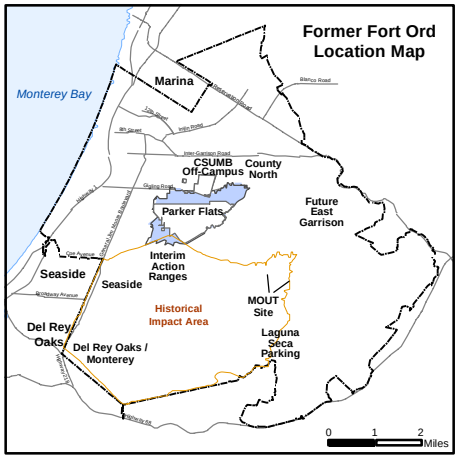
Phase II Non-Residential Development Reuse Area
(area subject to Land Use Controls including munitions recognition and safety training, construction support, and residential use restriction

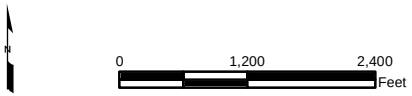
Parker Flats MRA

Borderland Interface

Major Road

E19a.2 Phase II USACE Parcel





Parker Flats Munitions Response Area
Phase II Designated Future Land Use and USACE Land Transfer Parcels

Monterey County, California

Source: FORA LUCIP, 2019

A Remedial Design/Remedial Action, Land Use Controls Implementation, and Operation and Maintenance Plan (LUCIP) was prepared as a result of the selection of LUCs as a component of the remedy in accordance with the ROD for Parker Flats MRA Phase I (FORA, 2009). The purpose of this LUCIP is to provide information on how the remedy selected in the ROD will be implemented and maintained. The LUCIP describes implementation actions to ensure that the LUC objectives are met. In addition, FORA & FORA staff have developed and communicated with the applicant standard templates and tools to ensure compliance with LUC objectives and implementation actions.

A regulatory database search for past hazardous material spills on properties within ½-mile of proposed project components was conducted (State Board, 2019 and DTSC, 2019). The State Board database shows two military cleanup sites, one federal Superfund cleanup site exists to the south and one incident of leaking underground storage tanks (UST) located to the northeast. For both sites the cleanup status is marked as "Open;" however, the UST site is marked as "eligible for closure as of 1/1/2019" as the UST was removed from 1990 to 1992 by the Army and the County of Monterey, there was no evidence of a petroleum release from this closed UST site.

Schools

Schools are considered sensitive receptors for hazardous materials because children are more susceptible than adults to the effects of many hazardous materials. As discussed above, one school is located within ¼-mile of the proposed project: Chartwell School.

Existing Hazards

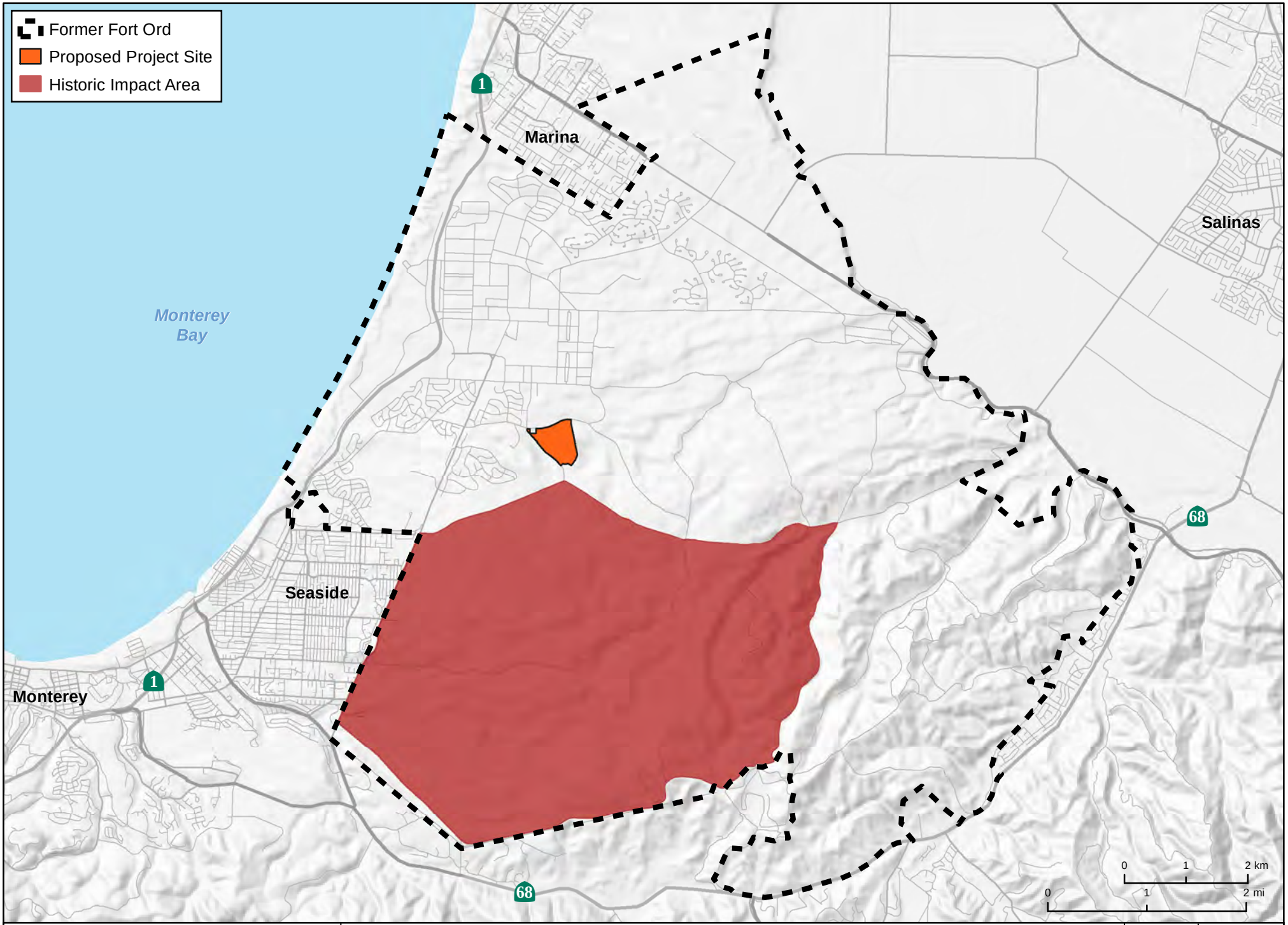
Military Munitions

Since 1917, portions of Fort Ord were used by infantry units for maneuvers, target ranges, and other purposes. Military munitions, formerly referred to as Ordnance and Explosives (OE)[2], were fired into, fired upon, or used on the facility in the form of artillery and mortar projectiles, rockets, guided missiles, rifle and hand grenades, land mines, pyrotechnics, bombs, and demolition materials. These materials are present throughout the former Fort Ord as either unexploded ordnance (UXO) or munitions debris. As a former Army training installation, the use of military munitions occurred throughout the base for training purposes.

Munitions-related training activities were primarily concentrated in an 8,000-acre area located in the south-central portion of Ford Ord; this area once served as the primary target area for weapons training. This area is referred to as the "Impact Area" and is anticipated to have the highest density of military munitions within the former Fort Ord; please refer to **Figure 3.9-3 Historic Impact Area Map**. Munitions and munitions debris are also found throughout the former base. Lower densities of military munitions and UXO are expected in the outer portions of the inland range area and in the training areas to the north and east of the Impact Area. Coastal beach firing ranges are also included in the classification of lower density UXO.

Unexploded munitions and explosives are considered MEC because they are considered an explosive safety risk consisting of UXO (fired military munitions) and DMM (unfired military munitions).

[2] According to the *Draft Final Ordnance and Explosives Remedial Investigation/Feasibility Study Work Plan* (USACE, 2000), OE, now referred to as military munitions, are defined as "anything related to munitions designed to cause damage to personnel or materials through explosive force or incendiary action including bombs, warheads, missiles, projectiles, rockets, antipersonnel and antitank mines, demolition charges, pyrotechnics, grenades, torpedoes and depth charges, high explosives and propellants, and all similar and related items or components explosive in nature or otherwise designed to cause damage to personnel or material."



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Historic Impact Area Map

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3.9-3

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As part of on-going clean-up activities on the former Fort Ord, the Army has been performing surface and subsurface clean-up actions involving military munitions and MECs in accordance with the Munitions Response RI/FS. As part of this process, prescribed burns have been used to clear the dense vegetation cover on much of the "Impact Area" and former range sites to reveal the presence of military munitions, munitions debris, and MECs. After initial surface clearance activities, the Army subsequently performs subsurface clean-up to ensure the suitability of the sites for transfer.

Asbestos Containing Material

Because a substantial amount of construction occurred at Fort Ord from the 1940s to the 1960s, the majority of former Fort Ord buildings contain some type of asbestos.[3] An asbestos survey of approximately 350 non-residential buildings (i.e., retail stores, office buildings, lavatories, dining halls, barracks, general-purpose buildings, vehicle maintenance and storage, oil storage, bus/taxi stations, and ammunition bunkers) was performed in 1989 and 1990 and both friable and non-friable asbestos containing material (ACM) were documented. Subsequently, from October 1991 to April 1993, a base-wide asbestos survey of an additional 2,689 non-residential and barracks structures was performed and both friable and non-friable ACM were found. To address asbestos related concerns, an asbestos management program is implemented at the former Fort Ord. The primary objectives of the program are to: 1) identify ACM in Army-controlled buildings; 2) evaluate the ACM's friability, condition, and potential for damage; and 3) implement response actions appropriate to the findings.

Lead-Based Paint

As many Fort Ord era structures were constructed and/or rehabilitated prior to 1978, it is assumed that these structures likely contain lead-based paint. The demolition and/or rehabilitation of these structures are likely to result in the exposure of construction personnel and/or future occupants to environmental hazards associated with lead-based paint. Lead-based paint may result in human health and safety concerns if not properly managed. The exposure to lead-based hazards can result in lead poisoning, which may produce neurological damage, including learning disabilities, behavioral problems, and impaired memories in children.

In order to address potential human health hazards associated with lead-based paint, a lead-based paint management program is implemented in Fort Ord. The objectives of this program are to: 1) identify and control lead-based paint and lead-contaminated dust in target facilities; and 2) eliminate hazards in reuse properties that contain buildings constructed prior to 1978 that are intended to be used for residential purposes. Lead hazards are of particular concern for properties that are designated for future residential use.

Polychlorinated Biphenyls

Polychlorinated biphenyls, or PCBs, have been widely used throughout the former Fort Ord as coolants and lubricant in transformers and other electrical equipment, such as fluorescent light ballast. PCBs, according to the U.S. EPA, are considered a carcinogen.

[3] The unregulated or unprotected exposure to ACM has been related to human health and safety concerns. Both the Occupational Safety and Health Administration (OSHA) and the U.S. EPA regulate asbestos due to potential health hazards. Exposure to ACM can increase the risk of asbestos related diseases, including certain cancers that can result in disability and/or death.

Contaminated Groundwater

There are no groundwater contamination sites or ground water monitoring wells within the proposed project site. Groundwater contamination is present in the Fort Ord aquifer system; however, this is north of the proposed project site.

Wildfire

The County of Monterey is characterized by moderate to very high fire hazard. CAL FIRE maps identify fire hazard severity zones in the State and local responsibility areas. Fort Ord is located within a Federal Responsibility Area. Portions of Fort Ord are designated as Very High Fire Hazard Severity Zones (VHFHSZ); however, the proposed project area is not in a designated very high severity zone (CAL FIRE, 2007).

Although the proposed project site is not located within a very high severity zone, the proposed project site is still susceptible to wildfire risk. Fire hazards include surrounding remote and undeveloped areas with chaparral and oak trees. In addition, the extent and adequacy of fire protection and control in various areas must also be considered. Poor roads and limited accessibility in the remote areas of Fort Ord increase the response time for firefighting equipment and may hinder escape. The risk of damage to life and property, therefore, is more severe and fire control more difficult.

3.9.3 Regulatory Framework

The generation, storage, and handling of hazardous materials and wastes are regulated by various Federal, State, and local laws and regulations aimed at the protection of public health and the environment. A summary of regulations follows.

Federal

Resources Conservation and Recovery Act

The U.S. EPA is responsible for enforcing regulations at the Federal level pertaining to hazardous materials and wastes. The primary Federal hazardous materials and wastes laws are contained in the RCRA of 1976 and in the CERCLA of 1980 (or Superfund). CERCLA established the National Priorities List for identifying and obtaining funding for remediation of severely contaminated sites. Federal regulations pertaining to hazardous materials and wastes are contained in the CFR (40 CFR). The regulations contain specific guidelines for determining whether waste is hazardous, based on either the source of generation or the characteristics of the waste.

U.S. Department of Transportation Hazardous Materials Transport Act (49 USC 5101)

The U.S. Department of Transportation, in conjunction with the EPA, is responsible for enforcement and implementation of Federal laws and regulations pertaining to transportation of hazardous materials. The Hazardous Materials Transportation Act of 1974 directs the U.S. Department of Transportation to establish criteria and regulations regarding the safe storage and transportation of hazardous materials. CFR 49, 171–180, regulates the transportation of hazardous materials, types of material defined as hazardous, and the marking of vehicles transporting hazardous materials.

Occupational Safety and Health Act (29 USC 15)

The Occupational Safety and Health Act of 1970 passed to address employee safety in the workplace. The Act created the Occupational Safety and Health Administration (OSHA), whose mission is to ensure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in

workplace safety and health. The OSHA staff establishes and enforces protective standards and reaches out to employers and employees through technical assistance and consultation programs.

Government Code 51175-89

Government Code 51175-89 directs CAL FIRE to identify areas of significant fire hazard severity zones within Local Responsibility Areas (LRA). Mapping of the areas, referred to VHFHSZ, is based on fuels, terrain, weather, and other relevant factors. These zones are used to define areas which may contain wildfire hazards and may need further measures to reduce risk associated with wildland fires.

State

California Hazardous Waste Control Law

The U.S. EPA has delegated much of its regulatory authority to individual States whenever adequate State regulatory programs exist. The DTSC of CalEPA is the agency empowered to enforce Federal hazardous materials and waste regulations in California in conjunction with the U.S. EPA.

California hazardous materials and waste laws incorporate Federal standards, but in many respects are stricter. For example, the California Hazardous Waste Control Law, the State equivalent of RCRA, contains a much broader definition of hazardous materials and waste. State hazardous materials and waste laws are contained in the CCR, Titles 22 and 26. Regulations implementing the California Hazardous Waste Control Law list 791 hazardous chemicals and 20 to 30 more common materials that may be hazardous; establish criteria for identifying, packaging and labeling hazardous waste; prescribe management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal and transportation; and identify hazardous waste that cannot be disposed of in landfills.

Under RCRA, a facility is classified as a generator of hazardous waste if it generates and stores hazardous waste on site for less than 90 days; such a facility is required to obtain a U.S. EPA generator's identification number from the U.S. EPA or DTSC. If, however, hazardous waste is stored on site for longer than 90 days, the facility is classified as a Transfer, Storage, or Disposal facility and is required to obtain a RCRA Part B Storage Permit, which can take as long as two years to obtain. Transportation and disposal of hazardous materials are also regulated; hazardous waste must be characterized to determine methods of disposal and site disposal (i.e., class of landfill).

Under both RCRA and the California Hazardous Waste Control Law, hazardous waste manifests must be retained by the generator for a minimum of three years. A hazardous waste manifest lists a description of the waste, its intended destination, and regulatory information about the waste. A copy of each manifest must be filed with DTSC. The generator must match copies of hazardous waste manifests with receipts from the treatment/disposal/recycling facility to confirm that the wastes were properly handled.

Health and Safety Code, Section 25500 et seq.

This code and the related regulations in 19 CCR 2620, et seq., require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit a Hazardous Materials Business Plan to their local Certified Unified Program Agency (CUPA) and to report releases to their CUPA and the State Office of Emergency Services.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Business plans contain basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) requires the administrative consolidation of six hazardous materials and waste programs (Program Elements) under the local CUPA. The following Program Elements are consolidated under the Unified Program:

- Hazardous Waste Generator and On-site Hazardous Waste Treatment Programs (a.k.a. Tiered Permitting)
- Aboveground Petroleum Storage Tanks
- Hazardous Materials Release Response Plans and Inventory Program (a.k.a. Hazardous Materials Disclosure or "Community-Right-To-Know")
- California Accidental Release Prevention Program
- UST Program
- Uniform Fire Code Plans and Inventory Requirements

California Fire Code, Title 24, Part 9, Chapters 33, 50 and 57

The 2013 California Fire Code (CFC), written by the BSC, is based on the 2012 International Fire Code (IFC). The IFC is a model code that regulates minimum fire safety requirements for new and existing buildings, facilities, storage and processes. The IFC addresses fire prevention, fire protection, life safety, and safe storage and use of hazardous materials in new and existing buildings, facilities, and processes.

Chapter 33 outlines general fire safety precautions for all structures during construction and demolition operations. In general, these requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. Features regulated include fire protection systems, fire fighter access to the site, hazardous materials storage and use, and temporary heating equipment and other ignition sources. Chapter 50 contains the general requirements for all hazardous chemicals in all occupancies and includes general provisions for the prevention, control, and mitigation of dangerous conditions related to storage, dispensing, use, and handling of hazardous materials. The Chapter 57 requirements are intended to reduce the likelihood of fires involving the storage, handling, use, or transportation of flammable and combustible liquids. Chapter 49 outlines construction methods and requirements for hazardous vegetation and fuel management in "High or Very-high Fire Hazard Severity Zones."

Uniform Fire Code

The Uniform Fire Code, Article 80 (Section 80.103 of the Uniform Fire Code as adopted by the State Fire Marshal pursuant to Health and Safety Code Section 13143.9), includes specific requirements for the safe storage and handling of hazardous materials. These requirements are intended to reduce the potential for a release of hazardous materials and for mixing of incompatible chemicals, and specify the following specific design features to reduce the potential for a release of hazardous materials that could affect public health or the environment:

- Separation of incompatible materials with a noncombustible partition;
- Spill control in all storage, handling, and dispensing areas; and
- Separate secondary containment for each chemical storage system. The secondary containment must hold the entire contents of the tank, plus the volume of water needed to supply the fire suppression system for a period of 20 minutes in the event of catastrophic spill.

Regional/Local

Reuse Plan

According to the Reuse Plan, the former Fort Ord was added to the "Superfund" list in 1990 (EMC and EDAW, 1997). Hazardous and toxic waste sites within the former Fort Ord fall into two major categories: 1) hazardous and toxic waste sites (i.e. buildings, landfills, storage facilities, etc.), and 2) OE. The Reuse Plan contains base-wide public-safety objectives related to past hazardous materials usage on the former Fort Ord, as well as jurisdiction specific goals and policies related to the treatment of hazardous materials. Applicable base-wide public-safety objectives include: 1) ensuring the timely and complete compliance by the Army with the RI/FS (HLA, 1995) and associated ROD; and, 2) protecting public health and safety during the remediation of hazardous and toxic material sites on Fort Ord.

Monterey County Code – Chapter 16.10

The County of Monterey Municipal Code Chapter 16.10 applies to parcels being transferred from the former Fort Ord to the County and outlines special standards and procedures for digging and excavation on these parcels in addition to those contained in the CBC. It requires that no digging or excavation shall take place until remediation of the site is complete, that potential purchasers or developers of the site are made aware of the potential for UXO, and provides a mechanism for DTSC statutory oversight.

Monterey County Code – Chapter 18.56

Chapter 18.56 of the Monterey County Code adopts Sections 4290 et seq. of the PRC which requires the incorporation of wildfire protection standards in conjunction with building, construction, and development. These standards provide that future design and construction of structures and developments must provide for emergency access and perimeter wildfire protection measures. Specifically, Section 4291 of the PRC requires a minimum 100 feet of defensible space around all residential, commercial, and industrial buildings within state responsibility areas approved after January 1, 1991.

Section 4117 of the PRC and the regulations promulgated by the CAL FIRE provide that local agencies, such as the County of Monterey, may adopt ordinances, rules, or regulations to provide fire prevention restrictions or regulations that are necessary to meet local conditions of weather, vegetation, or other fire hazards. These ordinances, rules, or regulations may be more restrictive than state statutes in order to meet local fire conditions.

City of Seaside Municipal Code – Chapter 15.34

The City of Seaside Municipal Code Chapter 15.34 contains the "Ordnance Remediation District Regulations of the City" (Ordinance 924 (part)) and establishes special standards and procedures for digging and excavation on those properties in the former Fort Ord military base which are suspected of containing ordnance and explosives (also called munitions and explosives of concern). This ordinance requires that a permit be obtained from the City for any excavation, digging, development, or ground disturbance of any type involving the displacement of ten cubic yards or more of soil. The permit requirements include providing each site worker a copy of the Ordnance and Explosives Safety Alert; complying with all requirements placed on the property by an agreement between the City, FORA, and

DTSC; obtaining ordnance and explosives construction support; ceasing soil disturbance activities upon discovery of suspected ordnance and notifying the Seaside Police department, the Presidio of Monterey law enforcement, the Army and DTSC; coordinating appropriate response actions with the Army and DTSC; and reporting of project findings.

3.9.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

b. create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

c. emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

d. be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

e. for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area;

f. impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;

g. expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires; or

h. if located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

    i. substantially impair an adopted emergency response plan or emergency evacuation plan;

    ii. due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; or,

    iii. require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.

Impact Analysis Overview

Approach to Analysis

The following impact analyses address potential hazardous substances in soil that may result in impacts during construction as well as potential use and disposal of hazardous materials or waste during operation and maintenance of the proposed project and alternatives. The significance criteria are

assessed in this section as the basis for determining the significance of impacts related to hazards and hazardous materials. If necessary, mitigation measures are proposed to reduce significant impacts to less than significant.

The evaluation is based on review of hazardous materials use or release sites databases, the types of chemicals and hazardous materials that may be used during construction or operation of the proposed project, and the location of the proposed project area in relationship to schools, airports, and fire hazard zones. Each potential impact is assessed in terms of the applicable regulatory requirements, such as mandatory compliance with various Federal, State, and local regulations that would serve to prevent significant impacts from occurring.

Areas of No Impact

Some of the significance criteria outlined above are not applicable to the proposed project or the proposed project would not result in impacts related to these criteria, as explained below.

(e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area. (No impact during construction or operation of the proposed project). This element of significance is not applicable to the proposed project because the project site is not located within the vicinity of an airport land use plan or private airstrip.

(f) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. (No impact during operation of the proposed project and alternatives). This element of significance is not applicable to the proposed project and alternatives. The Monterey County Emergency Operations Plan provides an overview of agency roles and responsibilities during emergencies (County of Monterey Office of Emergency Services, 2011). Proposed project operations would not interfere with the designated agency responsibilities and reporting in the event of an emergency, and no impact would result. Although construction activities temporarily could impede access for emergency response vehicles, measures to avoid interference with emergency access are addressed in **Section 3.15**, **Transportation**.

(h) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: 1) Substantially impair an adopted emergency response plan or emergency evacuation plan; 2) due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; or 3) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. (No impact during construction or operation of the proposed project and alternatives). The proposed project is not located within a state responsibility area or lands classified as very high fire hazard severity zone (CAL FIRE, 2007).

Summary of Impacts

Table 3.9-1 provides a summary of potential impacts from the proposed project and alternatives.

Table 3.9-1. Summary of Impacts – Hazards and Hazardous Materials

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	LS	LS	LS	NI
Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LS	LS	LS	LS	NI
Impact HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	LS	LS	LS	NI
Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.	LS	LS	LS	LS	NI
Impact HAZ-5: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.	LS	LS	LS	LS	NI

NI – No Impact
LS – Less than Significant
LSM – Less than Significant with Mitigation
SU – Significant Unavoidable

Impacts and Mitigation Measures

Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction

Construction of the proposed project would involve the temporary use of hazardous materials. These materials (petroleum products such as gasoline, diesel fuel, lubricants, and cleaning solvents) would be

used primarily to fuel and maintain construction vehicles and equipment; the accidental release of these substances is addressed separately, below. The registration, sale and use of potential hazardous materials would be required to comply with all applicable Federal, State, and local regulations pertaining to the use, handling, and disposal of such material, including California Occupational Health and Safety Administration (Cal-OSHA), CFC, and National Fire Protection Association (NFPA) requirements, and manufacturer instructions for the management and use of hazardous materials. Specifically, State regulations require a State General Construction Activity Stormwater Permit from the RWQCB be attained before grading begins. As part of this permit, the applicant would prepare a SWPPP that would establish BMPs for proper storage, handling, use, and disposal of hazardous substances.

In addition, site construction would include the removal and disposal of existing debris, if any. As outlined above, the project site is located on the former Fort Ord and has documented UXO and DMM have been documented at the site. Although removal of hazardous materials is not anticipated, procedural precautions would be taken during excavation and grading to enable the removal and disposal of undocumented debris and munition materials that may be encountered. Removal and/or disposal measures for all debris present on the project site would be in accordance with local, state, and Federal, State, and local regulations and agreements, including accordance with the LUCs outlined in the ROD (and described above) to manage the risk to future land users from MEC. Grading and soil movement cannot occur within a Soils Management Plan area due to a deed restriction for all remediated parcels on the former Fort Ord, including the project site, and ordinances by Seaside and the County on digging and excavating on the former Fort Ord. These codes require a plan to ensure that any soil from the site is stored on-site or in an acceptable location. In addition, due to the risk of UXO on the site and in accordance to with the LUC UXO Training and Construction Support Requirements, grading operations in previously undisturbed areas would require direct observation by UXO-trained personnel. A site-specific UXO Plan would be developed during the design phase and included as part of the construction requirements. A certified UXO expert would be required to be on-site to serve as a consultant to the contractor during all grading and/or excavating operations (Chapter 15.34 City Code and Chapter 16.10 of County Code). These plans would be prepared during the construction document phase for each phase of work. Furthermore, the project application has been working closely with FORA to facilitate the process and requirements of the UXO Training and Construction Support Requirements, including online training tools, standard templates for plans, and reporting forms, to ensure cooperation and compliance with LUC requirements. Implementation of this plan and continued cooperation with FORA staff during construction would reduce potential impacts to a less-than-significant level.

Operation

The operation and maintenance at the proposed project would involve the routine storage or use of hazardous materials in associated with operation of the facility and landscape materials and equipment, however the quantities of hazardous materials used would be minor. The small quantities of hazardous materials used onsite would be housed in appropriate storage space according to all applicable federal, state, and local regulations. In addition, hazardous waste would be disposed of in an appropriate manner.

In order to avoid the cost and delay of having unexploded ordinance technicians on-site during excavation of each burial, it is anticipated that each phase would complete excavation in compliance with the Seaside and County Code. If earthwork is required outside of phase construction, preparation and implementation of a Soil Management Plan would reduce potential impacts during operation to a less-than-significant level.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project; however, compliance with City and County Code would be required. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Compliance with City and County Code would be required. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. No impact would occur.

Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Hazardous materials that could be used during construction, operation, and maintenance activities include fuels, lubricants, paints, and solvents. However, as discussed above and in **Section 3.10**, the construction contractor would be required to prepare a SWPPP for construction activities in accordance with the General Construction Permit requirements. The SWPPP would list the hazardous materials (including petroleum products) proposed for use and describe measures for preventing spills, inspecting equipment and fuel storage, and providing immediate response to spills.

As described above in the discussion under **Impact HAZ-1**, routine use, storage, and handling of hazardous substances would be conducted in accordance with applicable Federal, State, and local regulations and agreements. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2 and the routine use, storage, and handling of hazardous substances would be conducted in accordance with applicable Federal, State, and local regulations and agreements. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. No impact would occur.

Impact HAZ-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Schools and daycare facilities are considered sensitive receptors for hazardous materials because children are more susceptible than adults to the effects of many hazardous materials. The proposed project is within one-quarter mile of Chartwell School.

As discussed above under **Impacts HAZ-1** and **HAZ-2**, routine use, storage, and handling of hazardous substances would be done in accordance with applicable federal, state, and local regulations. This would reduce the potential for emitting or releasing any hazardous substance into the environment. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project; however, construction and operation is anticipated to be similar to the proposed project. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. No impact would occur.

Impact HAZ-4: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The former Fort Ord, including the project site, is a listed site. However, as described above, the environmental documents prepared for the closure of the military site and its conversion to civilian use included extensive surveys and identification of hazardous or toxic areas to be remediated. Most of these areas have either been remediated or are in the process of remediation. Extensive studies, investigations, cleanup efforts, and a final ROD, overseen by the U.S. EPA and DTSC, have already been completed on the project site. There are no soil contamination sites, groundwater contamination sites, or ground water monitoring wells within the project site. However, there still remains the potential for a significant impact to the public, construction workers, and the environment, due to exposure to hazardous materials at this site. As discussed in **Impact HAZ-1**, compliance with local, state, and Federal, State, and local regulations and agreements, including accordance with the LUCs outlined in the ROD (and described above) to manage the risk to future land users from MEC would be required. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project; however, compliance with local, state, and Federal, State, and local regulations and agreements, including accordance with the LUCs outlined in the ROD (and described above) to manage the risk to future land

users from MEC would be required under this alternative. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Compliance with local, state, and Federal, State, and local regulations and agreements, including accordance with the LUCs outlined in the ROD (and described above) to manage the risk to future land users from MEC would be required under this alternative. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. No impact would occur.

Impact HAZ-5: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. (Criterion g)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

While the proposed project is not located within an area that is designated as being subject to severe or high fire hazards according to the Cal FIRE, the proposed project could still be subject to wildland fire hazards due to the site's proximity to expansive areas of open space containing oak woodland and vegetation.

While wildfire could occur on-site or on adjacent properties, the proposed project would comply with the applicable fire safety provisions of the CBC as well as comply with Section 18.56 of the Monterey County Code (Ordinance 3600, 1992), which would require that development include noncombustible construction, extraordinary fuel modification measures, creation of evacuation areas, alternative access routes, and alternative roadway modifications; thereby reducing the risk of damage from fire to the maximum extent practicable. Compliance with the CBC as well as Monterey County Code would ensure that people or structures are not exposed to significant risk of loss, injury, or death associated with wildland fires. Compliance with California Building Code and Section 18.56 of the Monterey County Code would ensure that exposure to wildland fires on the project site is minimized. This impact would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Construction of Alternative 2 would be slightly less than the impact described for the proposed project above. The overall footprint of construction would be reduced; therefore, it is assumed that the impacts associated with wildfire would be reduced. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Construction of Alternative 3 would be slightly greater than the impact described above. The overall footprint of construction would be increased; therefore, it is assumed that the impacts associated with wildfire would be increased. However, this alternative would still be subject to applicable codes. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.10 HYDROLOGY AND WATER QUALITY

3.10.1 Introduction

This section describes the hydrology and water quality conditions related to the proposed project and alternatives, including a discussion of the existing conditions, and the potential effects of the proposed project on surface and groundwater resources. This section also summarizes the regulations and laws pertinent to water quality. The analyses contained in this section are based primarily on the hydrological technical studies prepared for the proposed project identified below and included as **Appendix G** of this EIR/EA:

- D*etermination of 100-Year Floodplain for California Central Coast Veterans Cemetery* (Huitt-Zollars, February 18, 2019c);
- *Memorandum Re: Drainage Basin Design* (Huitt-Zollars, January 28, 2019d); and
- *Memorandum Re: Central Coast Veterans Cemetery CLOMR* (Huitt-Zollars, February 1, 2019e).

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. Public and agency comments related to hydrology and water quality were not received during the public scoping period. For a complete list of public comments received during the public scoping period, please refer to **Appendix A**, **NOP and Public Comment Letters.**

3.10.2 Environmental Setting

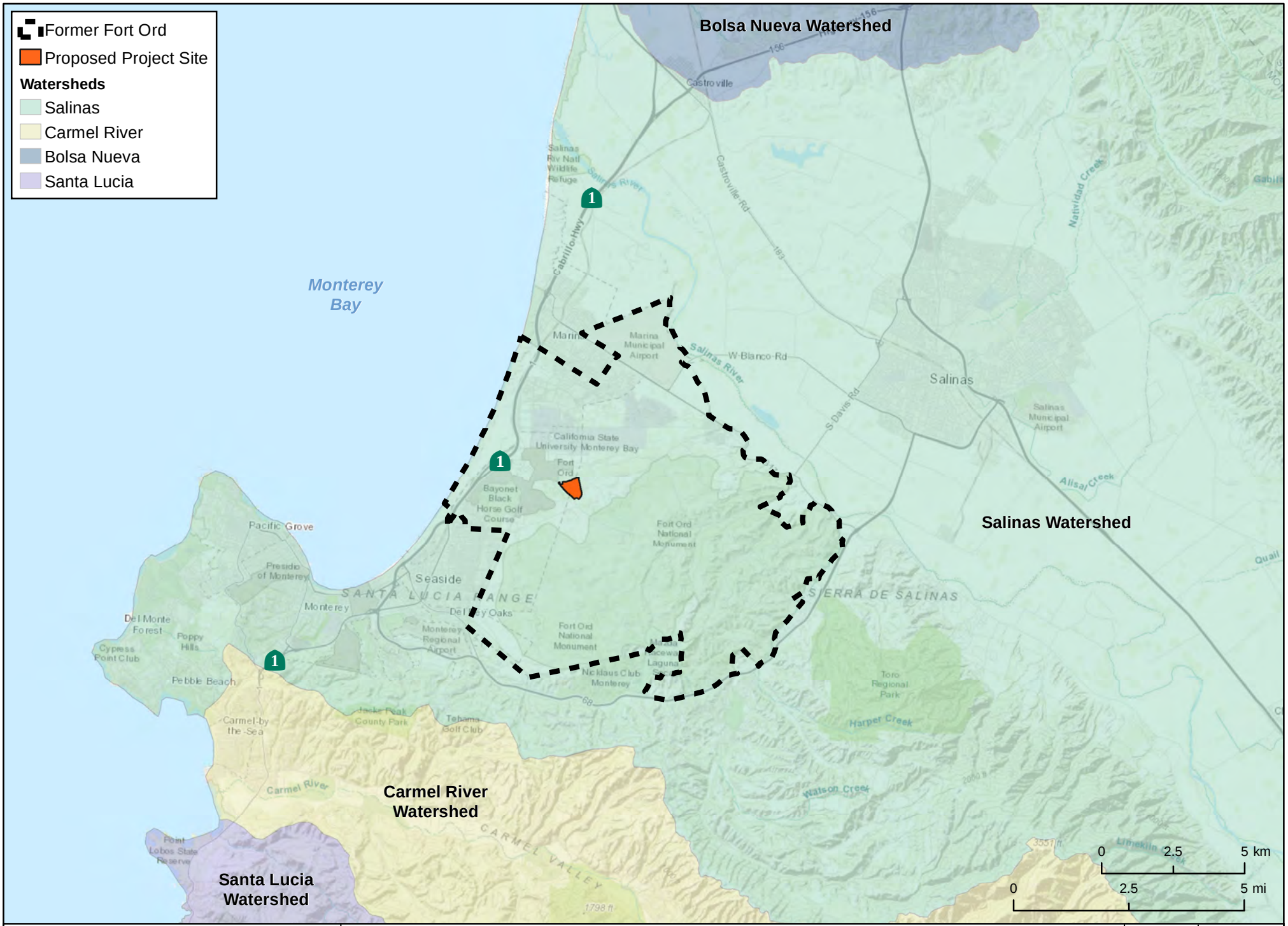
Regional Setting

The former Fort Ord is located between the Salinas River and Monterey Bay coastal watersheds and covers an area of about 44 square miles. These two major watersheds include several smaller watersheds and surface water bodies such as the Laguna Seca and Toro Creek watersheds in the Salinas River watershed, and the Canyon del Rey watershed in the Monterey Bay coastal watershed. The Salinas River watershed drains into Moss Landing Harbor, except for during high flows when the Salinas River watershed drains into Monterey Bay (**Figure 3.10.1 Watershed Overview Map)**.

The climate in the project area is moderate year-round with warm, dry summers and cool, moist winters. The average temperature is approximately 59 degrees Fahrenheit (County, 2010b). The average rainfall in the county varies, but is approximately 18 inches per year, mostly between the months of November and April.

Surface Water Hydrology

The topography of former Fort Ord is characterized by stabilized sand dunes in the western half of the base, transitioning to rolling hills and canyons in the eastern half. The sandy soils in the western half of the base are highly permeable and absorb much of the rainfall and runoff without forming distinct creek channels. The streams in the canyons in the eastern part of the former Fort Ord are small and intermittent. Impossible, Wildcat, Barloy, and Pilarcitos Canyons and Toro Creek drain to the northeast and into the Salinas River. Canyon del Rey drains the southern portion of the former Fort Ord and empties into the Monterey Bay, a designated national marine sanctuary.



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Watershed Overview Map

Date: 03-08-2019
Scale: 1 in=2.7 mi

Figure 3.10-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 3.10-1 Watershed Map.mxd

The Salinas River is the largest water system in County of Monterey and runs along the northeast border of the former Fort Ord. The Salinas River watershed is bounded by the Santa Lucia Mountains to the west and the Gabilan Mountains to the east. The Salinas River is 155 miles long and roughly bisects the county, terminating in Monterey Bay near Moss Landing. The Salinas River delivers approximately 282,000 afy of water to the Pacific Ocean at Moss Landing. Most of the water (approximately 90 percent) is delivered during periods of peak precipitation, between mid-December and April.

The Laguna Seca watershed is located between the cities of Monterey and Salinas. Surface flows in the watershed drain to Canyon del Rey Creek and thence into Monterey Bay. The Laguna Seca watershed includes a seven-square mile portion of the Seaside ground water basin. The Canyon del Rey watershed is relatively small and is located in the Seaside/Del Rey Oaks/Highway 68 Corridor (County, 2010b).

The shoreline of the Monterey Bay is the western boundary of the former Fort Ord. The oceanographic feature affecting waters of Monterey Bay and its adjacent continental shelf is primarily the California Current System, which consists of the California Current, the California Undercurrent, and the Davidson Current. The California Current is a large-scale upper ocean current that transports cold subarctic and North Pacific water south along the North American coast (Bograd et al., 2000). Beneath this near-surface current, and relatively close inshore (within 100 kilometers or 62 miles), is the California Undercurrent that transports warm subtropical water northward. During winter months, the California Undercurrent shoals and becomes the inshore countercurrent or Davidson current (Pennington and Chavez, 2000).

The CCCVC is located in the Parker Flats area of the former Fort Ord, which includes Artillery Hill surrounded by natural depressions. Parker Flats does not connect to any of the existing perennial or intermittent creeks. Instead, all stormwater collects in the depressions and percolates. In the 2009 FEMA Flood Insurance Study, a portion of the project area was identified as Zone AH, areas subject to inundation by the 1-percent annual chance flood event.

Groundwater Hydrology

Groundwater is the water occurring beneath the earth's surface and hydrogeology refers to the study of how that water interacts with the underlying geologic units of rock and soil. Most groundwater occurs in material deposited by streams, lakes, and oceans, generally called alluvium. Alluvium consists of sand and gravel deposits and finer-grained deposits such as clay and silt. Fluvial deposits, although commonly generically included with alluvium, more specifically refer to deposits laid down by rivers and streams as a result of bank erosion, where the material is transported and redeposited in the form of bars, points, and flood plains.

Coarse materials such as sand and gravel deposits usually provide the best storage capability for water and, when saturated with water, are termed aquifers. Finer-grained clay and silt deposits are relatively poor for water storage and use, and are referred to as aquitards, in that they restrict or impede the vertical migration of groundwater or infiltrated surface water. Aquifers can extend over many square miles and are referred to as basins. A groundwater basin is defined as an aquifer or a stacked series of aquifers with reasonably well defined boundaries in a lateral direction and a definable bottom. California's groundwater basins typically include one aquifer or a series of aquifers with intermingled aquitards.

In general, groundwater basin boundaries are determined by physical attributes, such as the lateral extent of aquifers, boundaries to flow (such as bedrock), and groundwater divides. A groundwater divide, like a surface water divide, separates distinct groundwater flow regions within an aquifer. A divide is defined by a line on either side of which groundwater moves in divergent directions.

Two groundwater basins underlie the former Fort Ord: the Salinas Valley Groundwater Basin (SVGB) and Seaside Groundwater Basin (Seaside Basin), which are described below. The project site is located within the Monterey subbasin of the SVGB, immediately adjacent to the Seaside Basin.

Salinas Valley Groundwater Basin

The main part of the SVGB has been divided into four subareas referred to as the 180/400-Foot, East Side, Forebay, and Upper Valley Subareas or Subbasins, based on sources of recharge and stratigraphy. There are four additional subbasins around the periphery of the main part of the basin that are recognized by the Department of Water Resources: Seaside Area, Langley, Monterey, and East Side Aquifer. The Department of Water Resources revised the basin boundaries in 2016. The Seaside Basin as discussed herein corresponds to the southwest parts of the former Seaside Area and Corral de Tierra Area Subbasins. The Monterey Subbasin contains the remaining portions of the Seaside and Corral de Tierra areas.

The northwest part of the former Fort Ord overlies the 180/400-Foot Aquifer, which contains several aquifers separated by aquicludes or clay layers. The 180/400-Foot Aquifer Subbasin includes three primary aquifers: the 180-Foot Aquifer (Upper and Lower), the 400-Foot Aquifer, and the 900-Foot (Deep) Aquifer, named for the average depth at which they occur. In addition, portions of the overlying Dune Sand deposits along the coast are saturated and are referred to as the Dune Sand Aquifer, although most of the water is saline to brackish due to proximity with the ocean and seawater intrusion and is consequently not used as a water supply. An extensive clay layer, known as the Fort Ord-Salinas Valley Aquiclude, underlies the dune sand deposits in the Main Garrison area. Beneath the Fort Ord-Salinas Valley Aquiclude in the Main Garrison area is the 180-Foot Aquifer, the shallowest of the aquifers in former Fort Ord used for water supply. The aquiclude is absent along a strip near the coast and in an area extending south from East Garrison. In these areas, recharge from the surface can percolate down to the 180-foot Aquifer. Beneath the 180-Foot aquifer are two deeper aquifer zones referred to as the 400-foot and 900-foot Aquifers.

Historically, most pumpage from former Fort Ord and the City of Marina came from the 180-Foot Aquifer. By the early 1980s, seawater intrusion caused by pumping extended approximately 2.5 miles into the 180-Foot Aquifer and 1.2 miles into the 400-Foot Aquifer in the vicinity of Marina. The 2013 estimates of seawater intrusion within the 180-Foot and 400-Foot Aquifers indicate that seawater has intruded to approximately 8 miles and 3.5 miles inland, respectively. Groundwater has been historically extracted from the 180-Foot and 400-Foot Aquifers; the Deep Aquifer, the 900-foot Aquifer, has experienced little development except near the coast where it is pumped to provide a replacement source of groundwater for the seawater intruded areas of the 180- and 400-Foot Aquifers.

The Monterey Subbasin comprises the northern and eastern portions of the former Fort Ord, the City of Marina and other incorporated areas. The Subbasin is generally delineated as lands southwest of the Salinas River and higher in elevation than the valley floor. Although the geological formations of the eastern part of former Fort Ord are less permeable than the sands of the western part, the entire area contributes recharge to the groundwater basin.

Seaside Basin

The southwest part of former Fort Ord overlies the Seaside Basin. The Seaside Basin is further subdivided into the Northern and Southern Subbasins by the Laguna Seca Anticline and a segment of the Old Terrance Fault, which restrict groundwater flow between the subbasins. The Seaside Bain consists of three aquifers: the surficial Aromas Sand (which includes the Dune Sands), a shallow aquifer, and a deep aquifer. The surficial Aromas Sand Aquifer is unsaturated in many places and, therefore, not directly used to produce potable groundwater as its proximity to the Pacific Ocean makes the water saline to brackish. In

the 2015-2016 water year, the Sand City desalinization plant produced 156 acre-feet (af) of potable water from this saline to brackish unit.

The two subbasins are further subdivided into coastal and inland subareas with the division boundary just west of General Jim Moore Boulevard. The former Fort Ord overlies most of the northern part of the Seaside Basin and supplies a substantial amount of total recharge to the basin.

Groundwater pumping in the Seaside Basin provides water supply for municipal, irrigation (primarily golf courses), and industrial uses. Most of the remaining pumpage is by municipal wells in Seaside and Sand City. The Shallow Dune/Aromas Sand Aquifer is not used for the production of potable groundwater; historically, California American Water Company (Cal-Am) extracted a limited amount of water from two wells in Sand City that were eventually abandoned in the early 1970s because of seawater intrusion. Historical and persistent low groundwater elevations caused by pumping led to concerns that seawater intrusion may threaten the Seaside Basin's groundwater resources. In 2006, an adjudication led to the issuance of a Monterey County Superior Court decision that created the Seaside Basin Watermaster. The court concluded that groundwater production within the Seaside Basin exceeded the "Natural Safe Yield" and, therefore, a physical solution was established (i.e., injection well replenishment) to prevent seawater intrusion and its deleterious effects on the Seaside Basin.

Surface Water Quality

Water quality is primarily a function of land uses in a project area. Pollutants and sediments are transported via runoff from the watershed into surface water features, such as streams, rivers, storm drains, and reservoirs. Local land uses influence the quality of the surface water through point source discharges (i.e., discrete discharges such as an outfall) and nonpoint source discharges (e.g., storm runoff). Land uses in the action area include industrial, agricultural, rural, and urban. Some of the water bodies are designated as impaired for pollutants such as pathogens, pesticides, and nutrients (please refer to **Section 3.10.3, Regulatory Setting**, for more details). Data from local monitoring programs are used to discuss water quality in the project area for the pertinent watersheds and water bodies.

Surface water quality of drainage channels within the base varies with the seasons. During the first strong rains of the season, ditches and storm drainage systems draining the urban areas of the base receive the highest concentration of urban pollutants, such as oils, grease, heavy metals, pesticide residues, and coliform bacteria. Winter storms also contribute to erosion and gullying in some areas, particularly the drainage of the eastern half of the base. Surface erosion can cause high concentrations of suspended sediment loading in streams causing increased siltation, turbidity, and accompanying high total dissolved solids.

The pollutants in the Salinas River watershed include unionized ammonia, low dissolved oxygen, nitrate, and pesticides. The water quality monitoring efforts of the Elkhorn Slough National Estuarine Research Reserve from 1988 to 1996 reported extraordinarily high nitrate concentrations in the lower Salinas River (Caffrey et al., 1997). Pesticides and priority organics were also found at high levels in the Salinas River watershed. The Central Coast Watershed Studies program monitored the lower Salinas watershed before and during a storm event in March 2003 and found Dichloro-Diphenyl-Trichloroethane (DDT[1]) and dieldrin (Kozlowski et al., 2004).

Numerous legacy pesticides[2] and currently used contaminants, such as dieldrin, DDTs, pesticides, polynuclear aromatic hydrocarbons (PAHs), PCBs, and bacteria, are found in Monterey Bay. The largest

[1] DDT is a synthetic pesticide banned in the US in 1972.

[2] Legacy pesticides are pesticides that are no longer registered for use.

sources of the contaminants are agricultural runoff into the San Lorenzo, Pajaro, Salinas, and Carmel Rivers. Seasonal data, collected by the Central Coast Long-term Environmental Assessment Network (CCLEAN), demonstrate that most of the contaminants wash into Monterey Bay during the wet season when the river flows are the greatest (CCLEAN, 2018). Nearshore waters of Monterey Bay exceeded the California Ocean Plan (please refer to Section 3.10.3 *Regulatory Framework*, for more details) standards for PCBs and have been listed as "impaired."

Groundwater Quality

Former industrial, commercial, and military activities in the region have resulted in soil and groundwater contamination from spills, leaking underground tanks, unlined chemical disposal sites, and inadvertent disposal of chemicals. In particular, groundwater in the shallow or A-Aquifer located beneath the former Fort Ord military base is contaminated with volatile organic compounds, mostly Trichloroethylene and carbon tetrachloride. Please refer to **Section 3.9, Hazards and Hazardous Materials**, for more information on groundwater contamination. The groundwater quality discussion below provides a general overview of the water quality issues that apply to the SVGB and Seaside Basin.

SVGB Water Quality

In general, groundwater quality in the SVGB is influenced by a number of factors including natural geochemical properties and flow within the different hydrogeologic formations, groundwater pumping and induced seawater intrusion, land use practices, and accidental releases of contaminants into the environment. For specific information regarding areas with contaminated soil and shallow groundwater, see **Section 3.9, Hazards and Hazardous Materials**. Historically, the groundwater basin has two major issues with groundwater quality for drinking water resources: seawater intrusion and nitrate contamination.

Seawater Intrusion

Extensive groundwater production in the Salinas Valley has resulted in overdraft conditions in the basin and induced seawater intrusion within the 180-Foot and 400-Foot Aquifers. Seawater intrusion in the Salinas Valley is typically inferred from chloride concentrations detected in groundwater monitoring and production wells, where concentrations that are greater than 500 milligrams per liter (mg/L) indicate seawater intrusion because these concentrations limit the use of the water supply for crop irrigation, and they were above the previously established California Safe Drinking Water Act, Secondary Drinking Water Standards for drinking water (Monterey County Water Resources Agency [MCWRA], 2006). This drinking water standard was lowered to 250 mg/L in 2006.

The seawater intrusion has resulted in the degradation of groundwater supplies, requiring numerous urban and agricultural supply wells to be abandoned or destroyed. Seawater intrusion in the SVGB was first documented in 1946 when the State Department of Public Works (now known as Department of Water Resources) published Bulletin 52: Salinas Basin Investigation. In the 1990s, MCWRA constructed the Salinas Valley Reclamation Plant and the Castroville Seawater Intrusion project. Since 1998, 12,000 acres of agriculture have been supplied with recycled water for crop irrigation, reducing the use of groundwater. In 2008, the Salinas River Diversion Facility was added to the project, further reducing the use of groundwater for irrigation. This project has slowed but not reversed the seawater intrusion. The current estimates of seawater intrusion within the 180-Foot and 400-Foot Aquifers indicate that seawater had intruded approximately 8 miles and 3.5 miles inland, respectively, as of 2015, inferred from chloride concentrations greater than 500 milligrams per liter.

Additionally, both the SVGB and Seaside Basin are hydrologically connected to the ocean, thus providing a constant source of seawater recharge. Because groundwater elevations along the coast and directly

inland have been at or below sea level in both groundwater basins, a landward groundwater gradient has developed and induced groundwater recharge from the ocean. The consequence of the overdraft conditions has led to degradation of groundwater quality along the coast within the SVGB, and concerns of potential future groundwater degradation within the Seaside Basin.

Nitrate Contamination

Nitrate contamination in the Salinas Valley was first documented in a report published by AMBAG in 1978. The SWRCB has twice documented that nitrate levels in the SVGB have impaired the beneficial use of the SVGB as a drinking water supply. In response to the identification of nitrate contamination, the Nitrate Technical Advisory Committee (NTAC) was formed by the MCWRA to examine nitrate in the SVGB and recommend a course of action, and as a result, MCWRA has prepared a nitrate management plan that is currently under implementation.

Other Chemicals of Concern

As part of a U.S. Geological Survey (USGS) Study (Kulongoski and Belitz, 2007), groundwater samples were analyzed for VOCs, pesticides, pesticide degradation products, nutrients, major and minor ions, trace elements, radioactivity, microbial indicators, dissolved noble gases, and various naturally occurring isotopes. The results of the USGS Study are used to characterize the quality of untreated groundwater resources within the action area and provide insight to the overall trends in groundwater quality. In general, analytical results indicate that raw groundwater quality is of good quality with respect to the compounds analyzed in the study; however, elevated concentrations of hexavalent chromium were reported as exceeding the detection level reporting threshold of 1 microgram per liter (µg/L) in the groundwater quality data summary (Kulongoski and Belitz, 2007).

Seaside Basin Water Quality

Seawater Intrusion

The Seaside Groundwater Basin 2018 Seawater Intrusion Analysis Report, prepared by Montgomery and Associates for the Seaside Basin Watermaster, November 2018 (Montgomery and Associates, 2018), addressed the potential for, and extent of, seawater intrusion in the Seaside Basin. Continued pumping in excess of recharge and fresh water inflows, pumping depressions near the coast, and ongoing seawater intrusion in the nearby Salinas Valley all suggest that seawater intrusion could occur in the Seaside Basin. Fortunately, no seawater intrusion was observed in existing monitoring wells. The Annual Report recommended continued monitoring and tracking of potential seawater intrusion.

3.10.3 Regulatory Framework

Federal and State

FEMA and the National Flood Insurance Program

FEMA is tasked with responding to, planning for, recovering from, and mitigating against disasters. FEMA is responsible for determining flood elevations and floodplain boundaries based on USACE and approved agencies' studies; for coordinating the federal response to floods, earthquakes, hurricanes, and other natural or man-made disasters; and for providing disaster assistance to states, communities and individuals. FEMA prepares and distributes the FIRMs, which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of special flood hazard areas, including the 100-year flood zone.

Previously, a portion of the project site was found to be within the 100-year flood zone with an elevation of 304 feet. The hydrologic study prepared for Phase 1 of the CCCVC found that this elevation was an

error. The Phase 1 IS/EA included a mitigation (Mitigation H-1) which required the project proponent to work with the City of Seaside to revise the FEMA FIRM based on the findings of the hydrologic study. As a result, in 2017, FEMA issued a LOMR to officially modify the existing FIRM. The new FIRM designates the subject portion of the project site as within Flood Hazard Zone AH with a flood elevation of 286.1. The most up to date FIRM for the project site is provided in **Figure 3.10-2 Flood Insurance Rate Map**. In order to accommodate new development, Phase 2 includes modifications to the drainage basin. These modifications would include increasing the size and depth of the drainage basin, which would lower the 100-year flood elevation to 283 feet.

The Flood Insurance and Mitigation Administration (FIMA), a component of FEMA, manages the NFIP. The NFIP consist of three components: flood insurance; floodplain management; and flood hazard mapping. Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary. In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP also identifies and maps the nation's floodplains.

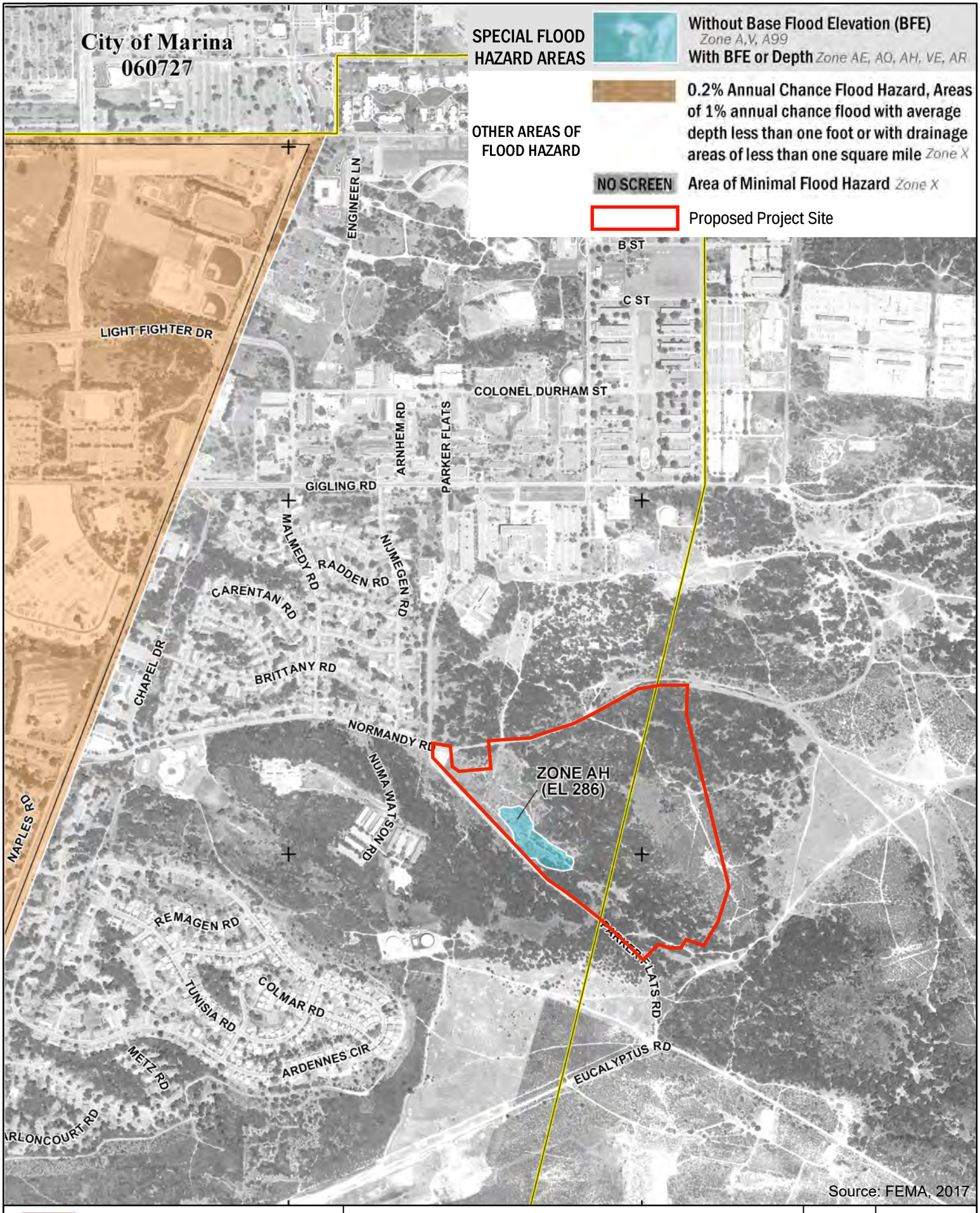
Clean Water Act

The CWA establishes the basic structure for regulating discharges of pollutants into Waters of the U.S. and regulating quality standards for surface waters. Its goals are to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under the CWA, the U.S. EPA has implemented pollution control programs and established water quality standards. The NPDES permit program under section 402 of the CWA and enabling regulations controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The U.S. EPA has delegated authority of issuing NPDES permits in California to the State Board, which has nine RWQCBs. The Central Coast RWQCB regulates water quality in the project area. The NPDES permit program is further described below.

The USACE and U.S. EPA regulate discharge of dredged and fill material into waters of the U.S. under Section 404 of the CWA and its implementing regulations. Waters of the U.S. are defined broadly as waters susceptible to use in commerce (including waters subject to tides, interstate waters, and interstate wetlands) and other waters (such as interstate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds) (33 CFR 328.3, 40 CFR 230.3(s)(1), 40 CFR 122.2). For regulatory purposes under the CWA, the term "wetlands" mean those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils conditions. Wetlands generally include swamps, marshes, bogs and similar areas (see 40 CFR 230.3(t)).

Section 401 of the CWA requires that, prior to the issuance of a federal license or permit for an activity or activities that may result in a discharge of pollutants into navigable waters, the permit applicant must first obtain a certification from the state in which the discharge would originate. A state certification indicates that the proposed activity or activities would not result in a violation of applicable water quality standards established by federal or state law, or that no water quality standards apply to the proposed activity.

Section 401 Water Quality Certifications are issued by the RWQCB to protect water quality and the beneficial uses of water from projects that may result in discharges of dredge and fill. The RWQCB only issues Section 401 Water Quality Certifications for projects that may discharge dredge of fill to waterbodies that are under the jurisdiction of the USACE. The RWQCB may issue other waste discharge



Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Flood Insurance Rate Map	N	Date 03-19-2019 / Figure 3.10-2

requirements (permits) for discharges of dredge or fill to waterbodies not under the jurisdiction of the USACE, but that are Waters of the State as defined by Porter-Cologne.

Water bodies that may not be covered under USACE jurisdiction may require a Section 401 Water Quality Certification for impact on waters of the state. Placement of structures, fill, or dredged materials into Waters of the State requires Section 401 Water Quality Certification. Activities that require a federal Section 404 permit also require a Section 401 Water Quality Certification. The RWQCB issues Section 401 Water Quality Certifications and waivers.

National Pollution Discharge Elimination System Waste Discharge System

In California, the NPDES program is administered by the State Board through the RWQCBs and requires point sources to obtain NPDES permits (also called WDRs, in California). Point sources include municipal and industrial wastewater facilities and stormwater. There are two types of NPDES permits: individual permits tailored to an individual facility and general permits that cover multiple facilities within a specific category. Effluent limitations serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. When developing effluent limitations for an NPDES permit, a permit writer must consider limits based on both the technology available to control the pollutants (i.e., technology-based effluent limits) and limits that are protective of the water quality standards of the receiving water (i.e., water quality-based effluent limits if technology-based limits are not sufficient to protect the water body. For inland surface waters and enclosed bays and estuaries, the water-quality-based effluent limitations are based on criteria in the National Toxics Rule and the California Toxics Rule, and objectives and beneficial uses in the Basin Plan (RWQCB/SWRCB/CalEPA, 2017). For ocean discharges, the Ocean Plan contains beneficial uses, water quality objectives, and effluent limitations.

National Pollution Discharge Elimination System Construction General Permit

Construction activities on one acre or more or that disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Construction Permit (SWRCB Order No. 2009-09-DWQ; Modified 2010-0014-DWQ). The State Board established the General Construction Permit program to reduce surface water impacts from construction activities. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation.

The Construction General Permit requires the development and implementation of a SWPPP. The General Construction Permit requires the preparation and implementation of a SWPPP for construction activities. The SWPPP must be prepared before the construction begins. The SWPPP must include specifications for BMPs that would need to be implemented during construction. BMPs are measures that are undertaken to control degradation of surface water by preventing soil erosion or the discharge of pollutants from the construction area. Additionally, the SWPPP must describe measures to prevent or control runoff after construction is complete and identify the procedures for inspecting and maintaining facilities and other project elements. The required elements of a SWPPP include:

- Site description addressing the elements and characteristics specific to the site;
- Descriptions of BMPs for erosion and sediment controls;
- BMPs for construction waste handling and disposal;
- Implementation of approved local plans;
- Proposed post-construction controls; and
- Non-stormwater management.

Examples of typical construction BMPs include scheduling or limiting activities to certain times of year, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing, and fueling. The RWQCB has identified BMPs in the *Construction Best Management Practice Online Handbook* (California Stormwater Quality Association, 2015) to effectively reduce degradation of surface waters to an acceptable level.

NPDES General Permit for Discharges with Low Threat to Water Quality

Construction in areas with shallow groundwater or that are located adjacent to surface water bodies could require dewatering to create a dry area. Discharges of non-stormwater from a trench or excavation that contains sediments or other pollutants to sanitary sewer, storm drain systems, creek beds (even if dry), or receiving waters is prohibited. However, discharges of dewatering effluent are conditionally exempt. The RWQCB requires that the dewatering effluent be tested for possible pollutants; the analytical constituents for these tests are generally determined based on the source of the water, the land use history of the construction site, and the potential for the effluent to impact the quality of the receiving water body.

The *Waste Discharge Requirements and NPDES General Permit for Discharges with Low Threat to Water Quality (Order No. R3-2011-0223, NPDES No. CAG993001, amended)* (RWQCB, 2011) applies to low-threat discharges, which are defined as discharges containing minimal amounts of pollutants and posing little or no threat to water quality and the environment. Discharges that meet the following criteria are covered under this permit:

a. Pollutant concentrations in the discharge do not: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable water quality objectives, including prohibitions of discharge;

b. The discharge does not include water added for the purpose of diluting pollutant concentrations;

c. Pollutant concentrations in the discharge will not cause or contribute to degradation of water quality or impair beneficial uses of receiving waters;

d. Pollutant concentrations in the discharge do not exceed the limits in the permit unless the Executive Officer determines that the applicable water quality control plan (i.e., Ocean Plan and/or State Implementation Policy) does not require effluent limits;

e. The discharge does not cause acute or chronic toxicity in receiving waters; and

f. The discharger demonstrates the ability to comply with the requirements of this General Permit.

For discharges from construction sites smaller than one acre that are part of a larger common plan of development or that may cause significant water quality impacts, the discharge may require coverage under the construction stormwater permit or an individual NPDES permit.

Nonpoint Source Pollution Control Program

In accordance with Section 319 of the CWA and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, the SWRCB and California Coastal Commission jointly submitted the Plan for California's Nonpoint Source Pollution Control Program to the U.S. EPA and National Oceanic and Atmospheric Administration on February 4, 2000. California's Nonpoint Source Pollution Control Program

provides a single unified, coordinated statewide approach to address nonpoint source pollution. The proposed project is not located within the coastal zone, and therefore this regulation is not applicable.

NPDES Municipal Stormwater Permit

The NPDES General Permit for WDRs for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) (Order No. 2013-001-DWQ, NPDES No. CAS000004) regulates stormwater discharges from small MS4s into waters of the U.S. (State Board, 2013). An "MS4" is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) designed or used for collecting or conveying stormwater; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works as defined at Title 40 of the Code of Federal Regulations Section 122.2.

The Phase II Municipal General Permit requires regulated small MS4s to develop and implement BMPs, measurable goals, and timetables for implementation, designed to reduce the discharge of pollutants to the maximum extent practicable and to protect water quality.[3] The permittees under the small MS4 (Phase II) General Permit[4] in the project area include Monterey County and cities therein. Each permittee is required to prepare and implement a stormwater management plan (SWMP) and regulate stormwater runoff from development and redevelopment projects through post-construction stormwater management requirements. Under the City's NPDES Phase II Storm Water permit for small MS4s, Post-Construction Stormwater Management standards are required for any project within the City. In order to acquire a NPDES permit, the proposed project would need to develop a SWPPP and comply with Resolution No. R3-2013-0032, Attachment 1, Post Construction Performance Requirements 1 through 4.

A Memorandum of Agreement for the Monterey Regional Stormwater Pollution Prevention Program was prepared and executed by M1 Water and by the entities in the southern Monterey Bay area (Monterey County and cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside) to form the Monterey Regional Stormwater Management Program (MRSWMP). M1 Water acts as the administrative agent for the MRSWMP. The purpose of the MRSWMP is to implement and enforce a series of BMPs to reduce the discharge of pollutants from the MS4s to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. The Phase II Program contains six Minimum Control Measures:

- Public Education and Outreach;
- Public Participation/Involvement;
- Illicit Discharge Detection and Elimination;
- Construction Site Runoff Control;
- Post-Construction Runoff Control; and
- Pollution Prevention/Good Housekeeping.

The MRSWMP lists BMPs and associated Measurable Goals for the six Minimum Control Measures. The Measurable Goals must include, as appropriate, the months and years for scheduled actions, including interim milestones and frequency of the action. It is through the implementation and evaluation of these

[3] Phase I stormwater permits provide permit coverage for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities.

[4] Phase II stormwater permits provide permit coverage for smaller municipalities (populations less than 100,000), including non-traditional Small MS4s, which are facilities such as military bases, public campuses, prisons, and hospital complexes.

BMPs and Measurable Goals that the permittees ensure that the objectives of the Phase II NPDES Program are met.

The Model Urban Runoff Program—a water quality program under the Statewide Nonpoint Source program—is a comprehensive guide developed for the local agencies to address polluted runoff in the urban environment. The Model Urban Runoff Program provides options to help small municipalities develop individual urban runoff programs. Each member or permittee is responsible for complying with the NPDES permit conditions. The local municipalities would require the proposed project to comply with the stormwater control requirements in their individual jurisdictions under the MS4 permit and require implementation of erosion and stormwater control measures to reduce any long term runoff effects from the facilities.

In July 2013, the RWQCB adopted Resolution No. R3-2013-0032 c, which prescribes new Post-Construction Requirements for projects that create or replace 2,500 square feet or more of impervious area and receive their first discretionary approval for design elements after March 6, 2014. **Table 3.10.1** summarizes the new post-construction requirements for different categories of projects, which would include the proposed project components.

Table 3.10-1. Overview of Post-Construction Requirements for Stormwater Management

Project Categories	Performance Requirements
Tier 1 Projects Projects that create or replace 2,500 square feet or more of impervious surface.	**Implement One or More Low Impact Design (LID) Measures:** Limit disturbance of natural drainage features. Limit clearing, grading, and soil compaction. Minimize impervious surfaces. Minimize runoff by dispersing runoff to landscape or using permeable pavements.
Tier 2 Projects Projects that create or replace 5,000 square feet or more net impervious surface.	**Tier 1 requirements, plus treat site runoff:** Treat runoff generated by the 85th percentile 24-hour storm event with an approved and appropriately sized LID treatment system prior to discharge from the site.
Tier 3 Projects Projects that create or replace 15,000 square feet or more of impervious surface.	**Tier 2 requirements, plus:** Prevent offsite discharge from events up to the 95th percentile rainfall event using Stormwater Control Measures.
Tier 4 Projects Projects that create or replace 22,500 square feet of impervious surface.	**Tier 3 requirements, plus:** Control peak flows to not exceed pre-project flows for the 2-year through 10-year events.
SOURCE: MRSWMP, 2014.	

Porter-Cologne Water Quality Control Act

Porter-Cologne (Division 7 of the California Water Code) is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. Porter-Cologne applies to surface waters, wetlands, and groundwater, and to both point and nonpoint sources of pollution.

Porter-Cologne defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. Porter-Cologne allows the State Board to adopt statewide water quality control plans (or "basin plans"), which serve as the legal, technical, and programmatic basis of water quality regulation for a region. The act also authorizes the NPDES program under the CWA, which establishes effluent limitations and water quality requirements for discharges to waters of the state.

The term "Waters of the State" is defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state." The RWQCB protects all waters in its regulatory scope but has special responsibility for wetlands, riparian areas, and headwaters, including isolated wetlands, and waters that may not be regulated by the USACE under Section 404 of the CWA. Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program, which regulates discharges of fill and dredged material under Section 401 of the CWA and Porter-Cologne.

Water Quality Control Plan

The RWQCB, State Board, and CalEPA updated the Basin Plan in 2017. It is intended to provide guidance on how the quality of the surface water and groundwater in the Central Coast Region should be managed to provide the highest water quality reasonably possible. The Basin Plan serves as a guidance document to the Water Board when reviewing and authorizing projects under their Section 401 authority. The RWQCB establishes beneficial uses of surface and groundwater resources, as contained in its Water Quality Control Plan for the Central Coast.

Anti-degradation Policies

California's anti-degradation policies are found in Resolution 68-16, Policy with Respect to Maintaining Higher Quality Waters in California, and Resolution 88-63, Sources of Drinking Water Policy.[5] These resolutions are binding on all State agencies. They apply to both surface waters and groundwaters, protect both existing and potential beneficial uses of surface water and groundwater, and are incorporated into RWQCB Basin Plan.

City of Seaside General Plan

The Conservation/Open Space Element of the City of Seaside General Plan includes the following provisions:

- Goal COS-3: Protect and enhance local and regional ground and surface water resources.
    - Policy COS-3.2: Work with all local, regional, State, and federal agencies to implement mandated water quality programs and regulations to improve surface water quality.
        - Implementation Plan COS-3.2.1 NPDES Requirements. To reduce pollutants in urban runoff, require new development projects and substantial rehabilitation projects to incorporate BMPs pursuant to the NPDES permit to ensure that the City complies with applicable state and federal regulations.
        - Implementation Plan COS-3.2.2 Adequate Drainage Systems. Apply appropriate development standards and fees to improve present drainage systems and provide adequate stormwater detention basins and sedimentation ponds with new construction. (See also Implementation Plan LU-8.2.1.)

City of Seaside Stormwater Permit

In order to reduce potential impacts of stormwater on the environment, the City of Seaside holds a NPDES Permit. As stated, the City participates in a joint regional permit (Monterey Regional Storm Water Permit), which must comply with certain requirements, including:

- Encourage low impact development;

[5] See http://www.swrcb.ca.gov/plans_policies/.

- Maintain good housekeeping practices such as sweep city streets according to the schedule;
- Providing community education about storm drain pollution and ways to reduce or prevent it;
- Training City employees to reduce or prevent storm drain pollution from City activities;
- Conducting educational site visits to business targeted as potential sources of polluted runoff;
- Conduct inspections of construction sites to reduce polluted runoff.

Floodplain Management Plan

The Monterey County Floodplain Management Plan was first developed in 2002, and most recently updated in 2014, to identify the flooding sources affecting properties, and to establish an implementation plan to reduce flooding and flood related hazards, and to ensure the natural and beneficial functions of our floodplains are protected. This requires utilization of existing programs and resources, involving those public agencies responsible for regulating development in special flood hazard areas in the planning process, and ensuring that the policies and programs identified in the implementation plan are carried out. The 2014 Floodplain Management Plan update was prepared by the MCWRA under the supervision of the Monterey County Floodplain Administrator. Monterey County has been a voluntary participant in the Community Rating System since October 1, 1991. The 2014 Floodplain Management Plan identified 109 Repetitive Loss Properties in Monterey County.

Monterey County Code

Chapter 16.08 of the Monterey County Code identifies rules and regulations to control all grading, including excavations, fills and embankments, and establishes the procedures for the issuances of grading permits. Chapter 16.08 is intended to minimize erosion as a result of ground disturbing activities.

Chapter 16.12 (Erosion Control) of the Monterey County Code sets forth required provisions for project planning, preparation of erosion control plans, runoff control, land clearing, and winter operations; and establishes procedures for administering those provisions. The code requires that specific design considerations be incorporated into projects to reduce the potential of erosion and that an erosion control plan be approved by the County prior to initiation of grading activities.

Chapter 16.16 of the Monterey County Code identifies rules and regulations to control development within the floodplain. Chapter 16.16 is intended to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions. Chapter 16.16 consists of regulations to: 1) restrict and/or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities; 2) require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; 3) control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters; 4) control filling, grading, dredging, and other development which may increase flood damage; and 5) prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Fort Ord Reuse Plan

The Reuse Plan provides a framework for reuse of the former Army base. The Reuse Plan identifies objectives and policies to transform the former base into an integrated community, including those pertaining to hydrology and water quality. The Reuse Plan identifies the following relevant objectives and policies concerning hydrology and water quality for the City of Seaside:

- Objective A: Protect and preserve watersheds and recharge areas, particularly those critical for the replenishment of aquifers.
    - Hydrology and Water Quality Policy A-1: At the project approval stage, the City shall require new development to demonstrate that all measures will be taken to ensure that runoff is minimized and infiltration maximized in groundwater recharge areas.
- Objective B: Eliminate long-term groundwater overdrafting as soon as practicably possible.
    - Hydrology and Water Quality Policy B-1: The City shall ensure additional water to critically deficient areas.
    - Hydrology and Water Quality Policy B-2: The City shall condition approval of development plans on verification of an assured long-term water supply for the projects.
- Objective C: Control nonpoint and point water pollution sources to protect the adopted beneficial uses of water.
    - Hydrology and Water Quality Policy C-1: The City shall comply with all mandated water quality programs and establish local water quality programs as needed.
    - Hydrology and Water Quality Policy C-2: At the project approval stage, the City shall require new development to demonstrate that all measures will be taken to ensure that on-site drainage systems are designed to capture and filter out urban pollution.
    - Hydrology and Water Quality Policy C-3: The MCWRA and the City shall cooperate with MCWRA and Monterey Peninsula Water Management District (MPWMD) to mitigate further seawater intrusion based on Salinas Valley Basin Management Plan.
    - Hydrology and Water Quality Policy C-4: The City shall prevent siltation of waterways, to the extent feasible.
    - Hydrology and Water Quality Policy C-5: The City shall support all actions necessary to ensure that sewage treatment facilities operate in compliance with waste discharge requirements adopted by the California Regional Water Quality Control Board.
    - Hydrology and Water Quality Policy C-6: In support of Monterey Bay's national marine sanctuary designation, the City shall support all actions required to ensure that the bay and intertidal environment will not be adversely affected, even if such actions would exceed state and federal water quality requirements.
    - Hydrology and Water Quality Policy C-7: The City shall condition all development plans on verification of adequate wastewater treatment capacity.

Fort Ord Reuse Authority Storm Water Master Plan

The Fort Ord Reuse Authority Storm Water Master Plan (FORA SWMP) provides guidelines for implementing the Reuse Plan's stormwater component (FORA, 2005). According to the FORA SWMP, since most of the FORA area overlies well-drained, highly permeable sandy soils, infiltration basins or subsurface infiltration systems would be the effective stormwater disposal methods. The basic criterion in developing the FORA SWMP is that all stormwater originating within a political jurisdiction is infiltrated within that jurisdiction. The preferred method of infiltrating storm runoff from streets is through

subsurface infiltration systems. Recommendations are also made for locating infiltration basins for street and other runoff.

Monterey Peninsula Water Management District

The MPWMD was formed on June 6, 1978, under the enabling legislation found in West's California Water Code, Appendix Chapters 118-1 to 118-901. The legislative functions of the MPWMD include:

- Augmenting the water supply through integrated management of surface and ground water resources;
- Promoting water conservation (includes rationing, if needed);
- Promoting water reuse and reclamation of storm and waste water; and
- Fostering the environmental quality, native vegetation, fish and wildlife, scenic values and recreation on the Monterey Peninsula and in the Carmel River basin.

3.10.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would:

a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

   i. result in substantial erosion or siltation on- or off-site;

   ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

   iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

   iv. impede or redirect flood flows.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Impact Analysis Overview

Approach to Analysis

Construction

Construction of the proposed project and alternatives could impact local hydrology and water quality. The hydrology and water quality analysis evaluates whether construction activities would have the potential to degrade existing water quality, increase erosion, modify existing drainage patterns, exceed capacities of existing drainage facilities, deplete groundwater supplies, or interfere with recharge.

The analyses related to criteria "a," "b", "c," and "e" are based on existing site conditions, applicable water quality requirements of relevant regulatory programs, including required permits and local ordinances. Regional data, plans, reports, and maps were reviewed to identify surface water resources that could be directly or indirectly affected by the construction of proposed project and alternatives. The impact analysis describes if, and to what degree, construction would change the existing water hydrology and water quality conditions described in **Section 3.10.2,** and how the proposed project and alternatives would comply with or exceed any regulatory requirements described in **Section 3.10.3**. The significance of an impact is determined using the criteria identified above.

During construction, the proposed project and alternatives would use water for soil compaction and dust control. The amount of water use is quantified and the sources of construction water are provided to determine if this use would adversely affect groundwater levels. At the project site, there would be new impervious surfaces constructed that may potentially change local recharge characteristics at each site. In particular, the impact analysis includes a description of how rainfall runoff from new impervious areas is allowed to flow to adjacent pervious areas to recharge the groundwater basins underlying the project site.

Operation

Operational or long-term impacts on surface water bodies relative to drainage quantities and water quality may occur. The impact analysis describes if, and to what degree, operations would change the existing hydrology, water quality, and flooding conditions described in **Section 3.10.2** and how the proposed project and alternatives would comply with or exceed any regulatory requirements described in **Section 3.10.3**. This section also analyzes whether proposed project and alternatives may result in a significant impact related to depleting groundwater supplies or interfering substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The significance of an impact is determined using the criteria identified above.

Areas of No Impact

Criterion "d" is not evaluated for construction-related impacts because the temporary construction activities would not result in substantial risks related to any types of flooding or inundation. Construction crews and equipment would demobilize in the unlikely event of one of these conditions occurring during the short-term construction periods of the proposed project and alternatives. This criterion is not discussed further as construction impacts.

Summary of Impacts

Table 3.10-2 provides a summary of potential impacts to hydrology and water quality from the proposed project and alternatives.

Table 3.10-2. Summary of Impacts – Hydrology and Water Quality

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact HYD-1: Impact water quality due to earthmoving or alteration of drainage patterns.	LS	LS	LS	LS	NI
Impact HYD-2: Result in groundwater depletion or interfere substantially with recharge.	LS	LS	LS	LS	NI
Impact HYD-3: Risks due to location within a 100-year flood hazard area.	LSM	LSM	LSM	LSM	LSM
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact HYD-1: Impact water quality due to earthmoving or alteration of drainage patterns. (Criteria a, c, and e)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction would not alter any drainage pattern or features since there are no waterways on or nearby the site. The proposed project would require grading and paving on-site to accommodate the proposed burial facilities and associated infrastructure. Construction of the proposed project would involve grading and vegetation removal that could cause erosion impacts. Each phase of the 2015 Master Plan would be required to comply with their NPDES permit, including the preparation of a SWPPP. The proposed project would also comply with City and County stormwater, drainage, and flood control policies. A SWPPP would list BMPs to prevent construction pollutants and products from violating water quality standards or waste discharge requirements. These on-site BMPs would reduce stormwater erosion before it discharges into the drainage basin located on-site. As a result, the proposed project would not violate any water quality standards or waste discharge requirements.

The 2015 Master Plan seeks to maintain existing discharge levels during the development process and to ultimately retain and percolate all storm water on-site, utilizing the drainage basin on-site and additional bio-swales. The drainage basin as currently sized would not accommodate the full build-out of the 2015 Master Plan, and expansion would be required in future phases, including Phase 2.

During operation and maintenance, stormwater runoff emanating from developed areas of the proposed project would be conveyed to a constructed storage and infiltration basin sized to capture the 100-year 24-hour storm. The proposed project would utilize and improve the on-site retention basin on the western side of the property where stormwater currently collects during flooding or heavy rainfall events. While on-site grading would alter runoff direction locally, modifying and using the existing retention basin as the main drainage facility allows the proposed design to mimic overall regional existing drainage patterns.

Phase 2 would increase the amount of impervious area within the site to three percent, an increase from 2.9 percent in the existing Phase 1 development. However, Phase 2 is designed to capture any runoff, as required by the approving agencies, and direct it to the on-site retention and infiltration basin where the porous soils would facilitate recharge. Increases in discharge are minimal and on-site drainage facilities would be designed to prevent flooding on- and off-site according to local drainage criteria. All stormwater produced on-site would be piped to the retention basin and retained with no stormwater being released off-site. Applicable BMPs from the SWPPP implemented during construction would be incorporated after completion of Phase 2 to prevent future erosion and siltation. Future phases of the 2015 Master Plan are anticipated to be similar to Phase 2.

Implementation of proper long-term erosion and sediment control BMPs would minimize potential erosion or siltation on- or off-site during construction and operation of the proposed project. Periodic maintenance cleaning of the retention basin would be required to maintain percolation capacity. Impacts to drainage patterns on- or off-site are less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to the 2015 Master Plan as described above. The area of temporary construction impacts would be lessened, thereby reducing the amount of grading needed. Adherence to the SWPPP and other applicable water quality regulations would lessen water quality impacts. All drainage from the site would be directed to the on-site retention basin. A reduced area would be developed and less vegetation cover would be removed. The overall level of impact would be reduced compared to the proposed project; therefore, this represents a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a slightly greater impact than Phase 2 under the proposed project, as described above. Although the area of temporary construction would be increased, this alternative would be required adhere to the SWPPP and other applicable water quality regulations, which would lessen water quality impacts. All drainage from the site would be directed to the on-site retention basin. This represents a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact HYD-2: Result in groundwater depletion or interfere substantially with recharge. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Minimal amounts of water may be used during construction of Phase 2 and each subsequent phase of the 2015 Master Plan for dust control, soil compaction, and equipment maintenance. During operation, a landscaping plan would be implemented that includes temporary irrigation. The water supply would be provided by MCWD. The MCWD sources their groundwater from the SVGB. This water use would be minimal and temporary in nature.

The proposed project would also create additional impervious surfaces at the project site, which would limit groundwater recharge. However, all runoff from the site will be designed to flow to the on-site retention basin, where it will be disposed of via infiltration and evaporation. The infiltration would improve water quality and contribute to groundwater recharge.

The planting design for the 2015 Master Plan employs primarily California coastal native plants as well some adapted non-invasive trees, shrubs, groundcovers, and perennials that require no irrigation once established. These plants reflect the character of Seaside and the surrounding region of Monterey County and meet the necessary demand of low water usage. The Cemetery has a minimal water allocation that will not support the traditional lawns of most cemeteries. The landscaping is designed to maximize the diversity of plant species and to provide year-round interest and season variation. Water use for irrigation would be temporary after each phase of development.

For the first two years of operation, Phase 2 would require approximately 4 afy of water for irrigation to establish landscaping. No water would be required for irrigation after plants have been established in the first two years. The project would not substantially affect groundwater recharge because it would not significantly increase impervious surfaces in the project area. The proposed project would be designed to capture any runoff and direct it to the on-site retention basin where the porous soils would facilitate recharge. Impacts to groundwater supplies or recharge would be less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

The location and design of this alternative would be generally the same as the proposed project. Therefore, impacts to groundwater are less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a slightly larger footprint that the proposed project. However, the location and design would generally be the same as the proposed project. This is a less-than-significant impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact HYD-3: Risks due to location within a 100-year flood hazard area. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

It is anticipated that the full build-out of the 2015 Master Plan would increase the impervious area of the project site to eight percent of the site, thereby increasing the amount of runoff from the site entering the retention basin. According to the Drainage Basin Design memo, the capacity of the retention basin would need to be 14 acre feet to accommodate the drainage needs of the full 2015 Master Plan build-out. The existing retention basin was converted from a natural depression during Phase 1 to serve as an earth borrow site and was not designed as a flood control basin for any specific event. Therefore, Phase 2 includes improvements to the retention basin to contain the 100-year flood volume from Phases 1 and 2 with a 100-year maximum water surface elevation of 283 feet. The improvements to the retention basin proposed during Phase 2 construction meet the drainage needs of development in Phase 1 and Phase 2, but not for build-out. Expansion of the retention basin in one or more future phases would be required to provide the full 14 acre feet of capacity. This is a potentially significant impact. Implementation of **Mitigation Measure HYD-1** below would reduce impacts associated with flood hazards to a less-than-significant level.

No new structures or housing would be located within the FEMA flood hazard zone, and the revised flood hazard zone would not add any existing structures to the floodplain. There are no structures that would impede or redirect flood flows. People or structures will not be at significant risk of loss. The proposed retention basin will be below grade, so there is no risk as a result of a dam or levee failure as a result of

the proposed project. Therefore, impacts to other potential flood hazards are less than significant. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have the same level of impact as the 2015 Master Plan described above. Additional modifications to the detention basin would be required to accommodate future phases subsequent to Phase 2. This is a potentially significant impact. Implementation of **Mitigation Measure HYD-1** below would reduce impacts associated with flood hazards to a less-than-significant level.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a higher impact than Phase 2 under the proposed project as described above. This is a potentially significant impact. An analysis consistent with the requirements of **Mitigation Measure HYD-1** below would reduce impacts associated with flood hazards to a less-than-significant level.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Because the existing retention basin was not designed as a flood control basin for any specific event, improvements would be required to accommodate the 100-year flood volume for Phase 1. An analysis consistent with the requirements of **Mitigation Measure HYD-1** below would reduce impacts associated with flood hazards to a less-than-significant level.

Mitigation Measure HYD-1: Drainage Basin Analysis

Prior to construction of Phase 3 and subsequent phases of the 2015 Master Plan, further analysis shall be completed by CalVet to confirm that the retention basin has the capacity to contain runoff from a 100-year storm event. If it is determined that the size of the retention basin is not adequate, design of that phase shall include modifications to the retention basin design to increase its capacity to the adequate size. In addition, the project proponent shall consult with the City of Seaside to submit a Letter of Map Revision (LOMR) request to FEMA to revise flood elevation included in FIRM Map #06053C0195H, based on the findings of the analysis.

3.11 LAND USE AND PLANNING

3.11.1 Introduction

This section analyzes potential impacts to land use that would result from implementation of the proposed project and alternatives. It describes the existing land uses within and in the vicinity of the proposed project site and the applicable plans, policies, and regulations that address land use. Potential impacts from construction and operation of the proposed project and alternatives are evaluated and analyzed to determine the potential for the proposed project to affect such resources through the displacement, disturbance, or direct conversion of these uses.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. Public and agency comments related to land use were received during the public scoping period, and are summarized below:

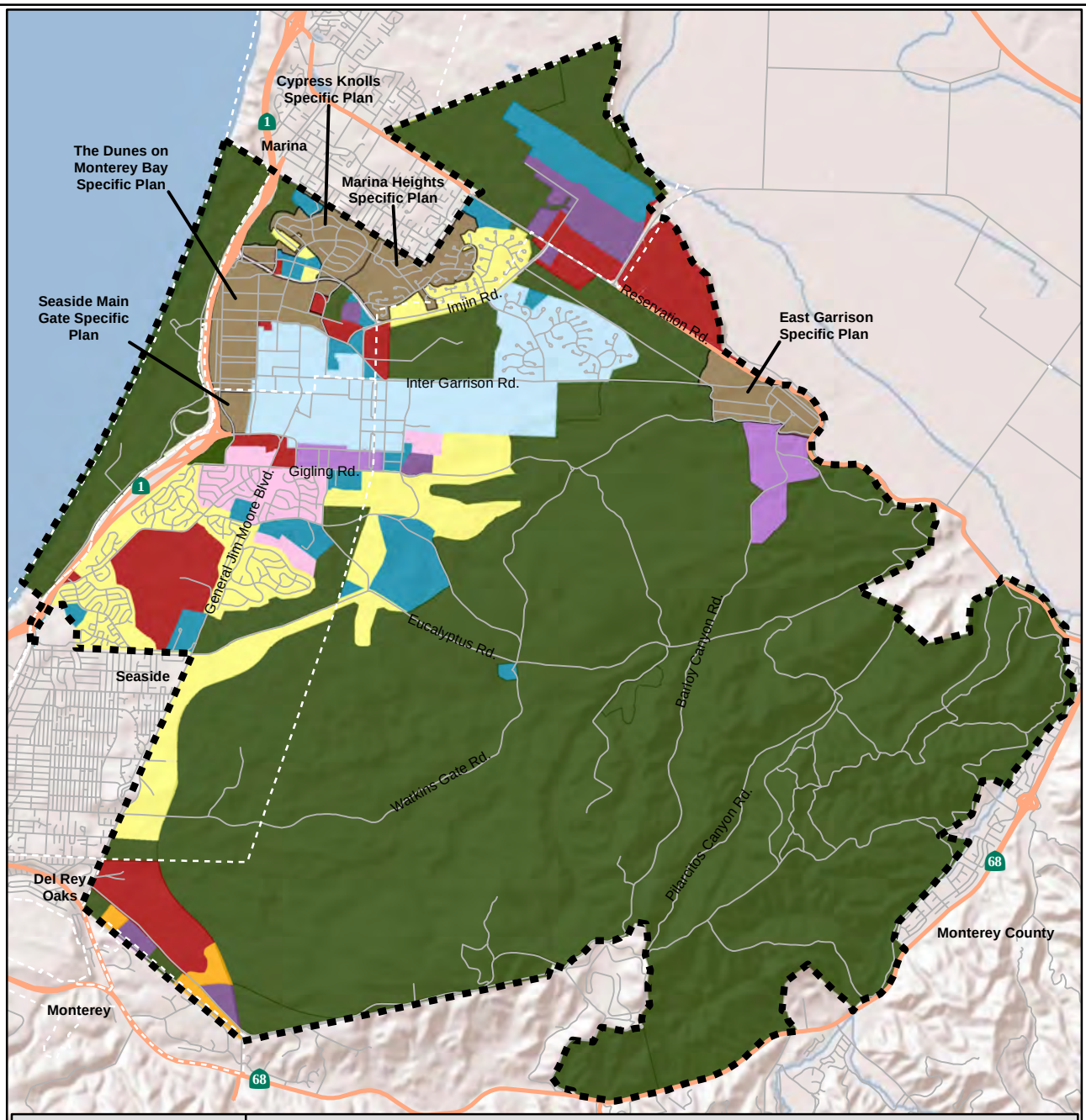
- Maintain consistency between Phase 2 plans and the Draft Fort Ord HCP.

The consistency of the proposed project and alternatives are discussed in **Section 3.4, Biological Resources**. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.11.2 Environmental Setting

The project site is located within the former Fort Ord in Monterey County, California, which is approximately 80 miles south of San Francisco and 42 miles southwest of San Jose (**Figure 1-1, General Location Map**). The project site is approximately 84.4 acres owned by the State of California. The Seaside/County boundary bisects the State's property with about 32 acres, including the Phase 2 site, within the City limits (**Figure 1-2, Project Vicinity Map**). The balance of the property is located within unincorporated County land. The project site occupies a portion of two parcels identified with the Monterey County APNs 031-052-002-000 and 031-152-005-000 (**Figure 1-3, Overall Boundary and Topography**). The Seaside portion of the project site is designated as Parks and Open Space (POS) by the Seaside General Plan and is zoned Open Space-Recreation (OSR) by City Zoning Code Title 17 (City, 2003). The portion of the site within the County is zoned Public/Quasi-Public (PQP-D-S) under Title 21 of the County Zoning Code; the County's Fort Ord Master Plan Land Use Plan designates the site as Single-Family Density Low Density Residential/Veterans Cemetery (County, 2010b) (**Figure 3.11-1**).

The project site is bound by Parker Flats Road to the north, Parker Flats Cut-Off to the west, and natural lands to the east (**Figure 1-3, Overall Boundary and Topography**). The land uses in the project vicinity include the City of Seaside to the west, CSUMB to the north, and the FONM to the east. The existing land uses surrounding the project site include residential to the northwest and undeveloped lands to the east, south, and west. Access to the project site is from Parker Flats Road located approximately 1.25 miles east of the Highway 1 and Lightfighter Drive exit (**Figure 1-2, Project Vicinity Map**).



Legend

- Former Fort Ord
- City Limits
- Highways
- Roads
- Specific Plans
- CSUMB
- Office/Professional (*1)
- Commercial (*2)
- Industrial (*3)
- Residential (*4)
- Open Space (*5)
- Public Facilities/Institutional (*6)
- Military (*7)
- Mixed Use (*8)

0 0.5 1 km

0 0.5 1 mi

N

*Notes

The land use classifications were obtained from applicable City and County General Plan maps for the former Fort Ord. As required pursuant to Chapter 8.0 of the FORA Master Resolution, all legislative land use decisions must be found consistent with the Fort Ord Base Reuse Plan. Land use data obtained from applicable general plans were used to produce this figure; all applicable land use data were reviewed for consistency with the Base Reuse Plan. For the purposes of clarity, jurisdiction-specific land use classifications were consolidated into a single classification system (e.g. commercial, residential, etc.). The following notes provide additional detail concerning the type of classifications used by each jurisdiction.

1) Office/Professional Includes:
City of Del Rey Oaks: Office-Professional

2) Commercial includes:
City of Marina: Commercial-Multiple Use, -Office/Research, -Retail/Professional Services, and -Visitor-Serving;
City of Del Rey Oaks: General Commercial - Visitor and Neighborhood Commercial;
City of Seaside: Community Commercial, Recreational Commercial, and Regional Commercial

3) Industrial includes:
City of Marina: Industrial - Light Industrial/Service Commercial
City of Monterey: Light Industrial/Office Park
County of Monterey: Business Park/Light Industrial Office/R&D

4) Residential includes:
City of Marina: Multi-Family Residential (15-35 dwelling units/acre), Single Family Residential (5 dwelling units/acre), and Village Homes (8 dwelling units/acre)
City of Seaside: High Density Residential and Low Density Single Family Residential
County of Monterey: SFD Low Density Residential

5) Open Space includes:
City of Marina: Open Space-Parks & Recreation, -UGP Open Space, and -Golf Course
City of Monterey: Park
City of Seaside: Park and Open Space
County of Monterey: Open Space Recreation and Habitat Management

6) Public Facilities includes:
City of Marina: Public Facilities-Education, -Education (Proposed), -Marina Municipal Airport, and -Other Public Facilities
City of Seaside: Public/Institutional
County of Monterey: Public Facility/Institutional and School/University

7) Military Includes:
City of Seaside: Military
County of Monterey: Military Enclave
City of Monterey: Office Park/Future Hwy 68

8) Mixed Use Includes:
City of Seaside: Mixed Use
County of Monterey: Planned Development Mixed Use District

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Land Use Map

N

Date 03-01-2019

Scale 1 in = 0.85 mi

Figure 3.11-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 4 - Habitat Map.mxd

3.11.3 Regulatory Framework

Regional/Local

Fort Ord Reuse Plan

The Reuse Plan, which was adopted in June 1997, governs the redevelopment of the former Fort Ord. The Reuse Plan assigns land use designations, as well as goals, policies, and objectives related to base reuse. The Reuse Plan identifies a range of land use categories, density standards, and permitted uses for land within the boundaries of the former Fort Ord. The Reuse Plan contains goals and objectives for the development of commercial, residential, institutional, and park/recreational uses within the former Fort Ord; these goals and objectives are based on key guiding principles, which include:

- creating a unique identity for the community around the educational institutions;
- reinforcing the natural landscape setting consistent with the character of the Peninsula;
- establishing a mixed use development pattern;
- providing diverse neighborhoods;
- encouraging sustainable practices; and
- providing regional design guidelines.

Since the Reuse Plan is the overarching planning document affecting the redevelopment of the former Fort Ord, a detailed discussion of the County and Seaside General Plans is not provided. The Fort Ord Master Plan Resolution, adopted in March 1997, requires cities and counties whose lands are within FORA's jurisdiction to bring their General Plan into conformance with the Reuse Plan, with the exception of properties transferred to the State (e.g., CSUMB and UC Campus Master Plans and State Parks General Plans are not subject to approval by FORA). State lands are considered sovereign entities and are not subject to the requirements of the Reuse Plan, although they are encouraged to maintain consistency with the Reuse Plan to the extent feasible.

Municipal and County Codes

In most situations, the State is not subject to local ordinances, and, therefore, is not required to obtain permits from the County or City. However, the State will comply with local ordinances when feasible. However, the former Fort Ord, including the project site, was used for training military personnel with equipment and munitions. These training activities left behind MEC, specifically UXO and DMM (please refer to **Section 3-9, Hazardous Materials and Hazards**). The site has been evaluated for the presence of UXO, including a geophysical survey and the site has been cleared for non-residential development (EMC and EDAW, 1997). Removal of hazardous materials at this location is not anticipated; however, UXO and DMM have been documented at the site. Therefore, grading and soil movement cannot occur within a Soils Management Plan area due to a deed restriction for all remediated parcels on the former Fort Ord, including the project site, and compliance with the ordinances by the City and County on digging and excavating on the former Fort Ord is required.

Monterey County Code – Chapter 16.10

The County of Monterey Code Chapter 16.10 applies to parcels being transferred from the former Fort Ord to the County and outlines special standards and procedures for digging and excavation on these parcels in addition to those contained in the CBC. It requires that no digging or excavation shall take place until remediation of the site is complete, that potential purchasers or developers of the site are made aware of the potential for UXO, and provides a mechanism for DTSC statutory oversight.

City of Seaside Municipal Code – Chapter 15.34

The City of Seaside Municipal Code Chapter 15.34 contains the "Ordnance Remediation District Regulations of the City" (Ordinance 924) and establishes special standards and procedures for digging and excavation on those properties in the former Fort Ord military base which are suspected of containing ordnance and explosives (also called munitions and explosives of concern). This ordinance requires that a permit be obtained from the City for any excavation, digging, development, or ground disturbance of any type involving the displacement of ten cubic yards or more of soil. The permit requirements include providing each site worker a copy of the Ordnance and Explosives Safety Alert; complying with all requirements placed on the property by an agreement between the City, FORA, and DTSC; obtaining ordnance and explosives construction support; ceasing soil disturbance activities upon discovery of suspected ordnance and notifying the Seaside Police department, the Presidio law enforcement, the Army and DTSC; coordinating appropriate response actions with the Army and DTSC; and reporting of project findings.

3.11.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. physically divide an established community; or

b. cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Impact Analysis Overview

Approach to Analysis

This analysis evaluates short-term impacts resulting from temporary construction of the proposed project and alternatives, as well as long-term impacts resulting from the siting and operation of the proposed project and alternatives, either of which may result in potential conflicts or inconsistencies with existing adopted plans and regulations. The analysis compares the existing land use setting with the conditions of each proposed project component site during construction and operations. Local planning documents and maps, as described above, were reviewed and site surveys were conducted to characterize existing land uses on and adjacent to the proposed project site.

Areas of No Impact

The proposed project would not result in impacts related to the some of the significance criteria, as explained below. Impact analyses related to the other criteria are addressed in the following section.

a. *Physically divide an established community.* (No impact during construction or operation of the proposed project and alternatives). For the purpose of this analysis, the division or disruption of the physical arrangement of an established community would occur if a project creates a physical barrier that would separate or divide portions of a built community. The project site is located on undeveloped State-owned land within the former Fort Ord within the City and unincorporated County. As discussed above, the project site is not located within an established community. Therefore, no impact would occur and criterion "a" is not applicable to the proposed project and alternatives.

Summary of Impacts

Table 3.11-1 provides a summary of potential impacts from the proposed project and alternatives.

Table 3.11-1. Summary of Impacts – Land Use and Planning

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact LU-1: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact LU-1: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The western portion of the project site is designated as POS by the Seaside General Plan and zoned OSR by Seaside Zoning Code Title 17. The eastern portion of the project site within the County is zoned PQP under Title 21 of the County Zoning Code; the County's Fort Ord Master Plan Land Use Plan designates the site as Single-Family Density Low Density Residential/Veterans Cemetery.

The POS land use designation allows for passive and active recreation sites of all sizes and a range of amenities (City, 2003). Although the POS land use designation does not explicitly identify cemeteries as an accepted use, a cemetery is consistent with the purpose of preserving natural resources and views, and the CCCVC is identified on Seaside's Land Use Map (City, 2003). In addition, Seaside's existing cemetery is also designated POS. The OSR zone is applied to land in public ownership that is either used or intended for community recreational purposes, and area of important aesthetic, historical, or public health and safety significant. The OSR zone uses include park, recreational, and cultural facilities. The CCCVC would be considered a cultural facility and therefore, consistent with Seaside's OSR zoning for the project area. In Title 21 of County Code, cemeteries are allowed uses within the PQP zone.

The Veterans Cemetery Land Use Designation was originally indicated in the revised 2001 Reuse Plan Land Use Concept. The republished (never officially adopted by FORA) 2001 Reuse Plan Land Use Concept designates a 178-acre area in support of the construction of a CCCVC. Although the revised Reuse Plan was never officially adopted by FORA, the proposed project is still consistent with the original land use designations that were adopted under the 1997 Reuse Plan. The 1997 Reuse Plan designates the area shown in the republished 2001 Reuse Plan as Veterans Cemetery as Low Density Residential and Military Enclave. Military Enclave designation allows for on-going military related

activities within the former Fort Ord Boundary. Although Veterans Cemeteries are not explicitly stated as an allowed use in the designation, the Veterans Cemetery is considered to be consistent with the purpose of the designation as it can be interpreted as a military related activity. This represents a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project, but would be located at the same location. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location Phase 2 would generally be the same as the proposed project. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. No impact would occur.

3.12 NOISE

3.12.1 Introduction

This section evaluates the potential noise and vibration impacts that could result from implementation of the proposed project and alternatives due to temporary construction impacts and long-term operational impacts. The section describes the existing noise environment, identifies sensitive receptors to noise and vibration that could be affected by the proposed project, presents relevant noise and vibration regulations and standards, evaluates the potential effects of construction and operation on these receptors, and identifies mitigation measures as appropriate. This section is based on the *Noise & Groundborne Vibration Impact Analysis for the Central Coast Veteran's Cemetery Project, Seaside, CA* (Ambient, 2019b; **Appendix H**).

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**. No public or agency comments related to noise and vibration were received during the public scoping period.

3.12.2 Environmental Setting

Noise Characteristics

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave because of a disturbance or vibration.

Amplitude

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in **Table 3.12-1**.

Table 3.12-1. Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)*	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	**100 dBA**	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	**70 dBA**	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	**60 dBA**	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
Suburban nighttime	**40 dBA**	
Quiet rural areas	**30 dBA**	Library
		Quiet bedroom at night
Wilderness area	**20 dBA**	
Most quiet remote areas	**10 dBA**	
Threshold of human hearing		Threshold of human hearing
	0 dBA	

** Typical A-weighted sound levels. The A-weighted decibel scale approximates the frequency response of the human ear.*

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive

ground surface between a line source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 dB per doubling of distance from a line source.

Atmospheric Effects

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

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in an approximate 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-30 dBA, with windows closed. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. As identified above, to approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the "A-weighted" sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-weighted noise scale. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, and CNEL. The energy equivalent noise level (L_{eq}) is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level (L_{dn}) is the 24-hour average of the noise

intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.). Another descriptor that is commonly discussed is the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in **Table 3.12-2**.

Table 3.12-2. Common Acoustical Terms and Descriptors

Descriptor	Definition
Decibels (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to referenced sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in dB that approximates the frequency response of the human ear.
Energy Equivalent Noise Level (L_{eq})	The energy means (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Sound Exposure Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called

"ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged.

Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3 dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial; and
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on Human Activities

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. In terms of land use compatibility, environmental noise is often evaluated in terms of the potential for noise events to result in increased levels of annoyance, sleep disruption, or interference with speech communication, activities, and learning. Noise-related effects on human activities are discussed in more detail, as follows:

Speech Communication

For most noise-sensitive land uses, an interior noise level of 45 dB L_{eq} is typically identified for the protection of speech communication in order to provide for 100-percent intelligibility of speech sounds. Assuming a minimum 20-dB reduction in sound level between outdoors and indoors, with windows closed, this interior noise level of 45 dB L_{eq} would equate to an exterior noise level of 65 dBA L_{eq}. For outdoor voice communication, an exterior noise level of 60 dBA L_{eq} allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility. Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA.

Annoyance & Sleep Disruption

With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or L_{dn}). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for L_{dn} as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA L_{dn}. It also indicates that the percent of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA L_{dn}. A noise level of 65 dBA L_{dn} is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed.

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level of 65 dBA CNEL/L_{dn} as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration and the State have identified a noise level of 65 dBA L_{dn} as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/L_{dn} are typically considered to result in a potentially significant increase in levels of annoyance.

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference.

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train passbys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of other noise metrics, such as the L_{eq} or L_{max} descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact.

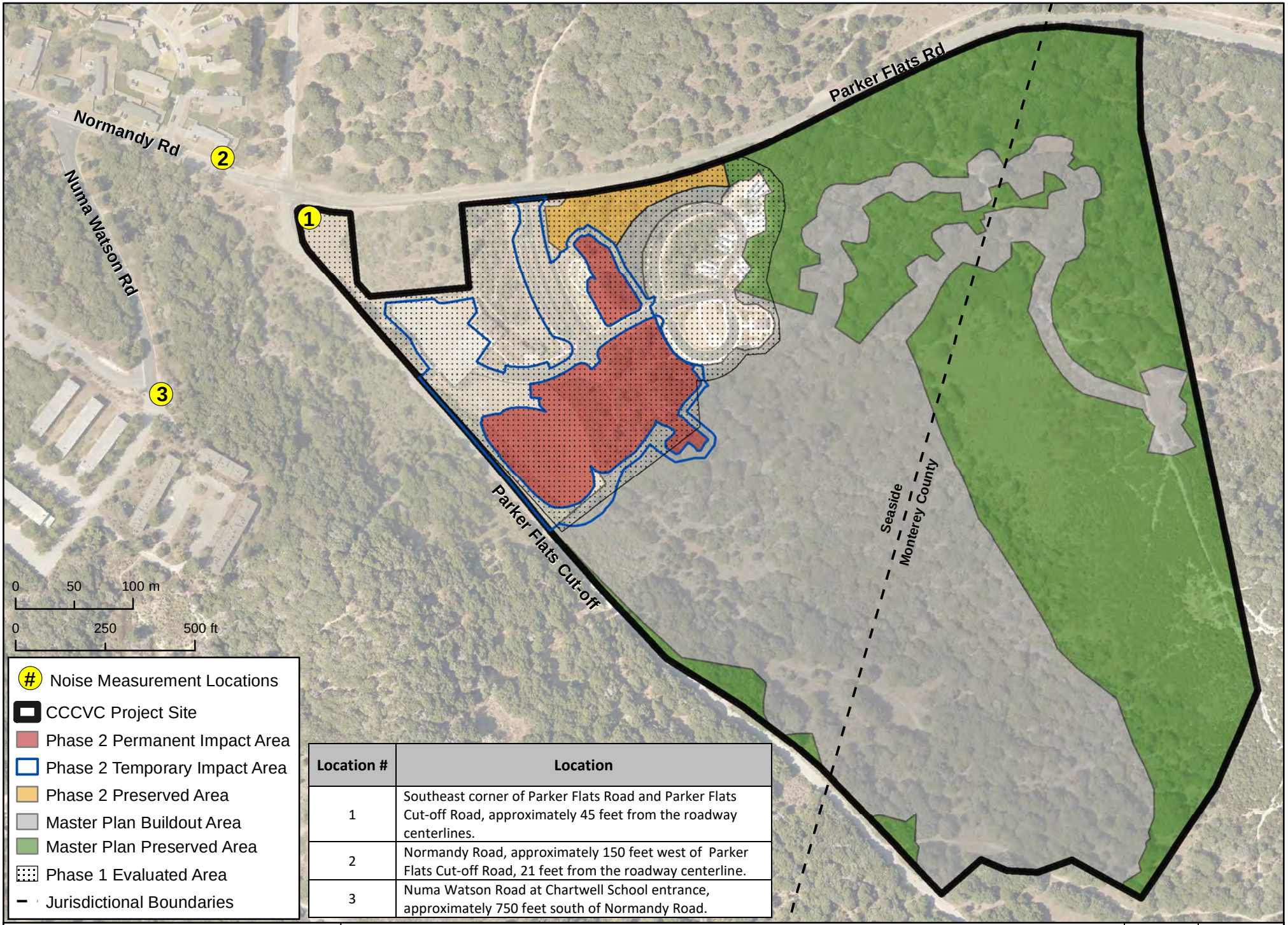
Noise-Sensitive Receptors

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The nearest noise-sensitive land uses include residential land uses to the northwest, across Normandy Road, and Chartwell School to the west, along Numa Watson Road. These land uses are located approximately 260 feet to the northwest and approximately 680 feet to the west, respectively, from the project site.

Ambient Noise Environment

To document existing ambient noise levels at the proposed project site, short-term ambient noise measurements were conducted on December 12, 2018 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter. The meter was calibrated before use and is certified to be in compliance with American National Standards Institute specifications. Measured ambient daytime noise levels are summarized in **Table 3.12-3**. Noise monitoring locations are depicted in **Figure 3.12-1, Noise Monitoring Locations**.



Location #	Location
1	Southeast corner of Parker Flats Road and Parker Flats Cut-off Road, approximately 45 feet from the roadway centerlines.
2	Normandy Road, approximately 150 feet west of Parker Flats Cut-off Road, 21 feet from the roadway centerline.
3	Numa Watson Road at Chartwell School entrance, approximately 750 feet south of Normandy Road.

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Noise Monitoring Locations

N

Date 04-10-2019

Scale 1 in=341.2 ft

Figure 3.12-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 3.12-1 Noise Measurement Locations Map.mxd

Table 3.12-3. Summary of Measured Ambient Noise Levels

Location #	Location	Monitoring Period	Measured Daytime Noise Levels (dBA)	
			L_{eq}	L_{max}
1	Southeast corner of Parker Flats Road and Parker Flats Cut-off Road, approximately 45 feet from the roadway centerlines.	11:40 – 11:50	38.4	46.5
2	Normandy Road, approximately 150 feet west of Parker Flats Cut-off Road, 21 feet from the roadway centerline.	11:55 – 12:05	40.2	56.7
3	Numa Watson Road at Chartwell School entrance, approximately 750 feet south of Normandy Road.	12:20 – 12:30	36.6	51.2
Ambient noise measurements were conducted on December 12, 2018 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter placed at a height of 4.5 feet.				

Based on the measurements conducted, daytime average-hourly noise levels in the project vicinity ranged from the upper 30s to low 40s (in dBA L_{eq}). Ambient noise levels within the project area are predominantly influenced by vehicle traffic on area roadways. Ambient noise levels during the evening and nighttime hours are generally 5-10 dB lower than daytime noise levels.

Groundborne Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement.

The effects of groundborne vibration levels, with regard to human annoyance and structural damage, is influenced by various factors, including ground type, distance between source and receptor, and duration. Overall effects are also influenced by the type of the vibration event, defined as either continuous or transient. Continuous vibration events would include most construction equipment, including pile drivers, and compactors; whereas, transient sources of vibration create single isolated vibration events, such as demolition ball drops and blasting. There are no Federal, State, or local regulatory standards for ground-borne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the Caltrans has developed vibration criteria based on potential structural damage risks and human annoyance. Threshold criteria for continuous and transient events are summarized in **Table 3.12-4** and **Table 3.12-5**, respectively.

As indicated in **Table 3.12-4**, the threshold at which there is a risk to normal structures from continuous events is 0.3 inches per second peak particle velocity (in/sec ppv) for older residential structures and 0.5 in/sec ppv for newer building construction. A threshold of 0.5 in/sec ppv also represents the structural damage threshold applied to older structures for transient vibration sources. With regard to human perception (**Table 3.12-5**), vibration levels would begin to become distinctly perceptible at levels of 0.04 in/sec ppv for continuous events and 0.25 in/sec ppv for transient events. Continuous vibration levels are considered annoying for people in buildings at levels of 0.2 in/sec ppv.

Table 3.12-4. Damage Potential to Buildings at Various Ground-borne Vibration Levels

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5
Note: *Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.* ***Source:*** *Caltrans 2013b*		

Table 3.12-5. Annoyance Potential to People at Various Ground-borne Vibration Levels

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10
Annoying to People in Buildings	--	0.2
Severe	2.0	0.4
Note: *Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.* *-- Not Available* ***Source:*** *Caltrans 2013b*		

3.12.3 Regulatory Framework

The State of California, County of Monterey, and City of Seaside have regulations, plans, and policies to limit noise exposure at existing and proposed noise sensitive uses. These regulations are established in the following applicable documents: the 2016 California Administrative Code (BSC, 2016), the County of Monterey General Plan (County, 2010a), and the City of Seaside General Plan (City, 2003).

State

California Building Code

The 2014 CBC (Chapter 12, Appendix Section 1207.11.2) regulates environmental noise intrusion. Interior noise levels attributable to exterior sources cannot exceed 45 CNEL. Regulated structures proposed where exterior noise levels exceed 60 CNEL require an acoustical analysis demonstrating that the proposed design will maintain interior noise levels at or below 45 CNEL. Further, if the interior standard can only be met with the windows closed, then the proposed buildings shall be supplied with some form of mechanical ventilation.

Regional/Local

County of Monterey

Monterey County, like many local jurisdictions, includes land use-noise compatibility standards in its General Plan for exterior noise exposure standards, which are based on parameters established by the California Department of Health, Office of Noise Control and provided by the Governor's Office of Planning and Research (**Table 3.12-6**). Based on these standards, noise levels of 60 dBA L_{dn} or less at various noise-sensitive receptor locations, including single- and multi-family residences, schools, hospitals, churches, and nursing homes are considered "normally acceptable" and noise levels of 60 to 70 dBA L_{dn} are considered "conditionally acceptable".

The Monterey County General Plan (County, 2010a) contains the policies related to noise in the Safety Element, Chapter 4. Policies pertinent to the Proposed Project are summarized in **Table 3.12-6**. Policy S-7.9 states that construction noise activities that exceed acceptable levels listed in **Table 3.12-7** are prohibited within 500 feet of a sensitive use during the evening hours of Monday through Saturday, or anytime on Sundays or holidays prior to completion of a noise mitigation study. Noise protection measures, in the event of an impact, may include constructing temporary barriers or using quieter equipment than normal. Policy S-7.10 provides that construction projects shall include the following standard noise projection measures:

- Construction shall occur only during times allowed by ordinance/code unless such limits are waived for public convenience;
- All equipment shall have properly operating mufflers; and
- Lay-down yards and semi-stationary equipment such as pumps or generators shall be located as far from noise-sensitive land uses as practical.

County of Monterey Code of Ordinances

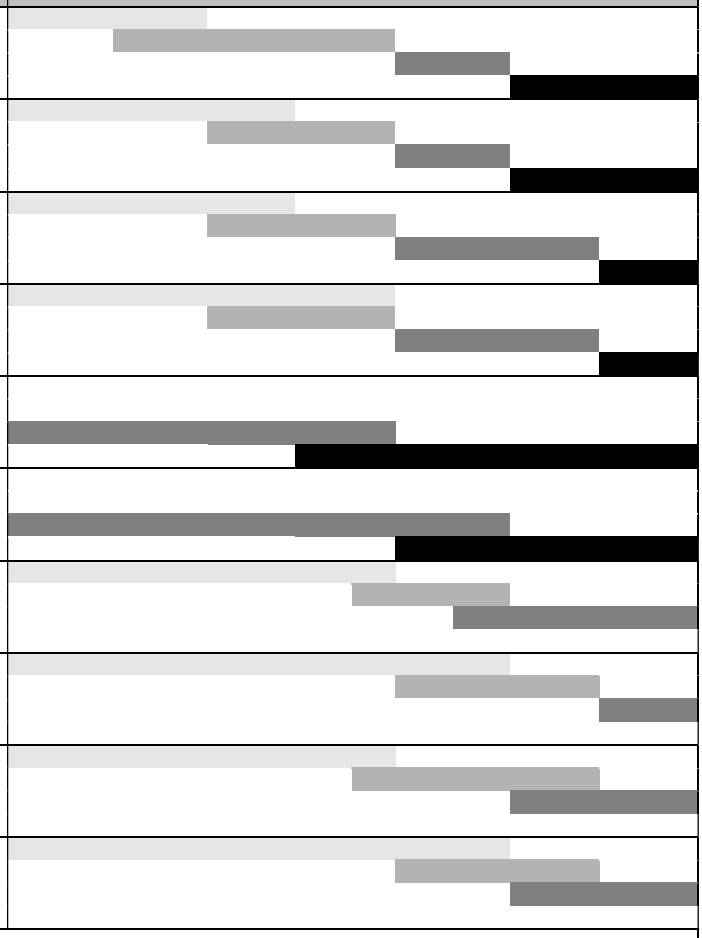
The County of Monterey Noise Control Ordinance is included in Chapter 10.60 of the County's Code of Ordinances. The County's noise ordinance establishes a maximum noise-level standard of 85 dB at 50 feet for non-transportation noise sources. The County's noise ordinance was recently updated in 2014 to also include nighttime noise limitations for non-transportation noise sources (County, 2014). During the nighttime hours between 10:00 p.m. and 7:00 a.m., noise levels shall not exceed 45 dBA L_{eq} or 65 dBA L_{max}, measured at the property line of the noise source. Noise generated by some activities, including but not limited to, devices associated with religious services, emergency vehicles, commercial agricultural operations, and outdoor gatherings, are exempt.

Table 3.12-6. Applicable Monterey County General Plan Policies Relevant to Noise and Vibration

Policy #	Policy
Policy S-7.2	Proposed development shall incorporate design elements necessary to minimize noise impacts on surrounding land uses and to reduce noise in indoor spaces to acceptable levels.
Policy S-7.3	Development may occur in areas identified as "normally unacceptable" provided effective measures to reduce both the indoor and outdoor noise levels to acceptable levels are taken.
Policy S-7.4	New noise generators may be allowed in areas where projected noise levels are "conditionally acceptable" (*Figure 10*) only after a detailed analysis of the noise reduction requirements is made and needed noise mitigation features are included in project design.
Policy S-7.5	New noise generators shall be discouraged in areas identified as "normally unacceptable." Where such new noise generators are permitted, mitigation to reduce both the indoor and outdoor noise levels are required.
Policy S-7.6	Acoustical analysis shall be part of the environmental review process for projects when: a) Noise sensitive receptors are proposed in areas exposed to existing or projected noise levels that are "normally unacceptable" or higher according to the Land Use Compatibility for Community Noise Table. b) Proposed noise generators are likely to produce noise levels exceeding the levels shown in the adopted Community Noise Ordinance when received at existing or planned noise-sensitive receptors.
Policy S-7.8	All discretionary projects that propose to use heavy construction equipment that has the potential to create vibrations that could cause structural damage to adjacent structures within 100 feet shall be required to submit a pre-construction vibration study prior to the approval of a building permit. Projects shall be required to incorporate specified measures and monitoring identified to reduce impacts. Pile driving or blasting are illustrative of the type of equipment that could be subject to this policy.
Policy S-7.9	No construction activities pursuant to a County permit that exceed "acceptable" levels listed in Policy S-7.1 shall be allowed within 500 feet of a noise sensitive land use during the evening hours of Monday through Saturday, or anytime on Sunday or holidays, prior to completion of a noise mitigation study. Noise protection measures, in the event of any identified impact, may include but not be limited to: Constructing temporary barriers; or Using quieter equipment than normal.
Policy S-7.10	Construction projects shall include the following standard noise protection measures: Construction shall occur only during times allowed by ordinance/code unless such limits are waived for public convenience; All equipment shall have properly operating mufflers; and Lay-down yards and semi-stationary equipment such as pumps or generators shall be located as far from noise-sensitive land uses as practical.

Table 3.12-7. Land Use and Noise Compatibility Standards

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dB)					
	55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Homes						
Residential - Multi. Family						
Transient lodging - Motels, Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheaters						
Sports Arenas, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Business Commercial and Professional						
Industrial, Manufacturing, Utilities, Agriculture						



INTERPRETATION

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE: New construction or development should generally be discouraged. If new development or construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: *California Governor's Office of Planning and Research, October 2003.*

City of Seaside General Plan

The City has established policies in the Noise Element of the General Plan to guide the development of new land uses with respect to noise exposure. **Table 3.12.8** summarizes the City's noise standards for various types of new land uses. These noise standards are the basis for the development of the land use compatibility guidelines presented in **Table 3.12.9**. As depicted, cemetery land uses are considered "normally acceptable" within noise environments up to 70 dBA CNEL.

Table 3.12-8. City of Seaside Interior and Exterior Noise Standards for New Development

Land Use	Noise Standards (dBA CNEL)[1]	
	Exterior	Interior
Residential	65	45
Mixed Use Residential	70	45
Commercial	70	-
Office	70	50
Industrial	75	55
Public Facilities	70	50
Schools	50	50

Source: *City, 2003*

Table 3.12-9. City of Seaside Noise Standards for Land Use Compatibility

Land Use	Community Noise Exposure (Exterior L_{dn}, dBA)			
	Normally Acceptable	Conditionally Acceptable	Generally Unacceptable	Land Use Discouraged
Residential: Single Family, Multifamily, Duplex	<60	60 – 70	70 – 75	--
Residential: Mobile Homes	<60	60 – 65	65 – 75	--
Transient Lodging – Motels, Hotels	<60	60 – 70	70 – 80	--
Schools, Libraries, Churches, Hospitals, Nursing Homes	<60	60 – 65	65 – 75	--
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	<60	60 – 70	--	--
Sports Arena, Outdoor Spectator Sports, Amusement Parks	<65	65 – 75	--	--
Playgrounds, Neighborhood Parks	<65	65 – 70	70 – 75	--
Golf Course, Riding Stable, Cemeteries	<70	70 – 75	75 – 85	--
Office and Professional Buildings	<65	65 – 75	75 – 80	--
Commercial Retail, Banks, Restaurants, Theaters	<70	70 – 80	80 – 85	--
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	<70	70 – 85	--	--
Agriculture	<85	--	--	--

Normally Acceptable: *Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*

Conditionally Acceptable: *New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.*

Generally Unacceptable: *New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*

Land Use Discouraged: *New construction or development should generally not be undertaken.*

Source: *City, 2003*

City of Seaside Municipal Code

The City of Seaside municipal code, Chapter 9.12, includes standards, prohibitions, exemptions for noise generated by non-transportation noise sources. Accordingly, construction noise is prohibited before 7:00 a.m. or after 7:00 p.m. daily except Saturday, Sunday, and holidays when the prohibited time is before 9:00 a.m. and after 7:00 p.m. Noise sources considered exempt from the City's noise ordinance includes excessive, unnecessary, or unusually loud noise generated by the following:

- Cries for emergency assistance and warning calls;
- Radios, sirens, horns and bells on police, fire and other emergency response vehicles;
- Parades, fireworks displays, and other special events for which a permit has been obtained from the city are exempted provided there is compliance with all conditions that have been noted in writing on the permit. Excessive, unnecessary or unusually loud noise produced as a result of noncompliance with any condition specified on the permit is not exempt from the requirements of this chapter;
- Activities on or in publicly owned property and facilities, or by public employees or their franchisees, while in the authorized discharge of their responsibilities, are exempt provided that such activities have been authorized by the owner of such property or facilities or its agent or by the employing authority; or
- Religious worship activities, including but not limited to, bells, organs, singing, and preaching.

3.12.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in:

a. expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b. expose persons to or generation of excessive groundborne vibration or groundborne noise levels;

c. have substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

d. have a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

e. for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; or

f. for a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

Impact Analysis Overview

Approach to Analysis

The noise and vibration impact assessment evaluates short-term impacts associated with construction of the proposed project and alternatives. It also assesses long-term operational impacts (i.e., those resulting from operation and maintenance of the proposed cemetery). The impact discussion analyzes

substantial increases in ambient noise levels in the vicinity of the proposed project site. In addition, the assessment uses local noise standards and applicable daytime exceptions as the basis for significance thresholds. The assessment of potential noise impacts was conducted using information on existing ambient noise levels and the anticipated noise that would be produced during construction and operation of the proposed project. The assessment of vibration impacts was conducted using information on anticipated vibration during construction and operation of the proposed project and alternatives based on anticipated equipment and activities to occur at each site.

The evaluation of permanent and temporary noise impacts was based on noise standards identified in local general plans and noise ordinances. For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 3 dB, or greater. As previously noted, increases of less than 3 dB are generally not discernible to the human ear. Projects resulting in a substantial increase in ambient noise levels of 3 dB, or greater, that exceed the above thresholds would be considered to have a potentially significant impact.

In accordance with the County's noise control ordinance, construction-generated noise levels would be considered significant if daytime noise levels would exceed 85 dB at 50 feet from the source. Nighttime noise levels would be considered significant if nighttime noise levels at the property line of the nearest noise-sensitive land use would exceed 45 dBA L_{eq} or 65 dBA L_{max}.

Long-term operational noise levels from non-transportation sources would be considered potentially significant if resultant noise levels at the nearest property line were to exceed 50 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) or 45 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.). For noise sources that are tonal, such as pumps and motors, these standards are reduced by 5 dBA to account for the increased potential for annoyance. Intermittent non-transportation noise that exceeds 65 dBA L_{max} at the nearest property line during the nighttime hours would also be considered to have a potentially significant impact. These standards are consistent with the County's nighttime noise standards, which were recently updated in 2014, as well as the City's noise ordinance standards. It is also important to note that these daytime noise standards, when averaged over a 24-hour period, would equate to an average daily noise level of approximately 50-55 dBA CNEL/L_{dn}, which would be below the land use compatibility standards identified by the County and City for noise-sensitive land uses. As a result, compliance with these hourly limitations would also ensure consistency with applicable general plan land use policies and related noise standards for land use compatibility.

Ground-borne vibration levels would be considered to have a potentially significant impact if resultant vibration levels at the nearest structures would exceed 0.5 in/sec ppv for structural damage and 0.2 in/sec ppv for annoyance to building occupants, based on Caltrans-recommended thresholds (refer to **Tables 3.12-4** and **3.12-5**).

Methodology

A combination of existing literature, noise level measurements, and application of accepted noise prediction and sound propagation algorithms were used for the prediction of short-term construction and long-term operational noise levels. Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on representative off-road equipment noise levels derived from the Federal Highway Administration's *Road Construction Noise Model* based on average equipment usage rates. Predicted noise levels for noise sources were calculated based on noise levels associated with similar sources derived from existing documentation and assuming a noise-attenuation rate of 6 dB per doubling of distance from the source. Ground-borne vibration levels were

calculated based on representative vibration levels obtained for similar equipment and methodologies recommended by Caltrans for construction related activities (Caltrans, 2013).

Areas of No Impact

The proposed project would not result in impacts related to the some of the significance criteria, as explained below. Impact analyses related to the other criteria are addressed in the following section.

(e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? (No impact during construction or operation of the proposed project and alternatives). The proposed project and alternatives are not located within two miles of an airport land use plan. The nearest airports include the Marina Municipal Airport, which is located approximately 3.3 miles northeast of the project site, and the Monterey Regional Airport, located approximately 3.9 miles to the southwest. The proposed project and alternatives are not located within the planning areas of these airports, nor would implementation of the proposed project affect airport operations. As a result, no impact would occur and evaluation of potential exposure to aircraft noise is not discussed further.

(f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? (No impact during construction or operation of the proposed project and alternatives). The proposed project and alternatives are not located within the vicinity of a private airstrip. The proposed project and alternatives would not affect private airstrip operations nor result in the installation of sensitive land uses in the vicinity of an airport. As a result, no impact would occur and evaluation of potential exposure to aircraft noise is not discussed further.

Summary of Impacts

Table 3.12-10 provides a summary of potential noise impacts from the proposed project and alternatives.

Table 3.12-10. Summary of Impacts – Noise

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact NOI-1: Expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies and/or have substantial temporary, periodic, or permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	LSM	LSM	LSM	LSM	NI
Impact NOI-2: expose persons to or generation of excessive groundborne vibration or groundborne noise levels.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact NOI-1: Expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies and/or have substantial temporary, periodic, or permanent increase in ambient noise levels in the project vicinity above levels existing without the project. (Criteria a, c, and d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction Noise

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading, excavation, paving, and erection) of the activity. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Noise levels associated with off-road equipment anticipated to be required for construction of the proposed project are summarized in **Table 3.12-11**.

Table 3.12-11. Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet	
	L_{max}	L_{eq}
Backhoe/Front-End Loader	80	76
Compactor	80	73
Concrete Mixer Truck	85	81
Concrete Vibratory Mixer	80	73
Dozer	85	81
Excavator	85	81
Grader	85	81
Paver	85	82
Roller	85	78
Source: FTA, 2006		

As depicted in **Table 3.12-12**, instantaneous noise levels generated by individual pieces of off-road equipment typically range from approximately 70 dBA to 85 dBA L_{max} at 50 feet (U.S. Department of Transportation, Federal Transit Administration [FTA], 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Based on typical off-road equipment usage rates, average-hourly noise levels would be approximately 82 dBA L_{eq}, or less, at 50 feet.

California Building Code requires that interior noise levels attributable to exterior sources cannot exceed 45 CNEL. The City of Seaside has not adopted noise standards that apply to short-term construction activities. However, the County's noise control ordinance identifies that construction-generated noise levels would be considered significant if daytime noise levels would exceed 85 dB at 50 feet from the source and if nighttime noise levels at the property line of the nearest noise-sensitive land use would exceed 45 dBA L_{eq} or 65 dBA L_{max}. Additionally, based on screening noise criteria commonly recommended by federal agencies, construction activities would generally be considered to have a potentially significant impact if average-hourly daytime noise levels would exceed 80 dBA L_{eq} at noise-sensitive land uses, such as residential land uses (FTA, 2006).

For Phase 2 construction, assuming an average-hourly construction noise level of 82 dBA L_{eq}, predicted noise levels at the nearest residential land uses would be approximately 56 dBA L_{eq} or less, when construction activities occur within approximately 50 feet of the site boundary. Based on these same assumptions, predicted construction noise levels at Chartwell School would be 51 dBA L_{eq}, or less. Assuming an average exterior-to-interior noise reduction of 25 dBA, with windows closed, predicted interior noise levels within Chartwell School would be approximately 26 dBA L_{eq}, or less. Therefore, construction-generated noise levels would not exceed the County's daytime noise standard of 85 dBA L_{eq} or the commonly applied federal exterior daytime noise standard of 80 dBA L_{eq}. Subsequent phases of the 2015 Master Plan would occur at increased distances from the noise-sensitive land uses compared to Phase 2 and therefore predicted noise levels are expected to be less than those identified for Phase 2 construction.

As such, construction-generated noise levels would not exceed the County's daytime noise standard of 85 dBA L_{eq} or the commonly applied federal exterior daytime noise standard of 80 dBA L_{eq}. However, because exterior ambient noise levels typically decrease during the late evening and nighttime hours as community activities (e.g., vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day could result in substantial increases in ambient noise levels, which may result in increased levels of annoyance and potential sleep disruption for occupants of nearby residential dwellings. For these reasons, this impact is considered potentially significant. Implementation of **Mitigation Measure NOI-1** would limit construction activities to the less noise-sensitive periods of the day. The use of mufflers would reduce construction equipment noise levels by approximately 10 dBA. Additional measures have also been included to further minimize potential noise impacts to nearby noise-sensitive land uses. With implementation of the **Mitigation Measure NOI-1** identified below, this impact is considered less than significant.

Operational Noise

Long-term, permanent increases in ambient noise levels would be primarily associated with potential increases in vehicle traffic on nearby roadways; as well as, noise generated by on-site vehicle activity, burial events, and maintenance activities. Noise levels commonly associated with these sources and potential impacts to nearby land uses are discussed as follows:

Vehicular Roadway Traffic. Operational vehicle trips for the proposed project are anticipated to be similar to existing Phase 1 operational activities. Typical vehicle trips per days including employees, visitors, and maintenance and services are expected to be approximately 80 vehicles per day with an additional 20 vehicles per day on weekends. This is based on an average of two burial events per day with an average of 30 vehicles per burial. The worst case scenario for typical operations would involve four burial events on a weekend day with a total of 200 vehicles per day, including worker vehicles.

As noted above, changes in ambient noise levels of approximately 3 dBA, or less, are typically not discernible to the human ear. Typically, a doubling of vehicle traffic would be required before a significant increase (i.e., 3 dBA, or greater) in traffic noise levels would occur. Implementation of Phase 2 and subsequent phases would not result in a doubling of vehicle traffic on area roadways. In comparison to existing conditions, the proposed project would not result in a significant increase in traffic noise levels along area roadways.

The City's General Plan includes noise criteria that can be relied upon to determine the compatibility of noise-sensitive land uses within noise environments. Based on these noise standards, cemeteries are considered "normally acceptable" within exterior noise environments up to 70 dBA CNEL and "conditionally acceptable" between 70 and 75 dBA CNEL. The proposed project is not located in the vicinity of a major roadway. The nearest major roadways are General Jim Moore Boulevard, which is

located approximately 3,600 feet west of the project site, and Gigling Road, located approximately 2,400 feet north of the project site. Existing traffic volumes for these roadways average approximately 6,500 and 5,600 vehicles per day, respectively (Transportation Agency for Monterey County [TAMC], 2019). Based on these traffic volumes, the projected 70 dBA CNEL noise contours for these roadways would not extend beyond the roadway right of ways. In general, roadway traffic volumes need to exceed approximately 15,000 average-daily trips before predicted traffic noise levels outside of the roadway right-of-way would exceed 70 dBA CNEL. Other roadways in the project area, including Parker Flats Road, Normandy Road, and Parker Flats Cut-Off Road do not exceed 15,000 average-daily trips. For these reasons, predicted onsite noise levels at the project site would not be projected to exceed the City's "normally acceptable" noise standard of 70 dBA CNEL.

On-site Vehicle Parking Areas. Noise levels commonly associated with parking lots are generated by the starting of vehicles, the opening and closing of vehicle doors, playing of amplified music, and the occasional sound of vehicle alarms and horns. Intermittent noise levels associated with such noise events can generate sound levels of up to approximately 92 dBA at 50 feet. Overall, average-hourly noise levels associated with parking lots are largely dependent on vehicle activity and, thus, would likely be greatest during the hours preceding or upon conclusion of onsite events.

Assuming a maximum of 40 vehicles per burial event, average-hourly noise levels associated with on-site vehicle parking areas would be 26 dBA L_{eq}, or less, at 25 feet. Predicted noise levels at nearby residential land uses would be masked by existing ambient noise levels. In comparison to existing conditions, onsite operational activities associated with Phase 2 and subsequent phases would occur at increased distance from nearby noise-sensitive land uses. For these reasons, on-site vehicle activities would not result in a significant increase in ambient noise levels at nearby noise-sensitive land uses. This impact is less than significant.

On-site Event and Maintenance Activities. Exterior noise events associated with ground maintenance activities would be predominantly associated with the operation of landscape maintenance equipment. Based on measurements conducted at similar facilities, landscape maintenance equipment, such as commercial lawn mowers, can generate noise levels of approximately 90 dBA at 3 feet. Assuming a maximum noise level of 90 dBA at 3 feet, predicted noise levels associated with ground-maintenance activities would be approximately 40 dBA, or less, at the nearest noise-sensitive land uses.

Predicted instantaneous noise levels associated with burial events involving the sounding of bugles or firing of rifle volleys would range from approximately 44 to 95 dBA. However, these events would be of short duration (i.e., seconds or minutes) and would be limited to the daytime hours of operation.

As a result, significant increases in average-hourly or average-daily noise levels at nearby land uses would not occur. Furthermore, in comparison to existing operations, onsite operational activities associated with Phase 2 and subsequent phases would occur at increased distance from nearby noise-sensitive land uses. It is also important to note that the City's Municipal Code (Section 9.12.040) provides exemptions for noise associated with religious activities, as well as, noise occurring on publicly owned property. As a result, noise generated by the proposed project would be exempt from compliance with the City's noise ordinance. For these reasons, noise generated by onsite activities would be considered less than significant.

Operation of each phase of the 2015 Master Plan, including Phase 2, would not result in a significant increase in traffic noise levels along area roadways; on-site vehicle activities would not result in a significant increase in ambient noise levels at nearby noise-sensitive land uses; and significant increases in average-hourly or average-daily noise levels at nearby land uses would not occur as a result of maintenance activities or on-site events. This represents a less-than-significant impact.

Alternative 2: Reduced CCCVC 2015 Master Plan

Construction and operational noise resulting from Alternative 2 would be the same impact as described above for the 2015 Master Plan. Although the overall footprint of construction would be reduced; it is assumed the same construction equipment would be utilized and the same operations would occur, and the distances to sensitive receptors would not change. Implementation of **Mitigation Measure NOI-1** would reduce impacts associated with construction noise to less than significant.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Construction and operational noise resulting from Alternative 3 would be the same impact as described above for Phase 2. Although the overall footprint of would be increased; it is assumed the same construction equipment would be utilized and the same operations would occur, and the distances to sensitive receptors would not change. Implementation of **Mitigation Measure NOI-1** would reduce impacts associated with construction noise to less than significant.

Alternative 4: No Action Alternative

No construction equipment noise or operational noise would be generated if construction of the proposed project did not take place. No impact would occur.

Mitigation Measure NOI-1: Construction Noise Reduction Measures

The following measures shall be implemented to reduce construction-generated noise levels:

- Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between the hours of 9:00 a.m. and 7:00 p.m. on weekends and legal holidays.
- Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
- When not in use, all construction equipment and haul trucks shall be turned off and shall not be allowed to idle. Clear signage that posts this requirement shall be provided for workers at the entrances to the site.
- Construction equipment and material staging areas shall be located at the furthest distance possible from nearby residential land uses.
- To the extent possible, heavy-duty haul truck trips required for project construction should be scheduled during the non-peak hours of the day.

Impact NOI-2: Expose persons to or generation of excessive groundborne vibration or groundborne noise levels. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction Groundborne Vibration

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction activities. Groundborne vibration levels associated with representative construction equipment likely to be required during project construction are summarized in **Table 3.12-12**. As depicted, construction-generated ppv levels would range from approximately 0.003 to 0.21 in/sec ppv at 25 feet. The highest vibration levels would be associated with the use of vibratory

rollers. The nearest existing structures would be located in excess of 900 feet from the project site. Because groundborne vibration levels generally decrease with increased distance from the source, predicted construction vibration levels at nearby structures would not be projected to exceed the minimum recommended criteria for structural damage and human annoyance (0.5 and 0.2 in/sec ppv, respectively). As a result, this impact is considered less than significant.

Table 3.12-12. Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (In/Sec)
Vibratory Roller	0.21
Large tractors	0.089
Loaded Trucks	0.076
Small Bulldozers/Tractors	0.003
Sources: *FTA, 2006 and Caltrans, 2013*	

Operational Groundborne Vibration

Long-term operational activities associated with the proposed project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration.

Alternative 2: Reduced CCCVC 2015 Master Plan

Groundborne vibrations resulting from construction of Alternative 2 would be the same impact as described above for the 2015 Master Plan. Although the overall footprint of construction would be reduced; it is assumed the same equipment would be utilized and the distances to sensitive receptors would not change. Operational activities would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. This represents a less-than-significant impact.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Groundborne vibrations resulting from construction of Alternative 3 would be the same impact as described above for Phase 2. Although the overall footprint of construction would be increased; it is assumed the same equipment would be utilized and the distances to sensitive receptors would not change. Operational activities would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. This represents a less-than-significant impact.

Alternative 4: No Action Alternative

No construction equipment that produces groundborne vibrations would be needed if construction of the proposed project did not take place. No operational activities that produces groundborne vibrations would occur that would result in potentially significant levels of ground vibration. No impact would occur.

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3.13 PUBLIC SERVICES

3.13.1 Introduction

This section assesses the potential impacts on public services from the proposed project and alternatives. Public services within the proposed project area include law enforcement services, fire protection services, emergency medical services, schools, and recreation.

No public or agency comments related to public services were received during the public scoping period. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.13.2 Environmental Setting

Fire

County of Monterey

The Monterey County Regional Fire District (MCRFD) is expected to provide service to the unincorporated areas of the proposed project site (Local Agency Formation Commission of Monterey County, 2017). The MCRFD is a full service fire department that provides emergency response to fires, medical incidents, vehicle accidents, and hazardous materials incidents. The MCRFD staffs seven fire stations. Its 62 full-time employees are supported by 15 volunteer firefighters. The proposed project site is serviced by the Toro Station, located at 19900 Portola Drive in the Toro Park area.

All of MCRFD's engines carry a full complement of advanced life support medical and rescue equipment. All personnel are emergency medical technicians or paramedics who can provide advanced medicals skills such as IVs, airway management, and medical administration.

City of Seaside

Fire protection services in the City are provided by the Seaside Fire Department. The closest fire station to the proposed project site is located at 1635 Broadway Avenue in Seaside. The Seaside Fire Department is staffed with two fire companies consisting of three persons each and one duty chief. Minimum staffing for the Seaside Fire Department is seven personnel on duty 24 hours a day, seven days a week. The Seaside Fire Department provides both emergency response and prevention services to the community. The Seaside Fire Department responds to 2,000 to 2,400 emergency calls annually, of which approximately 65 percent are medical in nature. The Seaside Fire Department's response times vary based on the proximity of the incident in relation to the location of the fire station, although 90 percent of the service area is within the four minute travel time recommended by the NFPA. Due to the closure of Fort Ord, the Seaside Fire Department response area is approximately three times larger and average responses to emergencies within former Fort Ord are outside of the recommended response time. Because of redevelopment activities within Fort Ord, the Seaside Fire Department has identified a need for a substation, with appropriate staffing and equipment, in northern Seaside to accommodate projected growth and development within the area.

Police

County of Monterey

The County of Monterey Sheriff's Office would be responsible for providing police protection services to the unincorporated areas of the proposed project site. Services would presumably be provided from the

County of Monterey Sheriff's Office Coastal Station, which is located in Monterey on Aguajito Road. This station is currently staffed with 22 sworn officers, which include 16 deputies, four sergeants, one detective, and one commander. The station is responsible for the unincorporated areas of the Monterey Peninsula, including Carmel, Carmel Valley, and approximately 90 miles of the Big Sur coastline south of Monterey. The estimated response time is varied depending on the location, number of personnel on duty and time of the call; however, the general range is five to ten minutes. Services may also be provided from the Sheriff's Central Office in Salinas and/or any sub-stations constructed as part of the redevelopment of the former Fort Ord.

City of Seaside

Police protection services within the City are provided by the Seaside Police Department. The Seaside Police Department currently has 43 sworn officers and 13 civilian employees. Services would presumably be provided from the main station, which is located at 440 Harcourt Avenue, until such time that a new police sub-station is constructed within the portion of the former Ford Ord. The estimated response time is varied depending on the location, number of personnel on duty and time of the call; however, the general range is five to ten minutes. Current average responses are estimated to range between 3:20 and 3:51 minutes. While staffing levels have historically remained the same, the response areas for police services has increased from 2.69 square miles to approximately 8 square miles due to the City's annexation of portions of the former Fort Ord. Average response times within the Department's jurisdiction between January and September 2006 ranged between 2:57 and 3:19 minutes. Current average responses, due to changes in traffic patterns, are estimated to range between 3:20 and 3:51 minutes.

Emergency Medical Services

The Monterey County Emergency Medical Services Agency is a Monterey County Health Department agency that incorporates over 100 participating agencies under one jurisdictional authority, including fire departments, ambulance companies, hospitals, and police departments (Monterey County Health Department, 2014). The closest major hospital is the Community Hospital of the Monterey Peninsula in Monterey.

Schools

The proposed project site is in the Monterey Peninsula Unified School District, which encompasses the cities of Del Rey Oaks, Marina, Monterey, Sand City, and Seaside and serves more than 10,000 students. The district is comprised of three early education centers, 12 elementary schools, four middle schools, four high schools, and three charter schools. The district also offers alternative education and adult education programs.

One school, Chartwell (a private school serving grades one through 12) is located within ¼-mile of the proposed project site. In addition, CSUMB is located within ½-mile of the proposed project site.

Libraries

The County maintains a network of free libraries with seventeen branch libraries, two bookmobiles, a library by mail program, deposit collections in local schools, and a number of special programs, including a literacy program which operates a literacy outreach vehicle focused on family literacy and kindergarten readiness. Free library services are provided to all residents of Monterey County. The closest libraries to the proposed project site are the Seaside Branch Library, located at 550 Harcourt Avenue in the City of Seaside, and the Marina Branch Library, located at 190 Seaside Circle in the City of Marina.

Recreation

There are a variety of recreational resources throughout the County, including Federal reserves, State beaches, and small neighborhood parks. Almost 14 percent (293,781 acres) of the County's land area is devoted to park and recreation facilities operated by various governmental entities. The County parks system, managed by the Monterey County Parks Department and Monterey Peninsula Regional Park District, makes up about 10 percent of the County's total park acreage. There are currently 17 county and regional parks in County of Monterey, offering a rich variety of recreational opportunities for residents and tourists.

Recreation includes formally designated parks, trails, and open spaces that provide activities like hiking and bird watching, as well as bodies of water where boating, fishing, and swimming are enjoyed. Recreation in County of Monterey is based on access to natural resources that are unique to the area, like the Monterey Bay shoreline, which contains one of the most significant and rare dune landforms on the west coast. Beach access, dune access, and hiking trails are available along the coast at recreational areas that are described in detail below. California State Parks has acquired approximately 990 acres of parkland on the former Fort Ord, including four miles of ocean beach located west of Highway 1, generally between Marina and Sand City, as part of the Fort Ord Dunes State Park.

Other significant recreational areas near the proposed project site include the Monterey Bay Coastal/Recreational Trail, Marina State Beach, Monterey State Beach, and Monterey Bay Waterfront Park/Window on the Bay. **Figure 3.13-1, Parks and Recreation Facilities in the Proposed Project Vicinity**, displays parks and recreational facilities located within the vicinity of the proposed project site.

Bureau of Land Management

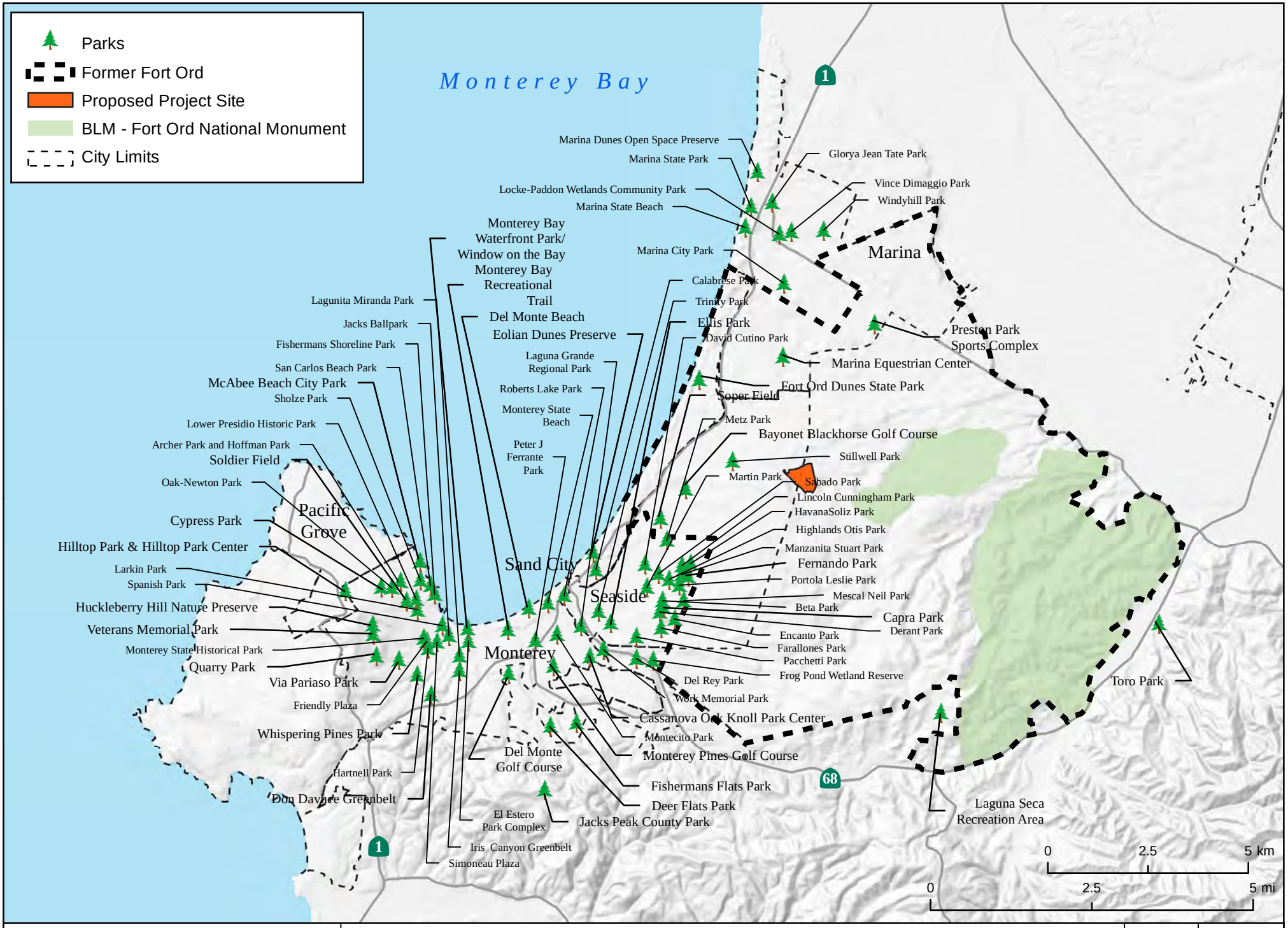
Over 7,200 acres of the former Fort Ord Amy base were acquired by the Bureau of Land Management (BLM) in October 1996. Habitat preservation and conservation were the primary missions for the BLM with the Fort Ord public lands under the BLM's approved Resource Management Plan and the HMP, but there are also more than 86 miles of trails open to the public for hiking, biking, or horseback riding. In order to assist former Fort Ord lands to transition from military to public use, the BLM manages its portion of the former base to protect rare habitat while also providing recreational opportunities on these public lands.

On April 20, 2012, the President of the United States established the FONM, which covers the entire 14,645 acres of the BLM public lands (existing and future). In establishing the FONM, "all Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, leasing, or other disposition under the public lands laws" (Fed. Reg. Vol. 77, No. 80, Wednesday April 25, 2012, pp. 24579-24583). As a national monument, the FONM is part of BLM's National Landscape Conservation System and shall be managed in a manner that protects the values for which the site was designated as a national monument. BLM will manage components of the National Landscape Conservation System to "conserve, protect, and restore nationally significant landscapes."

California State Parks

Fort Ord Dunes State Park

This recently opened State Park on the former Fort Ord has a 1,500-foot trail and four miles of ocean beach with beautiful views of Monterey Bay. From the parking area, visitors may also take a stroll on the new boardwalk to a bluff top viewing platform. Eight educational panels have been installed that inform the public about the natural and cultural history of the park. Existing park roads are open to bicyclists, hikers, and dogs on leash.



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Parks and Recreational Facilities in the Proposed Project Vicinity

N

Date 03-14-2019

Scale 1 in=1.9 mi

Figure 3.13-1

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Marina State Beach

State beaches are areas with frontage on the ocean, or bays designed to provide swimming, boating, fishing, and other beach-oriented recreational activities. Marina State Beach has been a unit of the State Parks system since 1977. Marina State Beach encompasses 170 acres and serves an estimated 500,000 visitors each year. The beach area winds through the Marina Dunes Natural Preserves. The function of the Marina State Beach is to preserve and protect the coastal dunes and provide opportunities for ocean or beach-oriented recreation to the public. The existing facilities at Marina State Beach include full utility hookups, restrooms, and a State Parks office and employee residence. The beach is known for hang-gliding; however, radio-controlled gliders and kites are also popular. Western Hang Gliders (not run by the State Parks office) provides hang gliding, paragliding, and ultralighting equipment and services adjacent to the beach parking lot. The beach is wheelchair accessible, with a boardwalk that winds through the Marina Dunes Natural Preserves. Water recreation is extremely hazardous due to strong rip currents.

Monterey State Beach

The Monterey State Beach is a favorite place for surfers and tidepool watchers. Fishing is popular, too. The cities of Monterey and Seaside share Monterey State Beach, which includes three separate beaches approximately a mile apart. The underwater area of the State beach attracts scuba divers. Visitors also enjoy kayaking, kite-flying and volleyball. The flat beach is an excellent place for beachcombing.

County and Regional Parks

Below is a listing of county and regional parks in the general vicinity of the proposed project site.

- Eolian Dunes Preserve
- Locke-Paddon Wetlands Community Park
- Marina Dunes Open Space Reserve
- Jacks Peak County Park
- Monterey Peninsula Regional Park
- Toro Park
- Laguna Seca Recreation Area
- Laguna Grande Regional Park
- Frog Pond Wetland Reserve

Local Parks

Below is a listing of local parks and other recreational elements in the general vicinity of the proposed project site in the cities of Del Rey Oaks, Marina, Monterey, and Seaside.

City of Del Rey Oaks

- Work Memorial Park
- Del Rey Park

City of Marina

- Glorya Jean Tate Park
- Vince Di Maggio Park
- Windy Hill Park
- Marina Equestrian Center
- Preston Park Sports Complex
- Marina City Park

City of Monterey

- Hilltop Park & Hilltop Park Center
- Oak Newton Park
- Archer Park Center & Hoffman Park
- San Carlos Beach Park
- Fisherman's Shoreline Park
- Larkin Park

- Huckleberry Hill Nature Preserve
- Veteran's Memorial Park
- Via Paraiso Park
- Whispering Pines Park
- Jacks Ballpark
- Don Dahvee Greenbelt
- El Estero Park Complex
- Iris Canyon Greenbelt
- Monterey Bay Waterfront Park/Window on the Bay
- Peter J. Ferrante Park
- Montecito Park
- Casanova Oak Knoll Park Center
- Fisherman's Flats Park
- Deer Flats Park
- Cypress Park
- Friendly Plaza
- Lagunita Mirada
- Del Monte Beach
- Quarry Park
- Lower Presidio Historic Park
- McAbee Beach City Park
- Sholze Park
- Spanish Park
- Soldier Field

City of Seaside

- Roberts Lake Park
- Soper Field
- Metz Park
- David Cutino Park
- Pachetti Park
- Farallones Park
- Beta Park
- Havana Soliz Park
- Lincoln Cunningham Park
- Fernando Park
- Highlands Otis Park
- Sabado Park
- Martin Park
- Durant Park
- Ellis Park
- Trinity Park
- Portola Leslie Park
- Manzanita Stuart Park
- Capra Park
- Mescal Neil Park
- Encanto Park
- Stillwell Park

Other Recreational Elements

Below is a listing of other recreational elements in the general vicinity of the proposed project site.

- Bayonet & Black Horse Golf Course
- Monterey Pines Golf Course
- Del Monte Golf Course
- Monterey Bay Recreational Trail

3.13.3 Regulatory Framework

State

California Fire Code

CFC (Title 24, Part 9 of the CCR) establishes regulations to safeguard against hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The CFC also establishes requirements intended to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of the CFC apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout the State. The CFC includes regulations regarding fire resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas.

3.13.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in:

- substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services such as fire protection, police protection, schools, parks, or other public services.

Impact Analysis Overview

Approach to Analysis

This impact analysis focuses on the potential for construction or operation of the proposed project and alternatives to directly affect public services. Potential effects related to wildland fire hazards are evaluated in **Section 3.9**, **Hazards and Hazardous Materials**. Potential construction-related effects on emergency access and access to schools and recreational facilities are addressed in **Section 3.15**, **Transportation**.

Operational impacts affecting public services and parks (and recreational facilities) considers whether proposed project implementation affects the ability of fire, police or emergency services, schools, and parks and recreational facilities to maintain acceptable service or other performance objectives, resulting in the need for new or expanded facilities or deterioration of existing park facilities.

Areas of No Impact

All of the significance criteria outlined above are applicable to the proposed project and, thus, are evaluated below.

Summary of Impacts

Table 3.13-1 provides a summary of potential impacts to public services from the proposed project and alternatives.

Table 3.13-1. Summary of Impacts – Public Services

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any public services, including:					
Impact PS-1: Emergency Services	LS	LS	LS	LS	NI
Impact PS-2: Schools and Libraries	LS	LS	LS	LS	NI
Impact PS-3: Parks and Recreation	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact PS-1: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for emergency services, including fire protection, police protection, or emergency medical services. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The proposed project site crosses the jurisdictional boundaries of the City of Seaside and the County of Monterey. Based on the location of each phase (e.g., Phase 2 is located entirely within Seaside city limits), fire and police protection services would be provided by either the City of Seaside Fire Department or the MCRFD, and by either the City of Seaside Police Department or the County of Monterey Sheriff's Office. Emergency medical services would be provided by the MCRFD, Monterey County Emergency Medical Services Agency, and the Community Hospital of Monterey County, located approximately 7.5 miles southwest of the proposed project site. During construction and operation of the proposed project, incidents requiring emergency services may occur. However, any increase in incidents would be minor and would not be expected to exceed the capacity of local service providers to a degree that would require new or expanded facilities that would result in significant physical environmental impacts.

The anticipated construction workers for each phase of the project would range from 20 to 30. There are currently four employees at the CCCVC (i.e., one manager, one skilled laborer, and two office technicians). However, there are five positions budgeted for Phase 1 and this vacancy may be filled at

any time. It is anticipated that three additional employees would be needed to operate and maintain the cemetery (i.e., one lead groundskeeper, one skilled laborer, and one associate program analyst) for Phases 2 and 3. It is anticipated that this hiring trend would continue every couple phases of development through build-out, with an estimated 20 total employees.

It is expected that new employees would be existing, local employees already residing in the County. While it is possible that some workers might relocate from other areas, the proposed project would not substantially increase the local population such that it would lead to an increased demand for fire or police protection services. Any increase in the local population during project construction and operation would be negligible, and resulting emergency service demand could be accommodated by existing service providers. The proposed project would have a less-than-significant impact on emergency services. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to emergency services as the impact described under Alternative 1 above. However, under Alternative 2, the Master Plan footprint would be smaller and would require less construction and fewer permanent employees, thereby reducing the number of potential incidents requiring emergency services. However, since Alternative 1 would have a negligible impact on emergency services, this difference would also be negligible. Alternative 2 would have a less-than-significant impact on emergency services. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to emergency services as the impact described under Alternative 1 above. However, under Alternative 3, the Phase 2 footprint would be slightly larger and would involve more construction, thereby potentially increasing the number of potential incidents requiring emergency services during construction. However, any increase in incidents would be minor and would not be expected to exceed the capacity of local service providers to a degree that would require new or expanded facilities that would result in significant physical environmental impacts. Alternative 3 would have a less-than-significant impact on emergency services. No mitigation is required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase demand for emergency services; Alternative 4 would, therefore, have no impact on these services.

Impact PS-2: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives for schools or libraries. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The proposed project site is located within the Monterey Peninsula Unified School District, which serves more than 10,000 students. Library services are provided by the Monterey County Free Libraries network, which maintains a number of free facilities and programs available to all residents of Monterey County. As noted under **Impact PS-1** above, construction of each phase of the proposed project would require 20 to 30 temporary construction workers and operation of the project would require an estimated 20 permanent employees at full build-out of the 2015 Master Plan. It is expected that new employees would be existing, local employees already residing in the County. While it is possible that

some workers might relocate from other areas, the proposed project would not substantially increase the local population such that it would lead to an increased demand for schools or libraries. Any increase in the local population during project construction and operation would be negligible, and resulting demand could be accommodated by existing schools and libraries. The proposed project would have a less-than-significant impact on schools and libraries. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to schools and libraries as the impact described under Alternative 1 above. However, under Alternative 2, the 2015 Master Plan footprint would be smaller and would require less construction and fewer permanent employees, thereby reducing the demand for schools and libraries. However, since Alternative 1 would have a negligible impact on schools, this difference would also be negligible. Alternative 2 would have a less-than-significant impact on schools and libraries. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to schools and libraries as the impact described under Alternative 1 above. Although the Phase 2 footprint would be slightly larger under Alternative 3, it is anticipated that the same number of permanent employees would be required as under Alternative 1. Alternative 3 would have a less-than-significant impact on schools and libraries. No mitigation is required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase demand for schools or libraries; Alternative 4 would, therefore, have no impact on schools and libraries.

Impact PS-3: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives for parks and recreation facilities. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

There are a variety of recreational resources throughout the County, including Federal reserves, State beaches, and small neighborhood parks. Almost 14 percent (293,781 acres) of the County's land area is devoted to park and recreation facilities operated by various governmental entities. There are over 70 parks and recreation facilities within 10 miles of the proposed project site alone. As noted under **Impact PS-1** above, construction of each phase of the proposed project would require 20 to 30 temporary construction workers and operation of the project would require an estimated 20 permanent employees at full build-out of the 2015 Master Plan. It is expected that new employees would be existing, local employees already residing in the County. While it is possible that some workers might relocate from other areas, the proposed project would not substantially increase the local population such that it would lead to an increased demand for parks and recreation facilities. Any increase in the local population during project construction and operation would be negligible, and resulting demand could be accommodated by the many existing parks and recreation facilities in the area. In addition, this negligible increase in the local population would not substantially increase the use of existing recreational facilities such that substantial physical deterioration would occur or be accelerated. The proposed project would have a less-than-significant impact on parks and recreation facilities. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to parks and recreation facilities as the impact described under Alternative 1 above. However, under Alternative 2, the Master Plan footprint would be smaller and would require less construction and fewer permanent employees, thereby reducing the demand for these facilities. However, since Alternative 1 would have a negligible impact on parks and recreation, this difference would also be negligible. Alternative 2 would have a less-than-significant impact on parks and recreation. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to parks and recreation facilities as the impact described under Alternative 1 above. Although the Phase 2 footprint would be slightly larger under Alternative 3, it is anticipated that the same number of permanent employees would be required as under Alternative 1. Alternative 3 would have a less-than-significant impact on parks and recreation. No mitigation is required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase demand for parks and recreation facilities; Alternative 4 would, therefore, have no impact on parks and recreation.

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3.14 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.14.1 Introduction

This section provides an overview of relevant information concerning the existing demographic characteristics of the region, including information pertaining to population and housing, minority and low-income populations, and employment information, as well as an overview of relevant Federal, State, and local regulations affecting socioeconomic and environmental justice issues. Information contained in this section is based on currently available documentation, including most recent U.S. Census data.

Public and agency comments were received during the public scoping period. To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. No comments concerning socioeconomics or environmental justice were received. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.14.2 Environmental Setting

Demographics

Population

Table 3.14-1 presents existing and projected population for the jurisdictions located within the boundaries of the former Fort Ord through 2035. The information presented in **Table 3.14-1** is based on the current population and historic trends reported by the AMBAG. The highest population growth rates are projected within the cities of Marina and Del Rey Oaks. Between 2015 to 2040, Marina's population is expected to increase by 49 percent and Del Rey Oaks' population is expected to increase by 80 percent. By 2035, the County of Monterey's population is expected to grow by 16 percent.

Table 3.14-1. Current and Projected Population Summary by Jurisdiction

Place of Residence	2010 Census	2015 Census	2020 Projected	2025 Projected	2030 Projected	2035 Projected	2040 Projected
City of Del Rey Oaks	1,624	1,655	1,949	2,268	2,591	2,835	2,987
City of Marina	19,718	20,496	23,470	26,188	28,515	29,554	30,510
City of Monterey	27,810	28,576	28,726	29,328	29,881	30,460	30,976
City of Seaside	33,025	34,185	34,301	35,242	36,285	37,056	37,802
Unincorporated County of Monterey	100,213	104,613	105,361	105,682	106,007	106,323	106,418
County of Monterey Total	**415, 057**	**432,637**	**448,211**	**462,678**	**476,588**	**489,451**	**501,751**

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates; and population projections from AMBAG's 2018 Regional Growth Forecast

Minority & Low Income Populations

For the purposes of environmental justice analysis, Federal agencies are required to identify whether a proposed action will possibly have disproportionately high and adverse effects on minority or low-

income populations within the proposed action vicinity.[1] The geographic scale used to identify any environmental justice "communities of concern" should more or less correspond to the scale of the project's potential adverse impacts and affected environment. The affected environment for the environmental justice analysis consists of the cities and the unincorporated area within or adjacent to the boundaries of the former Fort Ord.

Table 3.14-2 presents the racial composition for the County of Monterey and the jurisdiction with boundaries within the former Fort Ord. The proportion of minority individuals has also been compared to the composition of County of Monterey's total population. **Table 3.14-2** provides population percentages for the minority populations of the cities of Monterey, Marina, Seaside, and the County of Monterey. As shown in **Table 3.14-2**, the County has a 69.4 percent minority population.[2] Of the cities within the proposed project area, two have above 50 percent minority populations, Marina (64.2 percent) and Seaside (68.9 percent).

Table 3.14-2. Proposed Action Area Minority Profile

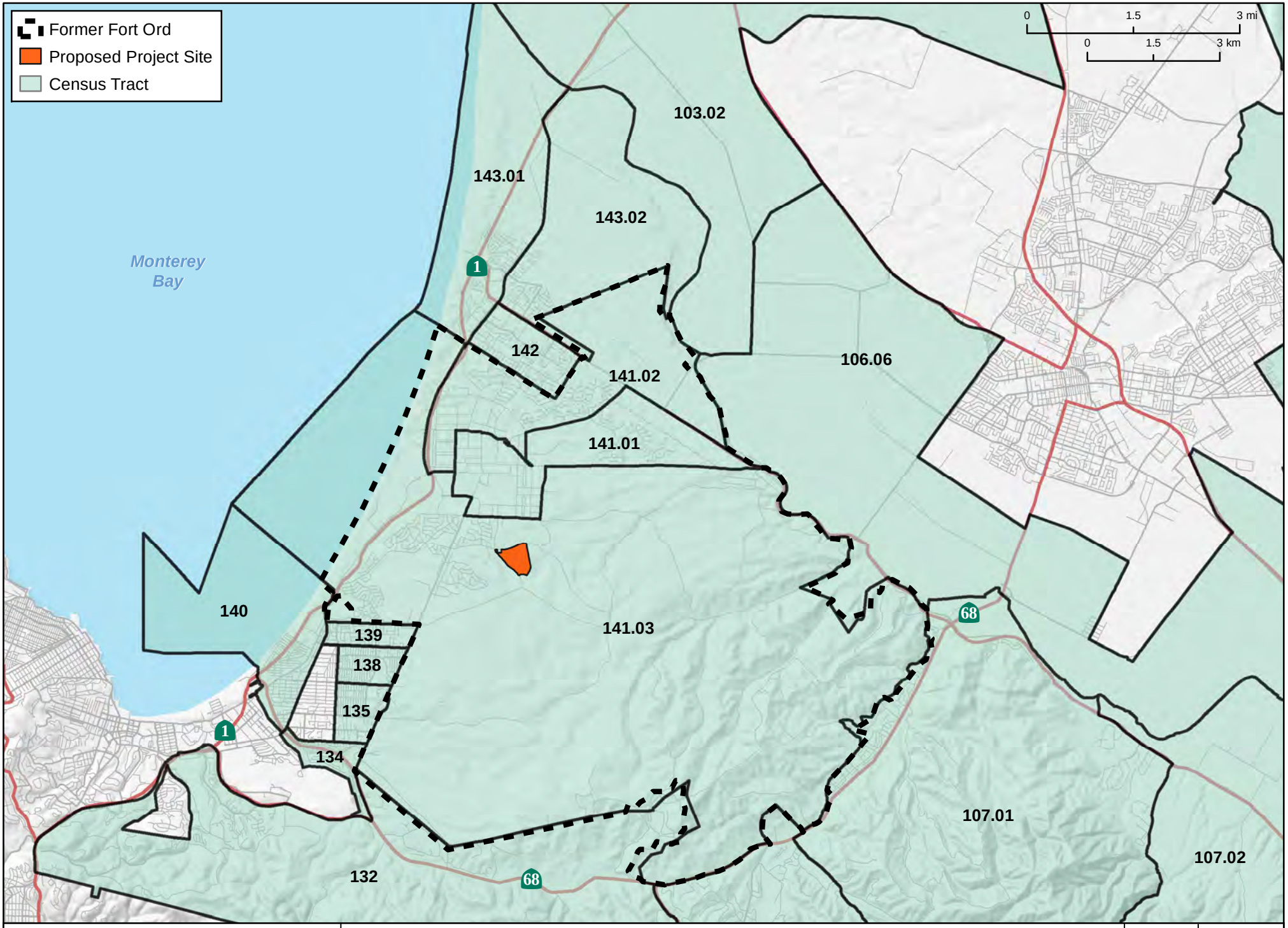
Jurisdiction	2013-2017 5-Year Average Population	Minority Population	Minority Percentage
Del Rey Oaks	1,555	440	28.3%
Monterey	28,671	9,844	34.3%
Marina	21,227	13,627	64.2%
Seaside	34,259	23,614	68.9%
County of Monterey	433,168	300,568	69.4%
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates			

Figure 3.14-1, Census Map, identifies census tracts located immediately adjacent to the former Fort Ord. **Table 3.14-3** shows the minority populations for the Census Tracts that are within or adjacent to the boundaries of the former Fort Ord. In addition, **Table 3.14-3** also contains information related to low income populations within those census tracts. The CEQ's environmental justice guidance (1997) states that "low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty." Generally, a low-income population exists if a community has 50 percent or more of its residents living below the poverty threshold (as defined by the U.S. Census) or its population of poverty level residents is meaningfully greater than the proportion of low-income individuals within the general population. For the purposes of this analysis, a census tract that contains 50 percent or more minority or low-income population constitutes an environmental justice community.

Based on the Census Tract analysis of the minority population contained in **Table 3.14-3**, there is a high proportion of minority communities within the proposed project vicinity. As shown in **Table 3.14-3**, seven Census Tracts have over 50 percent minority populations. These areas are located primarily within the unincorporated portion of the County located north of the former Fort Ord, as well as the cities of Marina and Seaside. The area with the highest proportion minority population is located within

[1] According to CEQ guidelines for environmental justice analysis, "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent; or (b) the minority population percentage of the affected area is meaningfully greater than the majority population percentage in the general population or other appropriate unit of geographic analysis…[A] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ, 1997).

[2] It is important to note, however, that the census data obtained for the County of Monterey represents the entire County, including the incorporated cities and unincorporated areas. The racial composition of the unincorporated areas of the County of Monterey within the proposed project vicinity is anticipated to vary significantly.



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Census Map

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Date 03-19-2019

Scale 1 in=1.7 mi

Figure 3.14-1

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unincorporated areas of the County (Census Tract 160.6). Census Tract 142, which is located in Marina, has the largest number of minority residents. As further identified in **Table 3.14-3**, no census tracts contain low-income populations in excess of 50 percent.

Table 3.14-3. Proposed Action Area Minority Profile by Census Tract

Tract Names	Population	Minority #	Minority %	Poverty %
103.02	1,258	506	40.22	10.2
106.06	6,299	5,226	82.97	21.6
107.01	6,769	1,481	21.88	1.9
107.02	3,911	557	14.24	2.9
132	4,225	628	14.86	2.2
134	1,624	307	18.90	5.0
135	4,920	2,900	58.94	11.1
138	5,548	4,246	76.53	11.7
139	2,765	1,298	46.94	11.0
140	2,637	1,669	63.29	19.3
141.01	8,322	4,977	59.81	26.8
141.02	2,259	1,046	46.30	35.4
141.03	5,890	1,269	21.54	4.7
142	9,570	5,309	55.48	12.7
143.01	3,602	1,819	50.50	6.01
143.02	4,024	1,412	35.09	11.5
TOTAL	73,623	34,650	47.06	-
Source: U.S. Census 2010 Lookup, http://factfinder2.census.gov/ accessed March 2018				

Housing

Table 3.14-4 shows the past housing estimates for the cities within and adjacent to the proposed project area. Between 1990 and 2010; the number of housing units within the County of Monterey increased by 12.8 percent; although both Marina and Seaside experienced a reported decline in the number of housing units.

Table 3.14-4. Historical Housing in County of Monterey and Selected Cities (1990 – 2010)

Jurisdiction	Housing Units			Percent Change (1990 - 2010)	Percent Vacant (2010)
	1990	2000	2010		
County of Monterey	121,224	131,708	139,084	12.8%	9.4%
Del Rey Oaks	733	727	741	1.0%	5.4%
Marina	8,261	8,537	7,200	(12.8%)	4.9%
Monterey	13,497	13,382	13,584	0.6%	10.3%
Seaside	11,214	11,005	10,872	(3.0%)	7.2%
Source: California Department of Finance, 2010 and U.S. Census Bureau, 2010.					

Generally, a five percent vacancy rate is considered adequate and healthy to allow for consumer choice and relocation within the housing market. As shown in **Table 3.14-4**, data obtained from the 2010 Census indicates the current county-wide housing vacancy rate is approximately nine percent. Housing vacancy rates are very high in the cities of Seaside and Monterey. The recent indication of high vacancy rate within the region is likely a result of foreclosures and a weakened real estate market resulting from the recent economic downturn.

Housing projections were developed by AMBAG as part AMBAG's 2018 Regional Growth Forecast (AMBAG, 2018a). AMBAG used statistical modeling to develop projections for anticipated housing units through the year 2040. Projected housing stock for jurisdictions within the former Fort Ord is identified in **Table 3.14-5**. Overall, AMBAG's projects that 24,009 new housing units will be constructed between 2015 and 2040, within the County.

Table 3.14-5. County of Monterey AMBAG Housing Projections 2010-2035

Jurisdiction	Year					
	2015	2020	2025	2030	2035	2040
Del Rey Oaks	741	874	1,020	1,180	1,297	1,361
Marina	7,334	8,172	8,776	9,324	9,692	10,014
Monterey	13,637	13,846	14,126	14,322	14,627	14,908
Seaside	10,913	11,126	11,264	11,517	11,878	12,342
Unincorporated County of Monterey	38,783	39,476	39,800	39,894	39,981	40,001
Total Housing Units in the County of Monterey:[1]	139,177	144,491	149,032	153,708	158,151	163,186

Note:
1) This includes all housing units within the County of Monterey, including the incorporated cities (i.e. Salinas, Soledad, King City, etc.) and unincorporated areas.

Source: AMBAG, 2018a

Employment

This section discusses trends in employment and the economy; overall trends in job growth as projected in AMBAG's Monterey Bay 2018 Regional Forecast are presented below. Key employment data include the number of employable residents (i.e., its available labor force) and the number of job opportunities (i.e. employment) within the community. **Table 3.14-6** shows civilian labor force and unemployment data for the County and the cities comprising the former Fort Ord. Currently, the unemployment rate within the County in January 2019 was approximately 10 percent (California Employment Development Department, 2019a).

Table 3.14-6. Labor Force and Unemployment in the County of Monterey & Proposed Project Vicinity

Jurisdiction	Labor Force	Unemployed	Unemployment Rate (%)[3]
County of Monterey	217,300	21,700	10%
Del Rey Oaks	1,000	100	10.3%
Marina	11,800	400	3.5%
Monterey	14,600	400	2.8%
Seaside	16,500	500	3.1%
State of California	19,564,800	934,700	4.8%

Source: California Employment Development Department, 2019a and 2019b.

Table 3.14-7 presents a breakdown of employment in different industry sectors in the Cities of Marina, Monterey, and Seaside, in addition to the County. The categories with the largest number of jobs in the affected jurisdictions include education, arts, retail, and professional. Projections for the non-farm industry in the County between 2002 and 2012 suggest that the largest changes would be in the services industry, which could increase by approximately 10,400 jobs, mainly in food service industry.

[3] Data may not add due to rounding. All unemployment rates shown are calculated on unrounded data.

Table 3.14-7. Labor Force Characteristics

Employment Sector	Year 2010			
	Monterey	Marina	Seaside	County of Monterey
Agriculture	810 (3.0%)	18 (0.4%)	-	45,100(24.8%)
Construction	818 (3.0%)	276 (5.6%)	204 (2.6%)	4,300 (2.4%)
Industrial	1,205 (4.5%)	212 (4.3%)	196 (2.5%)	5,600 (3.1%)
Retail	2,653 (9.9%)	926 (18.7%)	949 (12.2%)	20,100 (11.0%)
Service	12,085 (44.9%)	2,249 (45.4%)	2,743 (35.2%)	60,900 (33.5%)
Public	9,362 (34.8%)	1,270 (25.6%)	3,698 (47.5%)	46,000 (25.3%)
TOTAL	**26,933**	**4,951**	**7,790**	**182,000**
Source: AMBAG, 2014 Regional Growth Forecast				

In addition to the information contained in **Table 3.14-7** above, the AMBAG Monterey Bay 2018 Regional Forecast has also developed employment projections for the region (AMBAG, 2018a). AMBAG estimates that the County, by the year 2040, will have added 32,272 new jobs. According to AMBAG, the most recent employment data estimate that in 2015, approximately 203,550 jobs are located in the County. The largest proportion of these jobs is in the City of Salinas, of cities within the proposed project area the largest proportion of jobs is in the City of Monterey. Seaside and Marina are the other major employment centers on the Monterey Peninsula. Between 2015 and 2040, AMBAG projects a county-wide increase in employment of 16 percent. As shown in **Table 3.14-8**, substantial job growth is anticipated to occur within the cities of Monterey, Seaside and Marina.

Table 3.14-8. Employment Forecast

Jurisdiction	Employment						Percentage Growth (2015- 2040)
	2015	2020	2025	2030	2035	2040	
Del Rey Oaks	359	371	387	404	418	432	15%
Marina	6,340	6,649	6,886	7,140	7,373	7,620	20%
Monterey	34,030	34,434	35,970	37,405	38,814	40,173	18%
Seaside	9,650	10,161	10,455	10,726	11,020	11,299	17%
Unincorporated County of Monterey	59,939	62,503	63,497	64,438	65,516	66,390	11%
County of Monterey	203,550	211,799	218,203	224,207	230,212	235,822	16%
Source: AMBAG, 2014 Regional Growth Forecast							

The AMBAG 2018 Regional Forecast is consistent with the national forecasts but slightly slower than state-level forecasts (AMBAG, 2018a). Overall, jobs across all sectors of the economy are anticipated to increase through 2040; please refer to **Table 3.14-9** for more information. A detailed breakdown of employment growth by sector for each of the individual land use jurisdiction is not provided.

Table 3.14-9. County of Monterey AMBAG Employment Projections by Sector

Sector	Year				
	2010	**2020**	**2025**	**2030**	**2035**
Agricultural	45,100	47,432	47,927	48,256	48,666
Construction	4,300	5,902	6,010	6,118	6,226
Industrial	5,600	5,651	5,559	5,513	5,425
Retail	20,100	23,306	23,418	23,644	23,869
Service	60,900	71,430	73,414	75,586	77,805
Public	46,000	52,256	54,890	57,369	60,146
Total:	182,000	205,977	211,218	216,486	222,137
Source: AMBAG, 2014 Regional Growth Forecast					

Growth Inducement

Introduction

NEPA (40 CFR. § 1508.8(b)) requires that an EIS address the indirect effects of a proposed project. Indirect effects may include "growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems." In addition, CEQA Guidelines §§15126.2(d) requires that an EIR "discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Under NEPA, growth-inducing effects are a subset of indirect effects, which are defined as effects "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8)b)).[4]

A project/action may result in a growth-inducing impact if it individually or cumulatively removes an obstacle to population growth; results in increased population that requires the expansion of existing public facilities, the expansion of which has the potential to result in significant environmental effects; or generally encourages or facilitates activities that could adversely affect the environment. Direct growth inducement could result, for example, if a project involves the construction of new housing. Indirect growth inducement could result if a project established substantial new permanent employment opportunities (e.g. new commercial, industrial, or governmental enterprises) or if it would remove obstacles to population growth (e.g. expansion of infrastructure capacity).

Proposed Project Area

AMBAG prepares a regional forecast of population, housing, and employment projections every five years for Santa Cruz, San Benito, and Monterey counties. In 2018, AMBAG updated the Regional Growth Forecast (AMBAG, 2018a). Based on the 2018 population, housing, and employment forecasts, the County of Monterey is expected experience continued growth. Relevant information concerning population, housing, and employment forecasts for each of the jurisdictions within and adjacent to the former Fort Ord is present above; please refer above for more information. Also, please refer to the AMBAG 2018 Regional Growth Forecast for a detailed discussion of projections for each jurisdiction.

[4] Significance varies, depending on the setting of the Proposed Action (40CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth inducing and others related to induced changes in the pattern of land use, population density, or growth rate. Generally, effects that result in greater employment, income or otherwise improve the quality of life for the local population are considered beneficial socioeconomic impacts.

Patterns and Trends

The AMBAG 2018 Regional Growth Forecast notes that regional growth rate is similar to the national average, but slightly slower than state-level forecasts (AMBAG, 2018a). In addition, job growth is expected across most employment sectors. The updated forecasts are slightly lower than prior forecasts and is consistent with the slowing growth rates seen at both the state and national levels. This decline is attributed to a fall in fertility rates and international migration that occurred during the recession years that have not fully rebounded. In addition to slower growth, the new forecast predicts an older age distribution, which also impacts housing. While population growth will slow, which reduces future housing demand, older people are more likely to live alone or in a small household, this shift offsets the lower population forecasts with a slight upward effect on housing demand.

3.14.3 Regulatory Framework

Federal

National Environmental Policy Act

Under NEPA (42 USC 4321 et seq.), the social and economic effects of a project, if they are related to the project's natural or physical effects, must be considered. Implementation of NEPA (40 CFR Parts 1500-1508) defines "effects" to include economic and social factors whether direct, indirect or cumulative in nature (40 CFR Section 1508.8). Consequently, an EA or EIS must analyze a project's economic and social impacts related to natural or physical effects to the affected area's physical environment. However, NEPA provides no specific thresholds of significance for socioeconomic impact assessment.

Executive Order 12898

Federal agencies are directed by EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations,* as amended, to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The executive order requires Federal agencies to consider impacts on minority and/or low-income populations during their environmental and socioeconomic analyses of projects or programs that are proposed, funded or licensed under their authority. Specifically, EO 12898 requires that:

> "To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.
>
> Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin."

The executive order also requires that "each Federal Agency shall analyze the environmental effects, including health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA."

Regulation of the Federal Government's compliance with EO 12898 and NEPA is provided by the CEQ with assistance from the U.S. EPA and other agencies.

Council for Environmental Quality Regulations

The CEQ coordinates Federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives. The CEQ has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. The CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* advises agencies to consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse environmental effects to these populations (CEQ, 1997).

The CEQ provides guidance for incorporating environmental justice into NEPA compliance and definitions of key terms and concepts relevant to EO 12898 as established by the Interagency Work Group on Environmental Justice.[5] The CEQ guidance identifies minority populations where the percentage of minority individuals is greater than 50 percent, or "meaningfully greater" than that of the general population.[6] For the purposes of environmental justice analysis, the minority population for a community consists of all non-white individuals as well as all Hispanic or Latino individuals (i.e. of both white and non-white racial origin).

Similarly, a low-income population exists if the community consists of 50 percent or more living below the poverty threshold (as defined by the U.S. Census) or is meaningfully greater than the proportion of low-income individuals within the general population.

State

California Government Code

While there is no requirement to address environmental justice issues under CEQA, following the lead of EO 12898, the State of California passed a series of environmental justice regulations. California Government Code Section 65040.12 defines environmental justice as the "fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

Legislative and executive actions relating to environmental justice in California have been largely procedural including, but not limited to, formation of environmental justice advisory committees and assigning coordinating roles and responsibilities to the Governor's Office of Planning and Research and the Cal-EPA.

[5] The EO established the Interagency Working Group on Environmental Justice to guide and facilitate cooperation among Federal agencies in environmental justice policy implementation. The Interagency Working Group on Environmental Justice is chaired by the U.S. EPA Administrator and includes all the major Federal departments/agencies and White House offices.

[6] Although "meaningfully greater" is not defined by the CEQ guidelines, typically communities with a proportion of minority individuals twice that of the general population will be recognized as minority communities of concern.

3.14.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. substantially affect employment, industry, or commerce, including requiring the displacement of businesses or farms;

b. substantially affect property values or the local tax base;

c. substantially, disproportionately affect minority, low-income, elderly, disabled, transit-dependent, or other specific interest group(s);

d. predominantly result in an adverse effect on a minority or low-income area as defined by the EPA; or

e. displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Impact Analysis Overview

Approach to Analysis

The following impact analyses address potential socioeconomic and environmental justice effects associated with the implementation of the proposed project and alternatives. The significance criteria are assessed in this section as the basis for determining the significance of impacts related to issues of socioeconomics and environmental justice.

The evaluation is based on review of relevant documentation, the impacts to employment and housing during construction or operation of the proposed project, and the location of the proposed project area in relationship to minority, low-income, elderly, or other special interest groups. Each potential impact is assessed in terms of the applicable regulatory requirements, such as mandatory compliance with various Federal, State, and local regulations that would serve to prevent significant impacts from occurring.

Areas of No Impact

Some of the Thresholds of Significance criteria outlined above are not applicable to the proposed project or the proposed project would not result in impacts related to these criteria, as explained below.

(e) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. (No impact during the construction or operation of the proposed project and alternatives). The proposed project and alternatives would not displace a substantial number of people; there is no housing located within the proposed project site.

Summary of Impacts

Table 3.14-10 provides a summary of potential socioeconomic and environmental justice impacts from the proposed project and alternatives.

Table 3.14-10. Summary of Impacts – Socioeconomics and Environmental Justice

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact SEJ-1: Affect employment, industry, or commerce, including requiring the displacement of business or farms.	BI	BI	BI	BI	NI
Impact SEJ-2: Substantially affect property values or the local tax base.	LS	LS	LS	LS	NI
Impact SEJ-3: Cause a disproportionate effect on minority, low-income, elderly, disabled, transit-dependent, or other specific interest group(s).	LS	LS	LS	LS	LS
Impact SEJ-4: Cause an adverse effect on a minority or low-income area as defined by the EPA.	LS	LS	LS	LS	NI

NI – No Impact
LS – Less than Significant
LSM – Less than Significant with Mitigation
SU – Significant Unavoidable
BI – Beneficial Impact

Impacts and Mitigation Measures

Impact SEJ-1: Affect employment, industry, or commerce, including requiring the displacement of business or farms. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction

Construction of the proposed project could result in temporary increases to local employment, industry, or commerce; however, this impact would not require the displacement of business and would have no impact to farms. The extent to which construction activities and spending would benefit the local economy would depend on the proportion of construction labor, materials, and equipment sourced from the project area; however, it is reasonable to assume that construction of the proposed project would result in an increase to local economic activity.

In addition to the direct effect of increased employment and revenue for local businesses, a secondary economic effect could also result from subsequent "re-spending" by construction companies and materials suppliers that occurs when these companies spend their earning from the project at other businesses. However, much like the direct impacts to employment and local business revenue, these indirect "re-spending" impacts would be dependent on the proportion of local labor, goods, and services sourced from the local economy.

Operation

Currently, there are four employees at the CCCVC (i.e., one manager, one skilled laborer, and two office technicians). However, there are five positions budgeted for Phase 1 and this vacancy may be filled at any time. For Phases 2 and 3, it is anticipated that three additional employees would be needed to operate and maintain the cemetery (i.e., one lead groundskeeper, one skilled laborer, and one associate program analyst). It is anticipated that this hiring trend would continue every couple phases of development through build-out, with an estimated 20 total employees.

While the proposed project may directly and/or indirectly affect employment, industry, and/or commerce, the extent of potential effects varies. These changes would not constitute a substantial adverse socioeconomic impact. In addition, construction and operation of the proposed project would result in the creation of new sources of economic activity and new sources of employment. No business or farms would be displaced. As a result, construction and operation of the proposed project would not adversely affect existing sources of employment, industry, or commerce, including requiring the displacement of business or farms. This increase in economic activity and employment represents a beneficial impact. No mitigation measures are required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project; however, Alternative 2 would still result in new sources of economic activity and employment. As a result, this impact would be beneficial. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would result in new sources of economic activity and employment. As a result, this impact would be beneficial. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, the area would not benefit not be adversely affected.

Impact SEJ-2: Substantially affect property values or the local tax base. (Criterion b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Property values are dependent on a wide range of site-specific and broad geographic considerations, such as size and shape of the property, accessibility, environmental conditions, legal constraints, utilities, zoning and land use regulations, available land supply/inventory, and overall economic climate. The project site consists of unimproved open space and is surrounded by vacant land on the north, east, south, and west. The closest residence is located approximately 300 feet northwest of the project site. Development of the proposed project could impact nearby resident property values. However, the proposed project parcels are designated as "development parcels" in the Fort Ord HMP. Therefore, development of the property would not substantially affect property values as it would not impose new development/land use restrictions. This is considered a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project; however, Alternative 2 would still be in the same location of within a development parcel. As a result, this impact would be less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2. Therefore, Alternative 3 would still result in the development of a parcel designated as development and, thus, would not impact property values. As a result, this impact would be less than significant. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Impact SEJ-3: Cause a disproportionate effect on minority, low-income, elderly, disabled, transit-dependent, or other specific interest group(s). (Criterion c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As described above, a low-income community consists of an area, in this instance a census tract, which contains 50 percent or more residents living below the poverty threshold. A minority population consists of a geographic area that contains 50 percent minorities. For the purposes of this analysis, a census tract that contains 50 percent or more minority or low-income population constitutes an environmental justice community. The proposed project is located within census tract 141.03, which is not an environmental justice community (21.54 percent minority, and 4.7 percent poverty). However, there are communities within the vicinity of the proposed project site which are considered environmental justice communities. These communities include veterans, which would benefit from the proposed project. Under the proposed project, the full range of internment services including ground crypt burial (casket burial) would occur, meeting the needs of veterans and maintaining sensitivity to all cultures by providing a variety of internment services. Impacts would primarily be felt locally within census tract 141.03, which is not considered an environmental justice community, such as noise or traffic impacts generated as a result of construction and operation of the proposed project. Furthermore, the proposed project would not result in health hazards to nearby residences. As a result, the proposed project would have a minimal adverse effect on census tract 141.03, which is not considered an environmental justice community and would have even lesser impacts to surrounding communities which are considered environmental justice communities. Therefore, the proposed project would not disproportionately affect minority or low-income populations. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project and Alternative 2 would still be in the same census tract 141.03, which is not considered an environmental justice community. Furthermore, the nature of the proposed improvements is similar to the proposed project in that they would not impact the surrounding communities that are considered environmental justice communities. As a result, this impact is less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2 and would still be located in the same census tract 141.03, which is not considered an environmental justice community. Furthermore, the nature of the proposed improvements is similar to the proposed project in that they would not impact the surrounding communities that are considered environmental justice communities. As a result, this impact would be less than significant. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, the full range of internment services, including ground crypt burial (casket burial), would not occur. If veterans from the environmental justice communities in the project vicinity desired a ground burial, veterans and their families would be required to travel to one of the seven veterans cemeteries located 100 to 400 miles from the project site offering ground burial options. This is a less-than-significant impact. No mitigation is required.

Impact SEJ-4: Cause an adverse effect on a minority or low-income area as defined by the EPA. (Criterion d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

EPA's NEPA guidance for addressing environmental justice concerns (see *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis* [U.S. EPA, 1998]) defines both minority and low-income populations. A minority or low-income area/population exists when the area consists of 50 percent or more of an affected group (e.g., low-income or minority). The U.S. EPA Guidance defines a low-income community as persons living below the poverty level as defined by the U.S. Census Bureau. The U.S. EPA's NEPA guidance identifies that the "disproportionate high and adverse effects" of a Proposed Action on a minority or low-income community should be evaluated within the context of NEPA. These potential effects encompass both human health and environmental effects. The proposed project is not located within a minority or low-income community as defined by the U.S. EPA. However, minority and low-income communities are located within the project vicinity. As described above, the proposed project's impacts will widely be felt locally and will not impact minority and low-income areas; please refer to the discussion contained under Impact SEJ-3 for more information. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a reduced development footprint than the proposed project and Alternative 2 would still be in the same census tract 141.03, which is not considered an environmental justice community. Furthermore, the nature of the proposed improvements is similar to the proposed project in that they would not impact the surrounding communities that are considered environmental justice communities. As a result, this impact is less than significant. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The location and design of Phase 2 would generally be the same as the proposed project. The development footprint would be larger than Phase 2; however, construction and operation activities are anticipated to be similar to Phase 2 and would still be located in the same census tract 141.03, which is not considered an environmental justice community. Furthermore, the nature of the proposed improvements is similar to the proposed project in that they would not impact the surrounding

communities that are considered environmental justice communities. As a result, this impact is less than significant. No mitigation is required.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

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3.15 TRANSPORTATION

3.15.1 Introduction

This section provides an overview of existing conditions within the proposed project area, including existing roadway networks, traffic conditions, bicycle and pedestrian networks, and public transit, as well as an overview of relevant Federal, State, and local transportation regulations. The impact section evaluates construction, operational, and cumulative impacts with mitigation measures, as necessary. The analyses contained in this section are based primarily on *the Transportation Impact Analysis for the California Central Coast Veteran's Cemetery* (TIA) (Kimley-Horn and Associates, Inc., 2019). This document is included as **Appendix I** of this EIR/EA.

This analysis is based on estimates of workers and vehicles associated with construction and operation of the various components of the proposed project; Caltrans data on State highway traffic volumes; TAMC data on local roadway traffic volumes; field reconnaissance; and review of available maps of transit routes, and recreational paths.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. No public and agency comments related to traffic and circulation were received during the public scoping period. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters.**

3.15.2 Environmental Setting

Regional Overview

Individual cities in the County have jurisdiction over their respective city streets and city-operated traffic signals. Caltrans has authority over the State highway system, including mainline facilities, interchanges, and arterial State routes. Caltrans approves the planning and design of improvements for all State-controlled facilities. MST, the transit service provider in the County, has jurisdiction over its services. The TAMC has established a Regional Development Impact Fee (RDIF) program in the County. The program collects fees on the proportional impact of new development on regional transportation infrastructure, helping to streamline the process for analyzing and mitigating transportation impacts. Development within the former Fort Ord is not subject to the RDIF. The Reuse Plan states that FORA shall fund its "Fair Share" of "on-site," "off-site," and "regional" roadway and transit capital improvements based on a nexus analysis from TAMC.

Existing Roadway Network

The following provides descriptions of principal roadways that are located within the study area:

Lightfighter Drive

Lightfighter Drive is a four-lane, divided arterial that originates at an interchange on State Route (SR) SR 1 and continues easterly across General Jim Moore Blvd to Colonel Durham Street. The roadway is less than one-mile long. No bike facilities are provided along Lightfighter Drive; however, sidewalk is provided on both sides of the roadway. The posted speed limit is 40 miles per hour (mph).

General Jim Moore Boulevard

General Jim Moore Boulevard is a two-lane, undivided roadway, running north-south from Divarty Street south to Lightfighter Road. South of Lightfighter Road, the roadway widens to a four-lane, divided arterial, which extends to SR 218. Class I bike facilities are provided along the east side of the roadway from Normandy Road to Coe Avenue/Eucalyptus Road. Southbound Class II bike facilities are provided north of Coe Avenue/Eucalyptus Road. The posted speed limit is 35 mph southbound and 40 mph northbound.

Gigling Road

Gigling Road is a two-lane, undivided arterial, extending east and west from Noumea Road west of General Jim Moore Boulevard to 8th Avenue east of General Jim Moore Boulevard. No bike facilities are provided along Gigling Road. Sidewalks exist along both sides of the road in the study area. The posted speed limit is 35 mph.

Normandy Road

Normandy Road is a two-lane, local roadway that extends from Monterey Road west of General Jim Moore Boulevard to where it becomes Parker Flats Cut-Off Road east of the project site. A sidewalk is provided on the north side of Normandy Road from General Jim Moore Boulevard to a point just west of Park Flats Cut-Off Road. Bicycle facilities are not provided.

Normandy Road provides access to George C. Marshall Elementary School, which is located along the south side of the street just east of General Jim Moore Boulevard. Approximately 12 on-street parking spaces exist along the south side of Normandy Road. Chartwell Elementary School, which is a charter school, is located south of Normandy Road along Numa Watson Road. Porter Youth Center is located in the northeast corner of the intersection of General Jim Moore Boulevard and Normandy Road. A drop-off zone exists along the north side of Normandy Road, west of General Jim Moore Boulevard. This zone provides an area for student drop-offs to the Dual Language Academy of the Monterey Peninsula that exists at the northwest corner of the intersection of General Jim Moore Boulevard and Normandy Road.

All-way stop controls and school zone crosswalks have been installed at four intersections along Normandy Road between General Jim Moore Boulevard and Parker Flats Cut-Off Road, including three locations within ¼ mile of the George C. Marshall Elementary School frontage. The posted speed limit is 25 mph along Normandy Road.

Parker Flats Cut-Off Road

Parker Flats Cut-Off Road is a local two-lane undivided roadway that intersects at Coe Avenue/Eucalyptus Road south of the project site and extends north where it intersects with Colonel Durham Street. Parker Flats Cut-Off Road also extends from Normandy Road, west of the project site to the east and southeast, where it intersects with Eucalyptus Road. Barriers currently exist on Parker Flats Cut-Off Road, south of the project site near the intersection with Eucalyptus Road.

Coe Avenue/Eucalyptus Road

Coe Avenue/Eucalyptus Road is an east-west facility south of the project site that extends from Monterey Road in the west through the southern Fort Ord area in the east. West of General Jim Moore Boulevard, the roadway exists as "Coe Avenue" and provides access to Seaside Middle School (in the northwest corner of the General Jim Moore Boulevard intersection) and residential land uses. East of General Jim Moore Boulevard, the roadway is called "Eucalyptus Road." A barrier exists along Eucalyptus Road, east of General Jim Moore Boulevard, which restricts access to non-motorized vehicle

use. Approximately 1½ miles of Eucalyptus Road has been improved with sidewalk along both sides of the road, new curb and gutter, and Class II bike facilities.

Northeast Southwest Arterial Connector (formerly Eastside Parkway)

The Northeast Southwest Arterial Connector is included in the AMBAG 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) (AMBAG, 2018b) and the Reuse Plan. It is proposed as a new two- to four-lane roadway that would connect Parker Flats Cut-Off/Coe Avenue to Inter-Garrison Road. FORA is currently evaluating the feasibility of constructing this roadway, which includes alternative alignments and a no-build option. Access from this road would be provided to Gigling Road.

The existing local road network and study intersections are shown in Error! Reference source not found.**.15-1**.

Existing Transit Facilities

Transit Service

MST currently provides regular transit service throughout the County and in the general vicinity of the project site. Additionally, MST offers ADA Paratransit (RIDES) pick-up and drop-off service to eligible passengers as a ride-share program. MST RIDES service is provided within a service corridor that extends ¾ of a mile from any of MST's regular bus routes. The project site is within the ¾ of a mile service area (via a regular stop along Normandy Road, approximately 1,900 feet west of the project site) and eligible visitors going to the proposed project would be able to travel to the site using the MST RIDES service.

Existing bus stops for regular MST service along roadways in the study area are as follows:

Normandy Road

The closest MST bus stop to the project site is located approximately 1,900 feet west of the site along Normandy Road, serving MST route 75. This is farther than a typical ¼ mile walking distance, or 1,320 feet, assumed for transit access to a facility.

General Jim Moore Boulevard

Existing MST stops are located along General Jim Moore Boulevard, west of the project site, which provide transit service to routes 12, 16, and 75. Route 12 operates on weekdays only and includes seven runs (from The Dunes) and eight runs (from the Naval Postgraduate School) between 6:45 a.m. to 5:45 p.m. Route 16 operates daily and includes sixteen runs between 6:45 a.m. to 11:00 p.m. Route 75 operates on weekdays only and includes fifteen runs (from Presidio Express) and nine runs (from Marshall Park Express) between 5:45 a.m. to 10:15 p.m.

Gigling Road

Existing MST stops are located along Gigling Road, north of the project site, which provide transit service to routes 12, 16, 74, 75, and 76. Route 12 operates on weekdays only and includes seven runs (from The Dunes) and eight runs (from the Naval Postgraduate School) between 6:45 a.m. to 5:45 p.m. Route 16 operates daily and includes sixteen runs between 6:45 a.m. to 11:00 p.m. Route 74 operates on weekdays only and includes one run (from Presidio) and two runs (from Toro Park) between 6:15 a.m. to 6:00 p.m. Route 75 operates on weekdays only and includes fifteen runs (from Presidio Express) and nine runs (from Marshall Park Express) between 5:45 a.m. to 10:15 p.m. Route 76 operates on weekdays only and includes five runs (from Presidio Express) and six runs (from Stilwell Park Express) between 4:00 a.m. to 5:15 p.m.



Source: Kimley-Horn and Associates, 2019

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Existing Local Road Network and Study Intersections	N	Date 04-11-2019	Figure 3.15-1

Note that a gap in the City's sidewalk network currently exists along Normandy Road between the closest MST bus stop and the project site (west of the project site). Therefore, potential transit users would not have sidewalk to walk upon between the existing MST bus stop and the proposed project site.

Existing Pedestrian and Bicycle Facilities

Pedestrians

Sidewalk exists along the north side of Normandy Road approximately 800 feet west of the proposed project site. Sidewalk does not currently exist along Parker Flats Cut-Off Road along the project frontage and an approximate 90-foot gap in sidewalk exists along the north side of Normandy Road, west of Parker Flats Cut-Off Road. Additionally, crosswalks do not currently exist at the all-way stop-controlled intersection of Normandy Road and Parker Flats Cut-Off Road. This represents a gap in the City's pedestrian network that would present a challenge for potential pedestrians or transit users to access the project site.

Bicycles

There are no existing Class I, II, or III bikeway facilities within ½ mile of the project. A Class I bike path exists along the east side of General Jim Moore Boulevard approximately ¾ of a mile west of the project site at the intersection of General Jim Moore Boulevard and Normandy Road.

Class I facilities are paved bicycle paths that are physically separated from the vehicular travel lane. Class I facilities currently exist along General Jim Moore Boulevard between Normandy Road and Eucalyptus Road, and are approximately 6,000 feet long.

Class II facilities are striped bike lanes along the street. Class II facilities currently exist on Eucalyptus Road between General Jim Moore Boulevard and Parker Flats Cut-Off Road and just north of Coe Avenue/Eucalyptus Road along the General Jim Moore Boulevard southbound approach.

Class III bicycle facilities are bike routes denoted by signs that are shared with vehicles along the roadway. No Class III bicycle facilities exist within the study area.

Study Intersections

The proposed project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions, the intersections listed in **Table 3.15-1** were selected for evaluation based on the assumed project trip assignment and knowledge of the study area.

Table 3.15-1– Study Intersections

#	Intersection
1	General Jim Moore Blvd & Gigling Rd
2	Gigling Rd & Parker Flats Cut Off Rd
3	General Jim Moore Blvd & Normandy Rd
4	Project Driveway & Parker Flats Cut Off Rd
5	Parker Flats Cut Off Rd & Northeast Southwest Arterial Connector Roadway
6	General Jim Moore Blvd & Coe Ave
**All traffic count data collected on 1/24/2019*	

These study intersections are illustrated in **Figure 3.15-1**.

Existing Peak-Hour Turning Movement Volumes

Existing conditions traffic volume data was collected on January 24, 2019, during the AM (7:00-9:00 a.m.) and PM (4:00-6:00 p.m.) peak periods. The data includes vehicles, bicycles, and pedestrians. The data collection was conducted when local schools were in session and the weather was fair. Peak hour volumes at each intersection's respective peak were conservatively used in the analysis, and, therefore, some volume imbalances were observed between study intersections. Where imbalances occurred, volumes were conservatively increased above what was counted in the field where applicable. Existing peak hour turning movement volumes are shown in Figure 4 of **Appendix I**.

The General Jim Moore Boulevard and Coe Avenue intersection currently operates as a T-intersection. The east leg (Eucalyptus Road) is not publicly accessible in existing conditions.

Existing Level of Service at Study Intersections

Traffic operations were evaluated at the study intersections based on Existing Conditions lane geometry, traffic control, and AM and PM peak hour traffic volumes. Study Intersection #5 is a future intersection that would be constructed as part of the Northeast-Southwest Connector and is, therefore, not analyzed in existing conditions.

All study intersections operate at an acceptable LOS during Existing Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)

Results of the analysis are presented in **Table .15-2**.

Note that study intersection #6 (General Jim Moore Boulevard & Coe Avenue/Eucalyptus Road) is currently an all way stop controlled T-intersection in existing conditions. Based upon the California Manual of Uniform Traffic Control Devices (MUTCD) (Caltrans, 2014) peak hour signal warrant #3 is satisfied and a signal is warranted at this study intersection.

Table 3.15-2 – Existing Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Existing Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**48.2**	**D**	Overall	18.5	B
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	1.9	-	Overall	2.6	-
				Worst Approach	20.7	C (SB)	Worst Approach	19.0	C (NB)
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	24.6	C	Overall	14.6	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	5.3	-
				Worst Approach	0.0	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & NE-SW Connector Rd	MC	DOES NOT EXIST						
6	General Jim Moore Blvd & Coe Ave	CS	NOT ANALYZED (EUCALYPTUS ROAD CLOSED)						

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.

Note that no vehicles exit the project driveway during the existing AM peak hour at study intersection #4. Additionally, no vehicles enter the site via the westbound left-turn movement. Therefore, the overall and approach delays are 0.0 seconds.

3.15.3 Regulatory Framework

Federal and State

Individual cities in the County have jurisdiction over their respective city streets and city-operated traffic signals. Caltrans has authority over the State highway system, including mainline facilities, interchanges, and arterial State routes. Caltrans approves the planning and design of improvements for all State-controlled facilities. MST, the transit service provider in the County, has jurisdiction over its services. The TAMC has established a RDIF program in the County. The program collects fees on the proportional impact of new development on regional transportation infrastructure, helping to streamline the process for analyzing and mitigating transportation impacts. Development within the former Fort Ord is not subject to the RDIF. The Reuse Plan states that FORA shall fund its "Fair Share" of "on-site," "off-site," and "regional" roadway and transit capital improvements based on a nexus analysis from TAMC.

Senate Bill 743

SB 743 created a process to change the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 required the California Office of Planning and Research to amend the CEQA Guidelines to provide an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Measurements of transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." Since the CEQA Guidelines have been amended to include those alternative criteria, auto delay is no longer be considered a significant impact under CEQA. Transportation impacts related to air quality, noise, and safety must still be analyzed under CEQA where appropriate. SB 743 also amended congestion management law to allow cities and counties to opt out of LOS standards within certain infill areas. No regional or local VMT threshold has been determined by the governing agencies to date.

California Department of Transportation

Caltrans has jurisdiction over SR 1 and the balance of the state highway system. According to the Caltrans' Guide for the Preparation of Traffic Impact Studies, Caltrans aims to maintain a target LOS at the transition between C and D on state highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the Lead Agency consult with Caltrans to determine the appropriate target LOS. If an existing state highway facility is operating below the appropriate target LOS, the existing LOS should be maintained.

Caltrans' Transportation Concept Report for State Route 1 in District 5 identifies long-range improvements and establishes the concept (desired) LOS for specific corridor segments. The report identifies long-range improvements needed to bring an existing facility up to expected standards needed to adequately serve 20-year traffic forecasts. Additionally, it identifies the ultimate design concept for conditions beyond the immediate 20-year design period. The Transportation Concept Report establishes LOS D as the acceptable threshold for SR 1 in Monterey County (K.D. Anderson & Associates, Inc., 2014).

Regional/Local

Transportation Agency for Monterey County

TAMC is an independent association of local officials who oversee planning and funding of regional transportation improvements throughout the County (TAMC, 2014). The agency prepares the Regional Transportation Plan and oversees the implementation of its recommended improvements.

Association of Monterey Bay Area Governments

AMBAG prepares studies, plans, policy and action recommendations that may be incorporated into regulatory documents. In addition to its transportation planning, study functions, and policy recommendations, AMBAG develops and maintains a regional travel demand forecasting model used for the planning of regional transportation facilities and the assessment of development proposals.

City of Seaside

The City of Seaside is currently in the process of updating their general plan. The Public Draft General Plan (City, 2017) is available for review and comment; however, it has not yet been adopted. Therefore, significant impact criteria and LOS standards at City of Seaside study intersections are based upon the most recent City of Seaside General Plan (City, 2004).

Signalized Intersections

The level of service standard for signalized intersections is LOS C. A significant impact would occur if an intersection operating at unacceptable LOS A, B, or C degrades to LOS D, E, or F. For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the project results in an increase of more than 1.0 second in average delay.

Unsignalized Intersections

The level of service standard for unsignalized intersections is LOS C for the average delay of all entering traffic at most locations. In addition to average delay for all entering traffic (overall intersection delay), the standard for side street operations is LOS E or F, in conjunction with peak hour signal warrants described in the most recent version of the Caltrans Traffic Manual.

Monterey County

The General Plan (County, 2010) has established LOS D as the level of service standard for County roads and intersections, except as follows:

- Acceptable level of service for County roads in Community Areas may be reduced below LOS D through the Community Plan process.
- County roads operating at LOS D or below at the time of adopting this General Plan shall not be allowed to be degraded further except in Community Areas where a lower LOS may be approved through the Community Plan process.
- Area Plans prepared for County Planning Areas may establish an acceptable level of service for County roads other than LOS D. The benefits which justify less than LOS D shall be identified in the Area Plan. Where an Area Plan does not establish a separate LOS, the standard LOS D shall apply.

Fort Ord Reuse Authority

The Reuse Plan was adopted in June 1997 and contains several transportation policies that may be applicable to the proposed project.

Mitigation Fee Programs

The project is located in Monterey County and City of Seaside. It is also located in the former Fort Ord. Therefore, multiple impact fee programs could be applicable to the proposed project.

Fort Ord Reuse Authority

FORA collects development impact fees on projects built within the former Fort Ord area. The fees provide funding for various traffic infrastructure improvements, both on the former army base and regionally. Payment of the impact fees would mitigate the proposed project's share of impacts on regional roadways within the former Fort Ord. Examples of former Fort Ord roadways that would have improvements funded by the FORA fee include General Jim Moore Boulevard and South Boundary Road. Payment of the fees would also mitigate the project's cumulative impacts towards regional improvements, such as SR 1, SR 68, and SR 156. The following current 2018-2019 FORA capital improvement program (CIP) projects are located near the project site:

Fully Funded Improvements:

- Widening of Davis Road from two to four lanes between Reservation Road and Blanco Road, including reconstruction of the existing bridge over the Salinas River and intersection improvements at Davis Road and Blanco Road;
- Widening of Reservation Road from two to four lanes between the East Garrison development and Davis Road;
- Widening Inter-Garrison Road from two to four lanes between the future Northeast Southwest Connector Roadway (formally Eastside Parkway) and Reservation Road;
- Widening Gigling Road from two to four lanes between General Jim Moore Boulevard and the future Northeast Southwest Connector Roadway;
- Construct Northeast Southwest Connector Roadway between Eucalyptus Road and Inter-Garrison Road. The new road would be four lanes.
- Upgrade Eucalyptus Road to 2 lane connector from Seaside/Monterey County line to Parker Flats Cut-Off.

It should be recognized that the FORA capital improvement program focuses on improvements to the higher order access and mobility routes as listed above. The specific local network improvements will be identified with each of the FORA project developments. The FORA capital improvement program also contributes some money towards, but does not fully fund, other regional improvements, specifically the following:

Partially Funded Improvements:

- Widening of SR 1 to three lanes in each direction between Fremont Boulevard and Del Monte Avenue in Seaside/Sand City;
- Construction of the SR 1/Monterey Road interchange, to be located between the Lightfighter Drive and Fremont Boulevard interchanges;

- SR 156 widening to a four-lane freeway and construction of new interchanges.

The proposed project would pay FORA traffic impact fees.

Transportation Agency for Monterey County

TAMC's most recently established development impact fee program was last updated in 2018. Through agreement between TAMC and FORA, development projects that are located in the for a planning area are and subject to the FORA transportation fee, are exempt from the TAMC development impact fee. The FORA fee covers regional impacts outside Fort Ord. Monterey County does not have a separate traffic impact fee.

City of Seaside

The City of Seaside does not have a traffic impact fee. Any necessary monetary contributions towards impacts in the City of Seaside would involve fair-share payments towards the implementation of necessary improvements.

Caltrans

Caltrans does not have a traffic impact fee. Any necessary monetary contributions towards impacts to the state highway system would need to go through another funding mechanism, such as FORA. Impacted roadway facilities not covered by any fee program may be subject to a fair-share contribution towards needed improvements.

3.15.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. conflict with program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;

b. conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b);

c. substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or

d. result in inadequate emergency access?

Impact Analysis Overview

Approach to Analysis

The impact analyses in this section evaluates the potential for short-term construction-related traffic impacts that may result in increased traffic delays or hazards, or that may impede pedestrian, bicycle, and transit access, including access to recreational resources. Long-term traffic impacts associated with operations of the proposed project and alternatives are also addressed.

Development Conditions

This transportation impact analysis is based on the following development conditions:

Existing (2019) Conditions – Scenario 1 is based on current traffic count data collected in January 2019, as well as existing roadway geometry and traffic control.

Existing (2019) Plus Phase 2 Conditions – Scenario 2 is based on existing January 2019 traffic volumes, existing roadway geometry, and traffic control and traffic generated by Phase 2 of the proposed project.

Scenario 3: Cumulative (2040) Conditions – Scenario 3 is based on future traffic forecasted for developments anticipated to occur through 2040 for two roadway build-out alternatives. "Off the shelf" AMBAG model runs were used to estimate Alternative 1 future volumes. This model includes the assumption that the Northeast Southwest Arterial Connector Roadway Project (formally known as "Eastside Parkway" in the RTP) is constructed by the year 2040. Alternative 2 was also run using the AMBAG model with the assumptions that the Northeast Southwest Arterial Connector Roadway is not constructed by the year 2040.

Scenario 4: Cumulative (2040) Plus Phase 4 Conditions – Scenario 4 is based on Cumulative (2040) Alternatives 1 & 2, along with project traffic generated by Phases 2, 3, and 4 in the year 2040.

Scenario 5: Master Plan Build-out Conditions – This scenario qualitatively evaluates build-out of the cemetery's 100-year master plan (construction of all 11 proposed phases) and the potential effects the development would have on the transportation network within the study area.

Vehicle Miles Traveled

Potential traffic impacts due to the proposed development were evaluated consistent with CEQA requirements, which includes SB 743 or VMT analysis. To estimate the VMT generated by the proposed project, household locations by census tract with population information were used in combination with the estimated number of daily trips generated by the project for the existing conditions and for each phase of the proposed project. It was assumed that the proposed project would primarily serve veterans and their families located within 75-miles of the cemetery based on the location of existing veterans cemeteries. As the demographics in the future are unknown, the existing population distribution was used for all calculations. Although it is understood that population locations in the future will deviate slightly from existing locations, for the purposes of this analysis it was felt that using existing locations was a reasonable estimation of future population locations

Geographic Information System (GIS)-based tools were used to calculate the population located within in this 75-mile area, delineated by one-mile bands extending outwards from the project. The number of people living in each of the one-mile bands was used to generate a distribution of people-per-mile surrounding the project. This distribution was multiplied by the number of daily trips per scenario to estimate VMT per one-mile band. To estimate the total daily VMT generated by the project for the two scenarios (i.e., Existing Plus Phase 2 and Master Plan Buildout Conditions), the one-mile VMT estimates were totaled. Due to the assumed population locations being consistent for all analysis scenarios, the average trip length was estimated to be 49.5 miles for all scenarios.

Operating Conditions and Criteria for Intersections

In order to address criteria a) listed above, this analysis used thresholds described in applicable General Plans. The General Plans for the City of Seaside and Monterey County contain LOS standards. The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. LOS for this study were determined using methods defined in the *Highway Capacity Manual 2010* (HCM 2010; Transportation Research Board, 2010) and *Synchro 10* traffic analysis software.

HCM 2010 methodologies include procedures for analyzing side-street stop-controlled (SSSC), two-way stop-controlled (TWSC), all-way stop-controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement.

The AWSC and signalized intersection procedures define LOS as a function of average control delay for the overall intersection. HCM 2010 does not provide methodology to analyze U-turns. Therefore, U-turns are analyzed (and illustrated in volume figures) as left-turns.

Table 3.15-3 provides operational descriptions and characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 3.15-3. Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh)	Unsignalized (Avg. control delay per vehicle sec/veh)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	Less than 10	less than 10
B	Stable traffic. Traffic flows smoothly with few delays.	less than or equal to 10 to 20	less than or equal to 10 to 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	less than or equal to 20 to 35	less than or equal to 15 to 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	less than or equal to 35 to 55	less than or equal to 25 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	less than or equal to 55 to 80	less than or equal to 35 to 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	greater than or equal to 80	greater than or equal to 50
Sources: Transportation Research Board, 2010.			

This project impact was determined by comparing conditions without the proposed project to those with the proposed project. Significant impacts for intersections are created when traffic from the proposed project causes the LOS to fall below the maintaining agency's LOS threshold or causes deficient intersections to deteriorate further, per the criteria indicated below.

Areas of No Impact

Some of the Thresholds of Significance criteria outlined above are not applicable to the proposed project or the proposed project would not result in impacts related to these criteria, as explained below.

b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b). The County of Monterey General Plan and the City of Seaside General Plan have not yet adopted thresholds related to VMT. Thresholds set forth by the County and the City use LOS to measure transportation impacts of a project, as discussed above in **Impact TR-1**. For this reason, the project would not conflict with CEQA Guidelines Section 15064.3(b), which calls for evaluation of a project's transportation impacts based on VMT.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). (No impact during the construction or operation of the proposed project and alternatives). The 2015 Master Plan roadway improvements consist of loops and cul-de-sacs to provide access to the additional columbaria, flag plaza, and burial sites. Future roadways would generally be 24-feet wide (face of curb to face of curb), which is the NCA standard. In some cases, roadways may be larger (29-feet wide) to provide emergency access and

access compliance. Phase 2 improvements include an extension of A Street, an existing roadway completed as part of Phase 1. No impact would occur due to geometric design features.

d) Result in inadequate emergency access? (No impact during the operation or construction of the proposed project and alternatives). Construction and operation of the proposed project and alternatives would have no impact on emergency access as the proposed project and alternatives would not result in significant permanent impacts to emergency routes.

Summary of Impacts

Table 3.15-4 provides a summary of potential transportation impacts from the proposed project and alternatives.

Table 3.15-4. Summary of Impacts – Transportation

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact TR-1: Conflict with program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LSM	LSM	LSM	LSM	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact TR-1: Conflict with program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Trip Generation Estimates

The Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* (2017) was considered to estimate the trip generation potential for the existing uses and the proposed project. A trip is defined in *ITE Trip Generation Manual* as a single or one-directional vehicle movement with either the origin or destination at the project site. In other words, a trip can be either "to" or "from" the site. For example, a single customer visit to a site is counted as two trips (i.e., one to and one from the site).

For the purposes of determining the worst-case impacts of traffic on the surrounding street network, project peak hour trips were estimated between the hours of 7:00-9:00 AM and 4:00-6:00 PM on a weekday, which is when the street network in the project vicinity is anticipated to peak. While the project itself may generate more traffic during other times of the day, the peak of "adjacent street traffic" represents the time period when the uses contribute to the greatest amount of congestion, and consequently potential impacts.

Existing driveway count data was collected on January 24, 2019, during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. This existing data represents the trip generation for Phase 1 of the existing cemetery. A comparison of driveway count data and ITE estimates indicates that Phase 1 AM and PM

peak hour trip generation rates are slightly higher than ITE trip generation rates for cemetery land uses (ITE land use code 566). Therefore, the site-specific AM and PM peak hour trip generation rates (based on the driveway count data) were used to estimate the trip generation of each proposed phase of the project. Daily data for the existing site is not available, therefore, ITE land use code 566 (Cemetery) is used for estimation of daily trips generated by each phase of the project. This ITE land use was also used in the Fort Rosecrans National Cemetery TIA.

As indicated in **Table 3.15-5**, the existing cemetery (Phase 1) currently generates three AM peak hour trips (three in, zero out) and eight PM peak hour trips (two in, six out). Based on ITE data, Phase 1 generates 56 daily trips. Based on the Phase 1 trip generation data and the developed size of Phase 1 (9.10 acres), it is estimated that the site-specific AM peak hour trip generation rate is 0.33 trips per 1,000 square feet of cemetery land uses. Similarly, it is estimated that the site-specific PM peak hour trip generation rate is 0.88 trips per 1,000 square feet of cemetery land uses. This compares to ITE AM and PM peak hour trip generation rates of 0.17 AM peak hour trips per 1,000 square feet and 0.46 PM peak hour trips per 1,000 square feet (from Cemetery land use code 566).

Table 3.15-5. Proposed Existing Plus Phase 2 Weekday Trip Generation

Land Use	ITE Code	Phase	Size	Daily Rate[1]	Daily Trips	AM Peak Hour[2]				PM Peak Hour[2]			
						Rate	In	Out	Total	Rate	In	Out	Total
Existing Conditions													
Cemetery	566	1	9.10 ac.	6.02	56	0.33	3	0	3	0.88	2	6	8
Proposed for Phase 2 LOS Analysis													
Cemetery	566	2	4.29 ac.	6.02	26	0.33	1	1	2	0.88	1	3	4
Existing + New Project Trips (Phases 1 & 2)				-	82	-	4	1	5	-	3	9	12

Notes:
1. ITE Code 566 (Cemetery); Based on ITE average rate.
2. Based on traffic counts collected on 1/24/2019
3. Note that trips generated by each phase of the Project are rounded when appropriate. Daily trips are rounded to the nearest even number to represent in and out trips.
*ITE = Trip Generation 10th Edition (2010)

Phase 2 proposes to develop approximately 4.29 square feet of additional cemetery land uses. As indicated in **Table 3.15-5** and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 26 daily trips, two AM peak hour trips (one in, one out), and four PM peak hour trips (one in, three out).

Phase 3 proposes to develop approximately 2.07 square feet of additional cemetery land uses. As indicated in **Table 3.15-5** and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 14 daily trips, 1 AM peak hour trips (1 in, 0 out), and 2 PM peak hour trips (1 in, 1 out).

Phase 4 proposes to develop approximately 2.51 square feet of additional cemetery land uses. As indicated in **Table 3.15-5 Error! Reference source not found.**and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 16 daily trips, 1 AM peak hour trips (1 in, 0 out), and 2 PM peak hour trips (1 in, 1 out).

It is assumed that Phase 2 will be constructed in the near-term and is, therefore, analyzed under Existing Plus Phase 2 conditions. It is also anticipated that Phase 3 and Phase 4 development would follow Phase 2, with one phase being developed every 10 years. Consequently, construction of Phases 2, 3, and 4 is

expected to be completed by Cumulative year 2040, which is analyzed under Cumulative (2040) Plus Phase 2, 3, and 4 Conditions. The remaining phases (Phases 5 through 11) are anticipated to occur within the 100-year 2015 Master Plan build-out and analyzed under Master Plan Build-Out Conditions.

Trip distribution estimates were developed based on knowledge of the study area, as well as existing and future traffic patterns. Please refer to the TIA in **Appendix I** for a detailed description of the distribution estimates. The cemetery is expected to primarily attract visitors from counties within a 75-mile radius, ranging from the San Francisco Bay Area to San Luis Obispo. As a result, SR 1 and its interchange at Lightfighter Drive, General Jim Moore Road, Gigling Road, Parker Flats Cut-Off Road, and Normandy Road are the likely routes to the site in the near-term.

Construction

Construction information for development of Phase 2 is shown in **Table 3.15-6**. It is anticipated that construction would occur in the near-term and that the existing transportation road network would be in place. Based on discussions with Phase 2 design team and engineers, Phase 2 would be constructed over approximately 12 -13 months. Up to 20 construction worker trips are anticipated to and from the site per day.

Weekday peak traffic hours in the project vicinity occur between 7:00 AM and 9:00 AM, as well as between 4:00 PM and 6:00 PM). Typical construction hours are 7:00 AM to 3:00 PM. Therefore, construction workers are expected to generate up to 20 vehicle trips per day, which would occur during off-peak traffic hours. Typical construction equipment associated with the building trades would be transported to the site at various times depending on the nature of construction occurring at any time.

Table 3.15-6. Construction Information for Phase 2

Construction Phase	Duration (Days)	Off-Road Equipment	Construction Vehicle Trips
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20 Worker Trips/Day 525 Haul Truck Trips
Site Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20 Worker Trips/Day
Onsite Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15 Worker Trips/Day 50 Haul Truck Trips

1. Based on default equipment assumptions contained in the CalEEMod computer model and, where available, project-specific construction information. All equipment assumed to operate 8 hours per day. Worker trips are based on CalEEMod default assumptions and estimated equipment usage.
2. Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.
3. Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5 inch application material thickness) and an average haul truck capacity of 8 cubic yards.

The proposed project would generate construction trucks on the routes to and from the site. While the number of trucks would not have an appreciable effect on the quality of traffic flow on surrounding streets, adding trucks to Normandy Road could create safety conflicts between school age pedestrians and motor vehicles. Truck noise could be an issue due to the presence of several all-way stops adjoining the school. This is a potentially significant impact. This potentially significant impact would be mitigated to less-than-significant level with the implementation of **Mitigation Measure TR-1. Construction Traffic Management Plan** identified below.

Construction activities and associated traffic for future phases of the 2015 Master Plan are anticipated to be similar to Phase 2. Therefore, the construction of future phases could result in similar potentially significant impacts, which would be mitigated to less-than-significant level with the implementation of **Mitigation Measure TR-1. Construction Traffic Management Plan** for each future phase.

Operations

The proposed project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions, the intersections listed in **Table 3.15-1** were selected for evaluation based on the assumed project trip assignment and knowledge of the study area for each development scenario.

Existing Plus Project (Phase 2) Conditions

Traffic operations were evaluated at the study intersections under Existing Plus Project Conditions. All study intersections operate at an acceptable LOS during Existing Plus Project (Phase 2) Conditions, except for the following (**Table 3.15-7**):

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
    - The AM peak hour intersection continues to operate at LOS D with the project and delay decreases by 0.3 seconds due to relatively low project trip assignment (see table footnote for details on how intersection delay can decrease with project). Therefore, the intersection is not significantly impacted by the project.[1]

The LOS standard for unsignalized intersections is LOS C for the average delay of all entering traffic at most locations. In addition to average delay for all entering traffic (overall intersection delay), the standard for side street operations is LOS E or F, in conjunction with peak hour signal warrants described in the most recent version of the Caltrans Traffic Manual.

Phase 2 may add 3 to 14 peak hour trips to the circulation system proving access to the site. This traffic contribution would be too small to have a measurable impact on the operation of signalized intersections. Thus, Phase 2 project's impacts are not significant from the standpoint of minimum Level of Service standards. This is a less-than-significant impact. No mitigation measures are required.

Phase 2 could add a small amount of traffic to Normandy Road during times when students are traveling to and from school. Project trips could incrementally contribute to before and after school congestion, and increased conflicts between school age pedestrians and motor vehicles is a potential safety impact. Implementation of **Mitigation Measure TR-2** would reduce potential safety impacts to a less-than-significant level.

[1] For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the project results in an increase of more than 1.0 second in average delay.

Table 3.15-7. Existing Plus Phase 2 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Existing Conditions						Existing Plus Phase 2 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**48.2**	**D**	Overall	18.5	B	Overall	**48.1**	**D**	Overall	18.6	B
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	1.9	-	Overall	2.6	-	Overall	1.9	-	Overall	2.6	-
				Worst Approach	20.7	C (SB)	Worst Approach	19.0	C (NB)	Worst Approach	20.7	C (SB)	Worst Approach	19.1	C (NB)
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	24.6	C	Overall	14.6	B	Overall	24.6	C	Overall	14.6	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0	-	Overall	5.3	-	Overall	1.1	-	Overall	5.7	-
				Worst Approach	0	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.5	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & NE-SW Connector Rd	MC	SSSC	DOES NOT EXIST											
6	General Jim Moore Blvd & Coe Ave	CS	AWSC	NOT ANALYZED (EUCALYPTUS ROAD CLOSED)											

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.
5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

Cumulative (2040) Conditions

Traffic operations were evaluated under the following future year 2040 cumulative conditions:

- Cumulative Alternative 1 Conditions
    - Assumes construction of the Northeast Southwest Arterial Connector Roadway Project (formally known as "Eastside Parkway") by the year 2040.
- Cumulative Alternative 2 Conditions
    - Assumes no construction of the Northeast Southwest Arterial Connector Roadway Project (formerly known as "Eastside Parkway").

Cumulative Transportation Network Improvements

Cumulative Alternative 1 Network Improvements

This cumulative alternative assumes that the Northeast Southwest Arterial Connector Roadway Project would be constructed and that Eucalyptus Road improvements would be completed and connected/extended to Parker Flats Cut-Off Road, creating a new intersection (Study Intersection #5). The new Northeast Southwest Arterial Connector Roadway would extend to the east towards Salinas, providing an alternative route to the City of Seaside. The MUTCD peak hour signal warrant (Warrant #3) for intersections #5 and #6 indicate that both intersections should be signalized with construction of the Northeast Southwest Arterial Connector Roadway Project due to high future traffic volumes. Therefore, signalization of both intersections was assumed in Cumulative Alternative 1 conditions.

Cumulative Alternative 2 Network Improvements

This cumulative alternative assumes that the Northeast Southwest Arterial Connector Roadway Project is not constructed by cumulative future year 2040 and that the cumulative transportation network would be similar to existing conditions. The MUTCD peak hour signal warrant (Warrant #3) for intersection #6 indicates that the intersection traffic volumes satisfy the warrant in existing and Cumulative Alternative 2 Conditions without the proposed Project. Therefore, signalization was assumed in Cumulative Alternative 2 Conditions.

Cumulative Volumes

Cumulative conditions traffic volume development is based upon the AM and PM peak hour forecasts obtained from the AMBAG model from the AMBAG 2040 MTP/SCS study and existing turning movement data collected in the field. Year 2040 roadway link volumes from the recently certified AMBAG Travel Demand Forecast model were obtained for Cumulative traffic volume growth estimates. Approved FORA land use assumptions were incorporated into the model.

The construction of the Northeast Southwest Arterial Connector Roadway Project alters travel patterns and creates new connections. Manual adjustments were done to more accurately represent future traffic as a result of the altered traffic pattern. This was done by reviewing the annual incremental growth in traffic volumes at study intersection approaches and adjusting them to incorporate the expected traffic on the Northeast Southwest Arterial Connector Roadway.

"Off the shelf" AMBAG 2040 model runs were used to estimate Alternative 1 future volumes. The model used for Alternative 1 future volume estimates includes the assumption that the Northeast Southwest Arterial Connector Roadway Project is constructed by the year 2040. Alternative 2 was also run using the AMBAG model with the assumptions that the Northeast Southwest Arterial Connector Roadway is not constructed by the year 2040.

Cumulative Intersection Level of Service

Traffic operations were evaluated at the study intersections based on Cumulative Alternative 1 and Alternative 2 Conditions lane geometry, traffic control, and peak hour traffic volumes.

Study Intersection #5 is a future intersection that will be constructed as part of the Northeast Southwest Arterial Connector Roadway Project and is, therefore, analyzed in Cumulative Alternative 1 Conditions only.

All study intersections operate at an acceptable LOS during Cumulative Alternative 1 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)

- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
- General Jim Moore Boulevard & Coe Avenue (Intersection #6) (AM peak hour)

All study intersections operate at an acceptable LOS during Cumulative Alternative 2 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)

The Cumulative Alternative 1 analysis results are presented in **Table 3.15-8**. The Cumulative Alternative 2 analysis results are presented in **Table 3.15-9**. Note that study intersections #5 and #6 satisfy MUTCD peak hour signal warrant #3 in Cumulative Alternative 1 Conditions, and a signal is warranted at these study intersections. Study intersection #6 warrants signal control in Cumulative Alternative 2 Conditions.

Table 3.15-8 – Cumulative Alternative 1 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**72.0**	**E**	Overall	**52.5**	**D**
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	14.4	-	Overall	25.8	-
				Worst Approach	**331.7**	**F (SB)**	Worst Approach	**383.2**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	29.0	C	Overall	17.1	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	0.5	-
				Worst Approach	0.0	A (NB)	Worst Approach	9.4	A (NB)
5	Parker Flats Rd & Northeast Southwest Connector Roadway	MC	Signal	Overall	6.6	A	Overall	14.5	B
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**72.3**	**E**	Overall	24.0	C

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.

Table 3.15-9 – Cumulative Alternative 2 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**94.0**	**F**	Overall	31.6	C
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	3.0	-	Overall	5.3	-
				Worst Approach	**47.2**	**E (SB)**	Worst Approach	**50.0**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	28.7	C	Overall	17.3	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0	-	Overall	5.3	-
				Worst Approach	0	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Arterial Connector Roadway	MC	AWSC	DOES NOT EXIST					
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	22.1	C	Overall	5.9	A

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in bold.

Cumulative Plus Phase 2, 3, and 4 Conditions Level of Service

Traffic operations were evaluated at the study intersections based on Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions and Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions.

As shown in **Table 3.15-10**, all intersections would operate at acceptable levels of service during Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM & PM peak hour)
    - The intersection operates at LOS E in the AM and LOS D in PM with the project. Delay decreases by 0.1 seconds in the AM and increases by 0.1 seconds in the PM due to relatively low project trip assignment (see table footnote for details on how intersection delay can decrease with project). Therefore, the intersection is not significantly impacted by the project.[2]
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
    - The intersection would continue to operate at LOS F in the AM and PM peak hours with the project. Delay increases would not change in the AM with the project, but delay would increase by 4.8 seconds during the PM with the project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). However, it is anticipated that a traffic signal will be implemented as Gigling Road will become a four-lane roadway per the MTP. The project trips were added to non-

[2] For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the project results in an increase of more than 1.0 second in average delay.

critical movements. The average delay is a weighted average, so the average delay per vehicle goes down. For interpolation purposes, we assume that additional project traffic has no impact.[3]

- General Jim Moore Boulevard & Coe Avenue (Intersection #6) (AM peak hour)
    - During the AM peak hour, the intersection would continue to operate at LOS E and average vehicle would increase from 72.3 seconds per vehicle without project traffic, to 74.4 seconds per vehicle with project traffic. Therefore, this intersection would be potentially significantly impacted by the project. Adjusting signal timings and signal phasing would improve intersection operations and reduce AM peak hour delay to 72.2 seconds per vehicle. The improved signal timings would therefore result in a lower average vehicle delay with the project when compared to "no Project" conditions. This proposed mitigation would, therefore, mitigate the potentially significant impact. The intersection would continue to operate at unacceptable LOS E.[3]

Mitigated Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions LOS are shown in **Table 3.15-11**. Under Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions, which includes the construction of the Northeast Southwest Arterial Connector Roadway), the proposed project may result in potentially significant impacts to General Jim Boulevard & Coe Avenue (Intersection #6) (AM Peak Hour). During the AM peak hour, the intersection would continue to operate at LOS E and average vehicle delay would increase from 72.3 seconds per vehicle without project traffic, to 74.4 seconds per vehicle with project traffic. Therefore, this intersection would be potentially significantly impacted by the project. Adjusting signal timings and signal phasing would improve intersection operations and reduce AM peak hour delay to 72.2 seconds per vehicle. The improved signal timings would therefore result in a lower average vehicle delay with the project when compared to "no project" conditions. This proposed mitigation would, therefore, mitigate this potentially significant impact. However, the intersection would continue to operate at unacceptable LOS E. This potentially significant impact would be mitigated to less-than-significant level with the implementation of **Mitigation Measure TR-3. Signal Timings and Phasing Adjustments** identified below.

As shown in **Table 3.15-12**, all intersections would operate at acceptable levels of service during Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
    - The intersection continues to operate at LOS F in the AM with the project. Delay does not change in the AM. Therefore, the intersection is not significantly impacted by the project.
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
    - The intersection would continue to operate at LOS E in the AM and LOS F in the PM peak hours with the project. Delay would increase by 2.8 in the AM with the project and delay would increase by 6.0 seconds during the PM with the project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). Therefore, it is not a significant impact.[3]

The proposed project would result in less-than-significant impacts under Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions, which does not include construction of the Northeast Southwest Arterial Connector Roadway. No mitigation measures are required.

[3] The level of service standard for unsignalized intersections is LOS C for the average delay of all entering traffic at most locations. In addition to average delay for all entering traffic (overall intersection delay), the standard for side street operations is LOS E or F, in conjunction with peak hour signal warrants described in the most recent version of the Caltrans Traffic Manual.

Table 3.15-10 – Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions						Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**72.0**	**E**	Overall	**52.5**	**D**	Overall	**71.9**	**E**	Overall	**52.6**	**D**
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	14.4	**-**	Overall	25.8	-	Overall	15.0	-	Overall	27.3	-
				Worst Approach	**331.7**	**F (SB)**	Worst Approach	**383.2**	**F (NB)**	Worst Approach	**331.7**	**F (SB)**	Worst Approach	**398.0**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	29.0	C	Overall	17.1	B	Overall	29.0	C	Overall	17.2	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	0.5	-	Overall	0.1	-	Overall	0.9	-
				Worst Approach	0.0	A (NB)	Worst Approach	9.4	A (NB)	Worst Approach	9.5	A (NB)	Worst Approach	9.5	A (NB)
5	Parker Flats Rd & NE-SW Connector Rd	MC	Signal	Overall	6.6	A	Overall	14.5	B	Overall	6.5	A	Overall	14.6	B
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**72.3**	**E**	Overall	24.0	C	Overall	**74.4**	**E**	Overall	24.0	C

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.
5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

Table 3.15-11 – Mitigated Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Plus Phase 2,3,4 Conditions						Mitigated Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**74.4**	**E**	Overall	24.0	C	Overall	**72.2**	**E**	Overall	24.0	C

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.
5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

Table 3.15-12 – Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions						Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**94.0**	**F**	Overall	31.6	C	Overall	**94.0**	**F**	Overall	31.6	C
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	3.0	-	Overall	5.3	-	Overall	3.0	-	Overall	5.8	-
				Worst Approach	**47.2**	**E (SB)**	Worst Approach	**50.0**	**F (NB)**	Worst Approach	**47.7**	**E (SB)**	Worst Approach	**53.7**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	28.7	C	Overall	17.3	B	Overall	28.7	C	Overall	17.3	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	5.3	-	Overall	0.9	-	Overall	5.3	-
				Worst Approach	0.0	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Arterial Connector Roadway	MC	AWSC	DOES NOT EXIST											
6	General Jim Moore Blvd & Coe Ave	CS	AWSC	Overall	22.1	C	Overall	5.9	A	Overall	22.0	C	Overall	5.9	A

Notes:
1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.
2. Delay indicated in seconds/vehicle.
3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.
4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.
5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

Qualitative Evaluation of 100-Year 2015 Master Plan Build-Out

Development of the remaining phases of the 2015 Master Plan (Phases 2 through Phase 11) would result in 32.55 acres of cemetery uses in addition to the 9.10 acres already developed as part of Phase 1. **Table 3.15-13** shows the anticipated trip generation of buildout of the remaining phases site (Phases 2 through Phase 11). As shown in **Table 3.15-7**, it is anticipated that full buildout of the remaining phases would generate approximately 11 AM peak hour, 29 PM peak hour, and 196 gross daily trips on average weekdays. This trip generation represents approximately one vehicle to or from the cemetery every five minutes during the AM peak hour and approximately three vehicles to or from the cemetery during the PM peak hour. These are relatively low rates and are not anticipated to have a noticeable effect on the future local transportation network.

Based on the information provided above, the proposed project would not significantly affect the existing LOS; therefore, it would not conflict with the LOS standards of the General Plans of Seaside and Monterey County. Cumulative traffic conditions are expected to meet minimum standards and the proposed project would contribute a negligible amount of peak hour traffic, thus the cumulative impact of the proposed project would not be significant. In addition, the proposed project would be required to pay the traffic mitigation fees established by FORA. Paying the traffic mitigation fees established by FORA would off-set any potential cumulative traffic impacts associated with the proposed project, as the fees will help fund future road improvements that will be required as growth continues on the former Fort Ord. This is a less-than-significant impact. No mitigation is required.

Future phases could add a small amount of traffic to Normandy Road during times when students are traveling to and from school. Project trips could incrementally contribute to before and after school congestion, and increased conflicts between school age pedestrians and motor vehicles is a potential safety impact. Implementation of **Mitigation Measure TR-2** would reduce potential safety impacts to a less-than-significant level.

Table 3.15-13. 2015 Master Plan Full Build-Out Weekday Trip Generation

Land Use	ITE Land Use Code	Phase	Size	Daily Rate[1]	Daily Trips	AM Peak Hour[2]				PM Peak Hour[2]			
						Rate	In	Out	Total	Rate	In	Out	Total
Existing Conditions													
Cemetery	566	1	9.10 ac.	6.02	56	0.33	3	0	3	0.88	2	6	8
Proposed for 2015 Master Plan LOS Analysis													
Cemetery	566	2 thru 11	32.55 ac.	6.02	196	0.33	9	2	11	0.88	9	20	29
Existing + New Project Trips (Phases 1 through 11)				-	252	-	12	2	14	-	11	26	37

Notes:
1. ITE Code 566 (Cemetery); Based on ITE average rate.
2. Based on traffic counts collected on 1/24/2019
3. Note that trips generated by each phase of the project are rounded when appropriate. Daily trips are rounded to the nearest even number to represent in and out trips.

*ITE = Trip Generation 10th Edition (2010)

Pedestrian and Bicycle Improvements

The proposed project was evaluated to determine if it would adversely affect adopted policies, plans, and/or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks and pedestrian flow) or generate pedestrian, bicycle, or transit travel demand that could not be accommodated by transit, bicycle, or pedestrian facilities and plans.

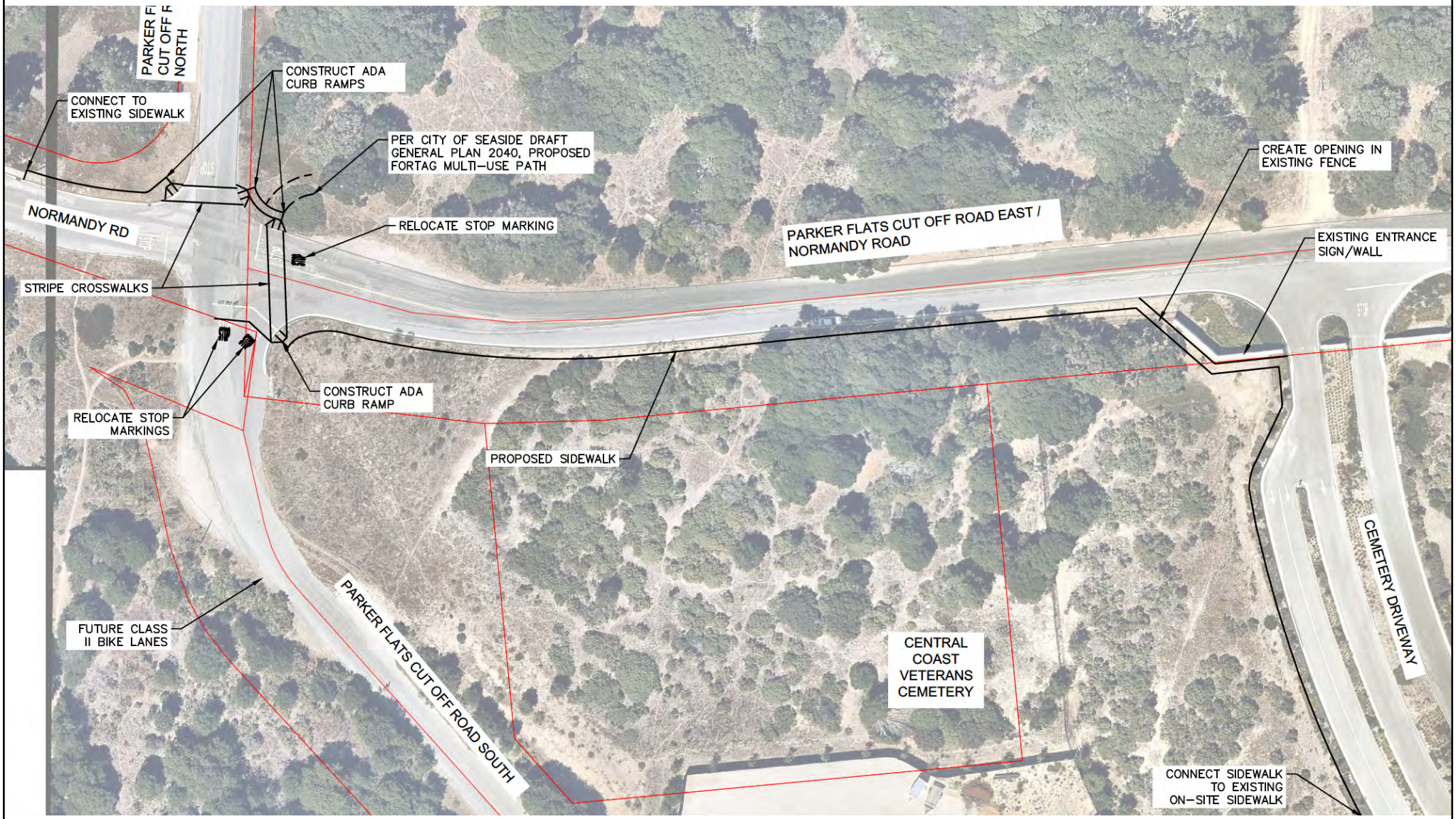
Pedestrian and bicycle access to and from the Project site was evaluated for existing and future conditions. Currently, the cemetery (Phase 1) has no pedestrian or dedicated bicycle access. The City of Seaside General Plan 2040 identifies Normandy Road as a "Neighborhood Arterial" and places a high priority on pedestrian, bicycle, and transit mobility. Additionally, an MST transit stop is located approximately 1,900 feet west of the project site on the north side of Normandy Road; however, there is a gap in the sidewalk network along the project frontage and just west of the Normandy Road and Parker Flats Cut-Off Road intersection.

Therefore, to provide pedestrian and transit connectivity to the site, it is recommended that the proposed project construct pedestrian and bicycle improvements. To connect the cemetery to the existing sidewalk northwest of the Normandy Road/Parker Flats Cut-Off Road intersection, sidewalk will need to be constructed from the on-site sidewalk network north to Parker Flats Cut-Off Road East/Normandy Road and then west along roadway. Since the entrance sign and fencing have already been built at the cemetery's entrance and no space remains for sidewalk adjacent to the driveway, it is recommended to route the sidewalk behind the entrance sign and create an opening or gate in the metal fencing. Curb ramps and crosswalks would need to be implemented across the east and north legs of the Normandy Road/Parker Flats Cut-Off Road intersection and/or the Normandy Road/Cemetery Access Road. The intersection will be a future connection point to the proposed Fort Ord Regional Trail and Greenway (FORTAG Trail). **Figure 3.15-2** provides an illustration of the recommended improvements.

Existing bicycle access to the cemetery uses the vehicular travel lanes on Parker Flats Cut-Off Road East/Normandy Road for shared access. For future conditions, several bike network improvements are planned near the cemetery. According to the City of Seaside Draft General Plan 2040, the proposed FORTAG Trail is planned to go along Parker Flats Cut-Off Road east and south on the north and west sides of the cemetery. The trail is planned to be located across the street from the proposed project. Normandy Road to the west and Parker Flats Cut-Off Road north and south are planned to have on-street Class II bike lane facilities. No on-street bike improvements are planned for the project's north frontage, Parker Flats Cut-Off Road East/Normandy Road, and bikes would have to use the vehicular lanes or use the FORTAG trail. It is anticipated that as an alternative, a connection may be provided to the project entrance from the FORTAG trail to the north (**Figure 3.15-2**).

Due to the lack of connectivity, the proposed project may conflict with existing and proposed pedestrian and bicycle facilities. This is considered a potentially significant impact. Construction of the recommended pedestrian facilities identified in **Mitigation Measure TR-4** as part of Phase 3 would close an existing sidewalk gap and provide a route for pedestrians and bicyclists to access the site from west Normandy Road, where an existing MST transit stop is located, reducing this impact to a less-than-significant level. This potentially significant impact would be mitigated to less-than-significant level with the implementation of **Mitigation Measure TR-4** identified below.

The proposed project is not anticipated to generate a significant amount of transit demand. Therefore, the existing transit facilities should be able to accommodate any transit riders generated by the proposed project. For any users that wish to travel to the site via transit, an MST transit stop is located



Source: Kimley-Horn and Associates, 2019

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Pedestrian and Bike Improvements	N	Date 04-12-19	Figure 3.15-2

approximately 1,900 feet west of the project site along Normandy Road. Existing MST Service routes and stops are discussed in detail in the **Existing Transit Facilities** above. Therefore, the proposed project would not conflict with any local transit policies or generate transit demand that could not be accommodated by existing transit infrastructure facilities. This is a less-than-significant impact. No mitigation measures are required.

Special Events

The proposed project is expected to host special events several times during the year, and these events would attract appreciable numbers of people to the site. Events would be expected to occur on Memorial Day, Veterans Day, and Independence Day, and an average of approximately 1,000 visitors per event are expected. Special events would generate an appreciable number of vehicle trips, and assuming typical vehicle occupancy rates achieved for public events (i.e., 2.5 persons per vehicle) 800 daily trips (400 inbound and 400 outbound) could occur. The proposed project description notes that these special events would be organized by the local community, and off-site parking with shuttle service would be required.

Travel to and from the site would be spread throughout the day, but there would be peak traffic periods immediately before and after scheduled events. Special events would likely occur on holidays or weekends when background traffic volumes are lower than on typical weekdays. Because special event traffic only occurs occasionally each year, traffic impacts associated with special events are not significant.

Special events would attract an appreciable number of vehicles to the site that would need to be parked. Assuming that all attendees were at the site at one time, a 1,000-person event could create a demand for 400 parking spaces. This demand would clearly exceed the capacity of on-site parking facilities, and would result in overflow parking onto adjoining streets and to other areas of former Fort Ord. This represents a potentially significant impact. This impact would be reduced to a less-than-significant level with the implementation of **Mitigation Measure TR-5. Special Event Management Plan.**

Alternative 2: Reduced CCCVC 2015 Master Plan

Construction and operational traffic resulting from Alternative 2 would result in generally the same impacts as described above for the 2015 Master Plan. Although the overall footprint of construction would be reduced; it is assumed the same construction equipment would be utilized for each phase and the same operations would occur. There may be less operational traffic, which may reduce impacts to the impacted intersection. In addition, the same special events under the proposed project are also anticipated under Alternative 2. These potentially significant traffic impacts would be reduced to a less-than-significant level with implementation of **Mitigation Measures TR-1** through **TR-5**.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Construction and operational traffic resulting from Alternative 3 would be the same impacts as described above for Phase 2. Although the overall footprint of construction would be increased; it is assumed the same construction equipment would be utilized and the same operations would occur. The same special events under the proposed project are also anticipated under Alternative 3. These potentially significant traffic impacts would be reduced to a less-than-significant level with implementation of **Mitigation Measures TR-1** through **TR-5**.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no impact would occur.

Mitigation Measure TR-1: Construction Traffic Management Plan

Prior to the commencement of construction activities for Phase 2 and future phases, CalVet or designated representative shall prepare a Construction Traffic Management Plan and submit plan to the City of Seaside and/or County Engineer. The plan shall:

1. Designate construction vehicle access routes to the project site that avoid roads with potential sensitive receptors (Normandy Road). The preferred designated access route to the project site should be via Gigling Road to Parker Flats Road.
2. Identify proper safety precautions to avoid safety impacts to sensitive receptors if access to the project site via Normandy Road is unavoidable. Access to the project site shall not occur directly before or directly after school hours.

Mitigation Measure TR-2: Operational Traffic Management

To reduce potential safety impacts during the operation of Phase 2 and future phases of the CCCVC:

1. Identify preferred routes to the CCCVC site which do not make use of Normandy Road between General Jim Moore Boulevard and Parker Flats Road.
2. Publicize and encourage the use of the identified alternative routes on the CCCVC facility information (i.e., website, pamphlet, and brochures).

Mitigation Measure TR-3: Signal Timings and Phasing Adjustments

If the Northeast Southwest Arterial Connector Roadway is in operation at the time the construction of Phase 4 of the CCCVC is proposed, CalVet will coordinate with the City of Seaside to adjust signal timing and signal phasing to improve intersection operations at General Jim Boulevard & Coe Avenue and reduce AM peak hour delay. The signal timings and signal phasing will be adjusted prior to operation of Phase 4 of the CCCVC.

Mitigation Measure TR-4: Pedestrian and Bicycle Facility Improvements

ADA compliant sidewalks and crosswalks, as well as bicycle parking, shall be designed and constructed as part of Phase 3 development of the CCCVC to address the gap in the sidewalk network along the project frontage and just west of the Normandy Road & Parker Flats Cut-Off Road intersection. The improvements will be constructed in compliance with adopted City of Seaside and County standards.

Mitigation Measure TR-5: Special Event Management Plan

CalVet shall prepare and implement a Special Event Transportation Management Plan during special events at the cemetery. The plan shall be submitted to the City of Seaside and/or County Engineer for review and approval for issuance of a Special Event Permit. The plan shall include:

1. Designated off-site parking facilities;
2. A traffic flow plan to direct motorists from access roads to identified off-site parking facilities; and
3. A description of the shuttle service system to transport special event attendees to and from established parking areas.

3.16 UTILITIES AND SERVICE SYSTEMS

3.16.1 Introduction

This section assesses the potential impacts on public utilities and service systems from the proposed project and alternatives. Utilities and service systems discussed include potable water service, wastewater service, solid waste facilities, and electricity and natural gas. Impacts related to water quality and stormwater/drainage infrastructure are addressed in **Section 3.10**, **Hydrology and Water Quality**.

Public and agency comments related to utilities were received during the public scoping period, and are summarized below:

- The cemetery appears to have sufficient water allocated for its current level of development (i.e., Phase 1) and for the proposed Phase 2.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR/EA. For a complete list of public comments received during the public scoping period, refer to **Appendix A**, **NOP and Public Comment Letters**.

3.16.2 Environmental Setting

Water Supply

The proposed project site is within the MCWD, which is responsible for providing water and wastewater service within their service area on the former Fort Ord. Long-term water demand for the cemetery is anticipated to be a maximum of 5 afy. Of this, the combined potable water demand for the office and maintenance yard is anticipated to be 0.8 afy at full buildout. The current use at the office building is 0.04 afy. It is anticipated that the water use at the office will increase over time due to an increased number of employees and visitors to the Cemetery. The irrigation demand for the plant establishment period (the first two to three years after construction) is estimated to be up to 4 afy per phase of construction. Since this is only a temporary demand, this may only be a temporary allocation and not a long-term allocation. Through the use of local, drought-tolerant species, a long-term water demand of 1 to 2 afy for landscape and general maintenance activities may be achieved after the initial plant establishment period for each phase. The cemetery has a 15 afy water supply from the Army until the irrigation needs are met. The cemetery has a total 7 afy of permanent water supply (2 afy from the County and 5 afy from the Army).

The MCWD Pressure Zones D and E are located to the north-west and south-west of the project site, respectively. Both are fed from reservoirs abutting the southwest corner of the project site. The MCWD has stated that the Zone D system currently has the capacity to handle the development of the cemetery. The majority of the cemetery development is within the Zone D service elevation range of 300 to 400 feet. The only conceptual element of the 2015 Master Plan currently outside Zone D is the monument (flag pole) area at elevation 417 feet. If necessary, this area could be served by the Zone D system with the use of a booster pump to provide additional pressure. An existing 24-inch Zone D water main crosses Normandy Road approximately 100 feet west of the intersection of Parker Flats Cut-Off and Normandy Road, which is approximately 150 feet west of the project boundary. This is the point of connection for the cemetery.

Water for fire suppression would also be provided by the MCWD. Approximately 6,200 linear feet of water main may be constructed to serve fire hydrants (**Figure 2-8, 2015 Master Plan Water Plan**). Fire hydrants spread throughout the site are assumed to be required, although given the lack of buildings and limited landscaping, it is possible this requirement may be waived.

Wastewater

The MCWD provides sanitary sewer to the project site. An existing 12-inch sanitary sewer main is located in Normandy Road approximately 120 feet west of the intersection of Normandy Road and Parker Flats Cut-Off (approximately 740 feet west of the main entrance) and flows to the west. A sewer pump station was installed as part of Phase 1 along with a two-inch sewer force main that discharges at the existing MCWD manhole. Additional four-inch gravity sewer lines that lead to the pump station provide service to the administrative complex as well as the maintenance building. Sewage is treated at the M1 Water wastewater treatment plant. The only areas of the project generating sewage are at the administrative complex and maintenance building within the Phase 1 site. Phase 1 constructed the entirety of the project's sewer infrastructure.

Seaside requires that the project's irrigation systems be plumbed for reclaimed water in anticipation of the availability of recycled water for the cemetery. The MCWD has installed several trunk lines; however, it is unknown when the system will go online and when recycled water will become available, and it is assumed that the 3,500 linear feet of new reclaimed water main required to connect the project would not be constructed by the cemetery due to its low anticipated irrigation water demand. It is assumed that potable water would be used for irrigation until such time as recycled water is available.

Solid Waste

Within the City of Seaside, solid waste collection and disposal services are provided by GreenWaste Recovery. Waste is transported to the Monterey Peninsula Landfill and Recycling Facility in the City of Marina, which is operated by the Monterey Regional Waste Management District (MRWMD). This facility serves the solid waste and recycling needs of an estimated 170,000 residents. The landfill operates six days per week and is permitted to receive 3,500 tons of waste per day. The landfill has a remaining capacity of approximately 48.5 million cubic yards and is expected to reach its permitted capacity in 2107 (California Department of Resources Recycling and Recovery [CalRecycle], 2016). The landfill receives approximately 200,000 tons of waste per year (MRWMD, 2018). Among other things, the facility accepts basic solid waste, liquid waste, and sewage sludge (biosolids), wood waste, yard waste, concrete, brick, rock, asphalt, tires, appliances, furniture, plastics, and boats. In addition to typical waste management, the MRWMD also operates a Materials Recovery Facility, which targets materials brought in from self-haul loads and commercial wastes, construction and demolition debris, wood waste, and yard waste. This facility diverts an estimated 64 percent of all incoming material. The facility also has off-site local recycling centers that collect household recyclables (glass, aluminum, paper, and plastics).

State agencies operate under a 50 percent waste disposal reduction mandate under AB 75; therefore, receptables and facilities would be provided to separate recyclable materials from non-recyclable waste during operation and special events. Materials, recyclables, containers, and storage shall comply with standards set for the by the City of Seaside Waste Management.

Natural Gas and Electricity

The proposed development is located with the jurisdiction of MBCP, a locally-controlled public agency in partnership with PG&E for power services, please see **Section 3.6 Energy** for more information on State

and local energy consumption as well as MBCP and PG&E power generation sources. Natural gas service is not being provided. Phase 1 constructed the entirety of the cemetery's electric infrastructure.

Stormwater

Stormwater is collected and treated on-site. Phase 1 improved a natural depression on the western edge of the project site into a retention basin. The proposed project would utilize a system of inlets and underground pipelines to capture drainage from on-site roadways and surrounding areas, and convey it to stilling basins prior to release to the detention basin. Project design would contain 100 percent of stormwater runoff through retention and percolation and would not require the use of existing offsite stormwater drainage facilities.

3.16.3 Regulatory Framework

Federal

Safe Drinking Water Act

The Safe Drinking Water Act is the primary Federal law, administered by the U.S. EPA, which regulates the quality of drinking water and establishes standards protecting public health and safety. The California Department of Health Services implements the Safe Drinking Water Act and oversees public water system quality statewide, establishing legal drinking water standards for contaminates that could threaten public health.

State

California Building Codes

The CalGreen Standards Code in Title 24, CCR requires newly constructed buildings to divert from landfills at least 50 percent of the construction materials generated by a project (CalGreen Standards, CCR Sections 4.408 and 5.408). In addition, certain additions and alterations to non-residential buildings or structures shall also recycle and/or salvage for reuse a minimum 50 percent of the nonhazardous construction and demolition debris (CalGreen Standards, CCR Section 5.713).

California Public Utilities Commission

The CPUC is responsible for ensuring that investor-owned (private) water, energy, and telecommunications utilities deliver safe, clean, and reliable services to their customers at reasonable rates. The CPUC adopts Rules of Practice and Procedure and issues General Orders to regulate various aspects of rates, services, facilities, and the safety and financial practices of utilities, including provisions regarding water quality. All major investment projects must be approved in advance by the CPUC after undergoing CEQA review.

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Board (CIWMB) was created to oversee, manage, and track waste generated in California. The authority and responsibilities of the CIWMB were promulgated in AB 939 and SB 1322, which were signed into law as the California Integrated Waste Management Act of 1989 (PRC, Division 30). The California Integrated Waste Management Act, as modified by subsequent legislation, mandated all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by 2000 (PRC Section 41780). In January 2010, the CIWMB changed its name to CalRecycle.

AB 341, which amends the California Integrated Waste Management Act of 1989 and was adopted by the California legislature in October 2011, directs CalRecycle to adopt a State policy that actively seeks to achieve a goal of diverting 75 percent of solid waste from landfills by 2020. The new legislation focuses largely on commercial waste generators, as this sector was identified as the most in need of improved waste management. AB 341 does not alter the 50 percent diversion mandate; rather, it is a "legislative declaration of policy" to guide CalRecycle's administration of the California Integrated Waste Management Act.

A jurisdiction's diversion rate is the percentage of total generated waste it diverts from disposal through source reduction, reuse, and recycling programs. The State determines compliance with the 50 percent diversion mandate through a complex formula. Use of the formula requires cities and counties to conduct empirical studies to establish a base-year waste generation rate against which future diversion is measured. The diversion rate in subsequent years is determined through deduction instead of direct measurement. Rather than counting the amount of material recycled and composted, the city or county tracks the amount of material disposed of at landfills and then subtracts that amount from the base-year amount; the difference is assumed to be diverted (PRC Section 41780.2).

Utility Notification Requirements

California law (Government Code Section 4216 et seq.) requires owners and operators of underground utilities to become members of, participate in, and share the costs of a regional notification center. Underground Service Alert North (USA North) is the notification center for the proposed project area. USA North receives planned excavation reports and transmits the information to all participating members that may have underground facilities at the location of excavation. The USA North members will then mark or stake their facility, provide information, or give clearance to dig (USA North, 2013).

Regional/Local

Monterey County Integrated Waste Management Requirements

The Monterey County Integrated Waste Management Plan incorporates relevant provisions of the CalGreen Standards, which the County has adopted. Diversion rates related to construction are from the CalGreen Standards. Section 5.408.1 of the code requires non-residential projects to recycle and/or salvage for reuse a minimum of 50 percent of nonhazardous construction and demolition waste. Further, Section 5.408.3, excavated soil and land clearing debris, requires that 100 percent of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing be reused or recycled (unless the vegetation or soil is contaminated with disease or pest infestation).

City of Seaside Urban Storm Management and Discharge Control

The City of Seaside Municipal Code Chapter 8.46 (Urban Storm Management and Discharge Control) regulates storm water discharge to ensure the health, safety, and general welfare of citizens, and to protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the CWA. The provisions of this regulation apply to all water entering the City's storm drain system generated on any developed and undeveloped lands lying with the city.

3.16.4 Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;

b. Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;

c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;

d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or

e. Conflict with federal, state, and local management and reduction statutes and regulations related to solid waste.

Impact Analysis Overview

Approach to Analysis

This impact analysis focuses on the potential for construction or operations from the proposed project and alternatives to indirectly or directly affect utilities and service systems.

Areas of No Impact

Phase 1 constructed the entirety of the cemetery's electric infrastructure. The proposed project and alternatives would not impact electric infrastructure beyond what has already been evaluated under the Phase 1 environmental review. In addition, natural gas is not being provided to the project. The project would, therefore, have no impact on these services, and they are not discussed further. In addition, waste generated by the proposed project and alternatives would comply with statues and regulations related to solid waste. No impact would occur.

Summary of Impacts

Table 3.16-1 provides a summary of potential impacts to utilities and service systems from the proposed project and alternatives.

Table 3.16-1. Summary of Impacts – Utilities and Service Systems

Impact Title	Alternative 1: Proposed Project		Alternative 2: Reduced CCCVC 2015 Master Plan	Alternative 3: CCCVC Master Plan – Modified Phase 2	No Action Alternative
	2015 Master Plan	Phase 2			
Impact UT-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LS	LS	LS	LS	NI
Impact UT-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LS	LS	LS	LS	NI
Impact UT-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LS	LS	LS	LS	NI
Impact UT-3: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS	LS	LS	LS	NI
NI – No Impact LS – Less than Significant LSM – Less than Significant with Mitigation SU – Significant Unavoidable					

Impacts and Mitigation Measures

Impact UTL-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. (Criterion a)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The proposed project is served by the MCWD. An existing 24-inch water main which crosses Normandy Road approximately 150 feet west of the project boundary would be the cemetery's point of connection to the MCWD network. Most of the proposed development is within MCWD's Pressure Zone D service

elevation range of 300 to 400 feet. The only conceptual element of the 2015 Master Plan currently outside Zone D is the monument (flag pole) area at elevation 417 feet. If necessary, this area could be served by the Zone D system with the use of a booster pump to provide additional pressure. This is a less-than-significant impact.

The MCWD also provides sanitary sewer to the proposed project site via an existing 12-inch sewer main in Normandy road, approximately 740 feet west of the cemetery's main entrance. Sewage is treated at the M1 Water wastewater treatment plant in Marina. Because the only areas of the cemetery which will generate sewage are at the administrative complex and maintenance building within the Phase 1 site, Phase 1 constructed the entirety of the cemetery's sewer infrastructure. Full build-out of the 2015 Master Plan would increase daily visitors and generate a minor increase in wastewater that would not impact MCWD or M1 Water's wastewater treatment capacity. This is a less-than-significant impact.

Stormwater is collected and treated on-site. Phase 1 improved a natural depression on the western edge of the project site into a retention basin. The proposed project would utilize a system of inlets and underground pipelines to capture drainage from on-site roadways and surrounding on-site areas, and convey it to silting basins prior to release into the retention basin. Project design would contain 100 percent of stormwater runoff through retention and percolation and would not require the use of existing offsite stormwater drainage facilities. The proposed project includes improvements to the retention basin contain the 100-year flood volume from Phases 1 and 2 with a 100-year maximum water surface elevation of 283 feet. The proposed project would adhere to the stormwater treatment requirements of the Central Coast Regional Water Quality Control Board, and, although the State is not required to do so, the project would also adhere to the policies of the City of Seaside when feasible.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to utilities and service systems as the impact described under Alternative 1 above. However, under Alternative 2, the Master Plan footprint would be smaller and require less water for irrigation, and would generate less wastewater (from fewer daily visitors). This is a less-than-significant impact.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to utilities and service systems as the impact described under Alternative 1 above. However, under Alternative 3, Phase 2 would include 869 additional burials by incorporating smaller groupings of in-ground cremains to infill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. This would reduce the landscaping footprint and irrigation demand and would be a less than significant impact.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase utility demand; Alternative 4 would therefore have no impact on utilities and service systems.

Impact UTL-2: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. (Criteria b)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Long-term water demand for the cemetery is anticipated to be a maximum of 5 afy. Of this, the combined potable water demand for the office and maintenance yard is anticipated to be 0.8 afy. The current use at the office is 0.04 afy. It is anticipated that the water use at the office will increase over time due to an increased number of employees and visitors to the Cemetery. The irrigation demand for

the plant establishment period is estimated to be up to 4 afy per phase of construction. Since this is only a temporary demand, this may only be a temporary allocation and not a long-term allocation. Through the use of local, drought-tolerant species, a total long-term water demand of 1 to 2 afy for landscape and general maintenance activities may be achieved after the initial plant establishment period for each phase. Total water demand during the construction of Phase 2 is estimated to be approximately 1,500 gallons per day for a period of 220 days, totaling 330,000 gallons. Construction of paved areas and landscaping would require approximately 500 gallons per day for a period of 40 days, totaling an additional 20,000 gallons of water. The water would come from the MCWD water supply via a hydrant located on-site. It is anticipated that future phases would require similar amount of water during construction. The cemetery has been allocated a 15 afy water supply from the Army until the irrigation needs are met, and has a total 7 afy of permanent water supply (2 afy from the County and 5 afy from the Army). This supply would adequately meet the cemetery's demand both during and after the plant establishment period. In addition, MCWD has stated that the is sufficient water supply for the proposed project. Water for fire suppression would be provided by the MCWD. Approximately 6,200 linear feet of water main may be constructed to serve fire hydrants. Fire hydrants spread throughout the site are assumed to be required, although given the lack of buildings and limited landscaping, it is possible this requirement may be waived. Therefore, there is sufficient water supply to serve the proposed project. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to water supply as the impact described under Alternative 1 above. However, under Alternative 2, the 2015 Master Plan footprint would be smaller and would require less water for irrigation. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to water supply as the impact described under Alternative 1 above. However, under Alternative 3, Phase 2 would include 869 additional burials by incorporating smaller groupings of in-ground cremains to in-fill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. This would reduce the landscaping footprint and irrigation demand, and is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase water demand; Alternative 4 would, therefore, have no impact on water supply.

Impact UTL-3: Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments. (Criteria c)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As stated under **Impact UTL-1** above, the only areas of the cemetery which will generate sewage are at the administrative complex and maintenance building within the Phase 1 site. Phase 1 constructed the entirety of the cemetery's sewer infrastructure. Full build-out of the 2015 Master Plan would increase daily visitors and generate a minor increase in wastewater that would not impact MCWD or M1 Water's wastewater treatment capacity. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to water supply as the impact described under Alternative 1 above. However, under Alternative 2, the 2015 Master Plan footprint would be smaller and would require less water for irrigation. This would be a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to water supply as the impact described under Alternative 1 above. However, under Alternative 3, Phase 2 would include 869 additional burials by incorporating smaller groupings of in-ground cremains to infill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. This would reduce the irrigation demand and is a less than-significant-impact. No mitigation required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase water demand; Alternative 4 would therefore have no impact on water supply.

Impact UTL-4: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. (Criteria d)

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Solid waste generated by construction and operation of the proposed project would be collected by GreenWaste Recovery and would be transported to the Monterey Peninsula Landfill and Recycling Facility in Marina. This landfill is permitted to receive 3,500 tons of waste per day but receives less than 1,000. It is expected to reach its permitted capacity in 2161. State agencies operate under a 50 percent waste disposal reduction mandate under AB 75; therefore, receptables and facilities would be provided to separate recyclable materials from non-recyclable waste during operation and special events. Materials, recyclables, containers, and storage shall comply with standards set for the by the City of Seaside Waste Management. There is adequate capacity at the landfill as discussed above. This is a less-than-significant impact. No mitigation is required.

Alternative 2: Reduced CCCVC 2015 Master Plan

Alternative 2 would have a similar impact to solid waste as the impact described under Alternative 1 above. However, under Alternative 2, the Master Plan footprint would be smaller and would generate less solid waste (due to fewer daily visitors) after full build-out. This is a less-than-significant impact. No mitigation is required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

Alternative 3 would have a similar impact to solid waste as the impact described under Alternative 1 above. However, under Alternative 3, Phase 2 would include 869 additional burials by incorporating smaller groupings of in-ground cremains to infill the open space surrounding the existing memorial walk as well as in-fill around the future columbaria. The increase in burials may increase the number of daily visitors, thereby increasing solid waste generation. However, this increase would not exceed the landfill's capacity. This is a less-than-significant impact. No mitigation is required.

Alternative 4: No Action Alternative

Alternative 4 would not involve any action that would increase solid waste generation; Alternative 4 would, therefore, have no impact on solid waste infrastructure or reduction goals.

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Chapter 4.0 OTHER STATUTORY CONSIDERATIONS

This chapter addresses other statutory considerations that must be evaluated pursuant to CEQA and NEPA. The following sections address these statutory considerations, with the applicable environmental guidelines noted in parentheses:

- Cumulative Impacts (CEQA and NEPA);
- Growth Inducing Impacts (CEQA);
- Significant Irreversible and Irretrievable Commitments of Resources that would result from the Proposed Project (CEQA and NEPA);
- Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity (NEPA);
- Monitoring and Reporting Program (CEQA);
- Significant and Unavoidable Adverse Impacts (CEQA);
- Findings of Fact and Statements of Overriding Consideration (CEQA);
- Areas of Controversy (CEQA); and
- Identification of the Environmentally Superior Alternative/Environmentally Preferable Alternative (CEQA/NEPA).

4.1 CUMULATIVE IMPACTS (CEQA AND NEPA)

This section discusses the anticipated cumulative impacts of the proposed project and alternatives described in Chapter 2 of this Draft EIR/EA. Impacts of past projects are incorporated into the description of the baseline, or the environmental setting, in the resource sections in Chapter 3. Present and reasonably foreseeable future projects are identified in this section and form the basis for the cumulative impact analysis.

An EIR is required to include an assessment of cumulative impacts when the proposed project's incremental impacts would be cumulatively considerable (CEQA Guidelines Section 15130). The assessment involves examining project-related impacts on the environment in the context of similar projects that have been caused by past or existing projects and that would be caused by reasonably foreseeable future projects. A cumulative impact is defined as "two or more individual impacts, which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). A project's incremental impacts are cumulatively considerable if the impacts are significant when considered in connection with other related projects.

4.1.1 CEQA and NEPA Requirements

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). Cumulative impacts can result from individually minor, but collectively significant, actions when added to those of other closely related past, present, or reasonably foreseeable future projects. Guidance for cumulative impact analysis is provided in Section 15130 of the CEQA Guidelines:

a. An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (i.e., the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).

b. An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR. Thus, where the impacts of a proposed project are beneficial rather than adverse, the EIR need not address adverse effects that might arise due to other projects in the vicinity of the project at issue.

c. A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

d. The discussion of impact severity and likelihood of occurrence need not be as detailed as for effects attributable to the project alone.

e. The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact.

CEQA further stipulates that the discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence; however, the level of detail concerning cumulative impacts is not required to be as great as is provided for the effects attributed to the project (CEQA Guidelines Section 15130(b)). Moreover, CEQA Guidelines Section 15130(b)(3) further requires that the "geographic scope of the area affected by the cumulative effect" is defined and that the analysis should "provide a reasonable explanation for the geographic limitation used."

NEPA requires Federal agencies to consider the effects of cumulative actions and cumulative impacts (1508.25 and 1508.7). CEQ's NEPA Regulations 1508.7 defines a cumulative impact as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative actions are those which when "viewed with other proposed actions have cumulatively significant impacts" and should be discussed in the impact statement (1508.25(a)(2)). In order to assist Federal agencies in assessing the extent of potential cumulative effects under NEPA, the CEQ developed a handbook entitled *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ, 1997b). The analysis contained in this EIR/EA follows the guidelines contained in that document to determine whether the proposed project or alternatives would, when combined with past, present, or reasonably foreseeable projects, cumulatively result in environmental effects.

4.1.2 Approach to Cumulative Impact Analysis

CEQA Guidelines Section 15130(b)(1) describes two methods for evaluating potential cumulative impacts: a list approach or projection approach. The list approach typically identifies all of the past, present, and probable future actions that may contribute to a cumulative impact, including those projects outside of the control of the agency. Alternatively, the cumulative impact analysis may rely on a summary of projections of future development described in local, regional, or statewide plans, or other similarly related planning documents, which describes or evaluates conditions contributing to cumulative effects. It is also common for the cumulative analysis to rely on a combined approach.

This EIS/EIR relies on a combined approach for the cumulative impact analysis. Relevant local land use plans (e.g., Reuse Plan, Marina, Seaside, Monterey, County, CSUMB, UC, and State Parks) and the AMBAG projections are used to establish the cumulative context. Most of the local land use plans involve planning projections of 20 to 30 years, while redevelopment of the former Fort Ord under the Reuse Plan is projected to occur over the next 40 to 60 years. This cumulative analysis addresses the environmental impacts that may occur over the build-out of the 2015 Master Plan. While it is anticipated that each phase would accommodate burial needs for approximately ten years, phases would be implemented based on demand and available funding. For the purpose of this analysis, it is assumed that future phases would be implemented every ten years with build-out occurring in 2101. It is highly uncertain what the environmental conditions will be in 2101, or what laws and regulations will be in place. Therefore, this cumulative assessment is qualitative due to the speculation involved with predicting the timing, design, density, and location of future actions over the next 100 years.

The area addressed in this cumulative analysis is primarily the County, including the incorporated cities. The exceptions are air quality, which as required by the MBARD is based on the NCCAB, and biological resources, which addresses a larger area based on the range of the species being impacted. In addition, the cumulative analysis for traffic relies upon traffic modeling of the AMBAG. Greenhouse gases also are assessed using summaries of projections.

Section 15355 of the CEQA Guidelines defines "cumulative impacts" as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental effects. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time. In addition to assessing the combined impacts of the project and past, present and probable future projects, the EIR/EA determines whether the impact of the proposed project is cumulatively considerable.

Three criteria were used to determine an appropriate list of relevant present and future projects to be considered in this cumulative analysis: (1) similar environmental impacts, (2) geographic scope and location, and (3) timing and duration of implementation.[1] A relevant future probable project is defined as one that is "reasonably foreseeable," such as a proposed project that has approved funding or for which an application has been filed and deemed complete by an approving agency by the time of commencement of environmental review of the proposed project. In addition, some projects may be excluded from the cumulative list if the agency and/or applicant were not actively pursuing further entitlements at the time of preparation of this EIR/EA.

Similar Environmental Impacts

Projects that are relevant to the cumulative impact analysis include projects that could contribute incremental environmental effects on the same resources as, and would have similar impacts to, those discussed in this EIR/EA applicable to the proposed project. Cumulative impacts that could occur when the impacts of the proposed project are considered in combination with the impacts of other relevant projects are discussed in **Chapter 3, Environmental Setting and Environmental Impacts**, **Sections 3.2** through **3.16** of this EIR/EA.

[1] As discussed in **Section 4.1**, impacts of past projects are incorporated into the description of the baseline, or the environmental setting, in the resource sections in Chapter 3. Present and reasonably foreseeable future projects are identified in this section and form the basis for the cumulative impact analysis.

Geographic Scope and Location

Projects that are relevant to the cumulative analysis include those that are within the defined geographic scope for the cumulative effect. The defined geographic scope is dependent on the environmental resource affected. Generally, the geographic scope includes the area within and adjacent to the project component site. However, for certain environmental resource topics the geographic scope extends farther, such as the regional roadway network, regional air basin, or the former Fort Ord. The geographic scope is described by resource topic in the section below.

Timing and Duration of Implementation

Projects that are relevant to the cumulative analysis include projects that could contribute impacts that coincide with proposed project impacts during construction (short-term) or operation (long-term). For the 2015 Master Plan, each phase is anticipated to be constructed approximately ten years apart for the next 100 years. Each phase would vary in overall size, but development would generally range between three and four acres. The duration of each phase of construction is anticipated to take approximately 12-24 months. The specific timing of construction for future phases is unknown at this time. For Phase 2, it is assumed that construction would commence late 2019 or early 2020 and be completed by the end of 2020. Please refer to **Chapter 2, Proposed Project and Alternatives, Sections 2.4.1** and **2.4.2**, for more details on construction activities and duration. For temporal impacts such as air pollutant emissions, and increased noise levels and traffic during construction, cumulative effects could overlap with those of the proposed project, and would affect the same environmental resources.

4.1.3 List of Relevant Projects

Table 4-1. Projects Considered for Cumulative Impacts Analysis provides a list of the present and probable future projects within and near the proposed project area, including a brief description of the projects, their anticipated construction schedules, and the potential impacts which could interact with those of the proposed project. Not all of the projects listed will complete the environmental review process, and not all projects will be funded and constructed; however, this analysis conservatively assumes that any or all of the projects could be constructed at some time. Impacts of past projects are incorporated into the description of the baseline, or the environmental setting, in the resource sections in Chapter 3. **Figure 4-1** shows the location of the cumulative projects; the numbering of the projects in the table correlates to the numbered location of the projects on the figure.

The cumulative impact analysis is presented below by each resource topic included in **Chapter 3, Environmental Setting and Environmental Impacts**. Resources topics determined to have no impact as a result of the proposed project as described in **Section 3.1.4, Resources Not Considered in Detail** are not included in the cumulative impact analysis. A summary of the projects considered for the cumulative impact analysis is provided in **Table 4-1**.



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Planning and Environmental Consulting

Projects Considered for Cumulative Impacts Analysis

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Date 04-09-2019

Scale 1 in=1 mi

Figure 4-1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 4-1 Cumulative Projects.mxd

Table 4-1. Projects Considered for Cumulative Impact Analysis

Cumulative Project No.	Project Name	Project Description	Areas of Overlap	Estimated Construction Schedule
1	Fort Ord Habitat Conservation Plan (HCP)	Based on the 1997 Fort Ord Habitat Management Plan, the HCP addresses the conservation and enhancement of habitat for several special-status plants and animals on the former Fort Ord. The plan identifies designated development areas, habitat management areas, and borderlands.	Similar environmental impacts, geographic scope, and location	Management activities are anticipated to commence in 2021 and continue through the 50-year permit term
2	Fort Ord Oak Woodland Conservation Plan (OWCP)	The Reuse Plan requires Monterey County and the City of Seaside, along with other jurisdictions who received property with the closure of the Army base, to designate, manage, and monitor the conservation of oak woodlands on the former military base including development of a plan for the long-term protection and conservation obligations related to oak woodlands.	Similar environmental impacts, geographic scope, and location	Management activities are anticipated to commence in 2021 and would continue as needed in perpetuity
3	The Dunes on Monterey Bay	A mixed-use planned community over 429 acres located on the former Fort Ord, in the City of Marina. The development is long-term over multiple phases and actively under construction.	Similar environmental impacts and geographic scope	In progress to 2030
4	Sea Haven	A 248-acre residential development located in the City of Marina (formerly known as Marina Heights).	Similar environmental impacts and geographic scope	In progress to 2040
5	Marina Airport Economic Development Area	Located at the Marina Municipal Airport in the City of Marina, the Airport Economic Development Area aims to: 1) Ensure the long-term viability of the airport aviation operations, and 2) Ensure economic development opportunity through development of a business park and recreational uses.	Similar environmental impacts and geographic scope	2025 - 2035
6	Cypress Knolls	A proposed 190-acre senior residential community located in the City of Marina. The City is currently working on concepts for the area.	Similar environmental impacts and geographic scope	Beyond 2025
7	Northeast Southwest Arterial Connector Project (NE-SW Connector Project)	An arterial connector (formerly known as Eastside Parkway) would connect General Jim Moore Boulevard to Reservation Road through the former Fort Ord within unincorporated Monterey County.	Similar environmental impacts, geographic scope, and location	2025 - 2027

Cumulative Project No.	Project Name	Project Description	Areas of Overlap	Estimated Construction Schedule
8	Monterey Peninsula Water Supply Project	The project will create and expand three water supply sources for the Monterey Peninsula to reduce regional demand on groundwater and the Carmel River. These sources include construction of a desalination facility as well as aquifer storage and recovery (ASR) wells. The third source will include recycled water purchased from the M1W Monterey Peninsula Groundwater Replenishment Project (described below).	Similar environmental impacts and geographic scope	Start-up and commission scheduled for 2021
9	Monterey Peninsula Groundwater Replenishment Project (GWR or Pure Water)	The Pure Water Project is proposed by M1W and will artificially recharge the Seaside Groundwater Basin with advanced, treated wastewater. The treated wastewater will be injected underground using a series of shallow and deep injection wells. The goal is to have injected water mix with existing groundwater for storage until Cal-Am begins to use the water to supply its customers in order to reduce Cal-Am's pumping from the Carmel River.	Similar environmental impacts and geographic scope	Construction complete in 2019
10	South Boundary Road Project	The project consists of the realignment of the existing South Boundary Road, within the Cities of Del Rey Oaks and Monterey.	Similar environmental impacts and geographic scope	2020-2021
11	Seaside Senior Living	Demolition of an existing 5,000 square feet structure and construction of a 5.47-acre Residential Care Facility for the Elderly located in the central portion of the City of Seaside.	Similar environmental impacts and geographic scope	Beyond 2025
12	Seaside Resort	In January 2009, Seaside Resort Development, LLC (SRD) completed the upgrade of the Bayonet and Black Horse golf courses. The next phase of development will feature a four-star hotel with approximately 275 rooms, 175 timeshare units and 125 custom residential lots.	Similar environmental impacts and geographic scope	In progress to 2025
13	Campus Town Project	A mixed-use 85-acre site located directly south of the CSUMB campus aimed to provide housing, employment and mixed-use opportunities to campus and the region.	Similar environmental impacts and geographic scope	2022 to 2030
14	The Projects at Main Gate	The proposed mixed-use project will include retail, entertainment, residential and hotel. The development site is approximately 60 acres of vacant coastal land at the Main Gate of the former Fort Ord Army Base and adjacent to CSUMB campus.	Similar environmental impacts and geographic scope	Beyond 2025

Cumulative Project No.	Project Name	Project Description	Areas of Overlap	Estimated Construction Schedule
15	Seaside East	The Seaside East site is approximately 700 acres of undeveloped coastal upland. The City of Seaside's General Plan and a 2007 market study calls for varying densities of residential units with about 50 acres of neighborhood retail. The City is currently re-evaluating the highest and best use of Seaside East, Requests for Proposals for a Master Developer will be released at a future date.	Similar environmental impacts and geographic scope	Beyond 2025
16	Ferrini Ranch	Located in Monterey County, the project is a subdivision of an approximately 866-acre property into 212 residential lots including 146 market-rate lots, 23 clustered lots for workforce housing units & 43 lots for inclusionary housing units; one commercial parcel fronting on River Road and 600 acres of open space.	Similar environmental impacts and geographic scope	2020 to 2025
17	Marina Station	An approved mixed-use development including over 1,300 residential units, specialty retail, general office, and industrial uses in three mixed-use village centers. In addition, the project includes approximately 30 acres of open space, parks, playgrounds, recreation areas, and a buffer between the proposed project and existing neighborhoods.	Similar environmental impacts and geographic scope	Beyond 2025
18	East Garrison	Located within the former Fort Ord, the project is a mixed-use development consisting of a standard subdivision into 1400+/- residential units, commercial uses, and public uses.	Similar environmental impacts and geographic scope	In progress to 2025
19	CSUMB Comprehensive Master Plan Update	CSUMB has initiated a process to update its campus master plan. The master plan will consider a wide range of issues encompassing the academic environment, student and residential life, sustainability, mobility and infrastructure systems, and connections with Monterey Bay communities.	Similar environmental impacts and geographic scope	2020-2040
20	Fort Ord Dunes State Park Campground Project	Construction of a new campground with 95 new campsites. Formally part of the Fort Ord Army Base, the property includes approximately 990 acres of State parkland, including 4 miles of ocean beach.	Similar environmental impacts and geographic scope	2020-2021

4.1.4 Cumulative Impact Analysis

The proposed project and alternatives could result in less-than-significant and potentially significant impacts to the resource topics as described in **Chapter 3, Environmental Setting and Environmental Impacts**. The proposed project may be implemented in an interactive manner with other projects. In addition, these other projects may affect the impacts of the proposed project. A cumulative impact may be significant in the context of all projects being analyzed, but an individual project's contribution may be less than significant. This analysis focuses on the incremental impacts that could contribute to cumulative impacts at the appropriate temporal or spatial scaled. The significance thresholds identified in each resource section were used to determine the significance of each cumulative impact.

The following discussion identifies potential cumulative impacts that are anticipated as a result of implementing the proposed project and the alternatives in relation to past, present, and reasonably foreseeable future projects for each resource area described in Chapter 3. The discussion identifies those areas in which the impacts of the proposed project, when viewed against the backdrop of these other projects, could cause an incremental impact that is "cumulatively considerable" within the meaning of CEQA.

Aesthetics

The geographic scope for cumulative impact analysis on aesthetic resources consists of the proposed project site and the immediate vicinity around the site that is visible from the same public vantage points as the cumulative project sites. Based on the list of cumulative projects provided on **Table 4-1. Projects Considered for Cumulative Analysis**, the following projects are within the same viewshed of the proposed project: the Fort Ord HCP, Fort Ord OWCA Project, and NE-SW Connector Project. The locations of the projects listed on **Table 4-1** do not necessarily need to be visible simultaneously with the proposed site from one fixed vantage point; however, for an impact to occur, the sites must be visible in the same general vicinity by a viewer.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction of Phase 2 would not overlap with the projects identified above. Construction of future phases of the 2015 Master Plan may overlap with the construction of some of these projects. **Table ES-1,** in **Chapter ES, Executive Summary**, provides a summary of potential impacts from the proposed project and alternatives to the aesthetic environment and significance determinations for potential impacts. The proposed project impacts (**AES-1**) on scenic vistas, visual character and quality of site (**AES-2**), and light and glare (**AES-3**) were found to be less than significant.

The construction components of the Fort Ord HCP and OWCA projects may overlap with future phases of the 2015 Master Plan, but generally consist of habitat management activities, which would have a beneficial aesthetic impact on parcels to the south, east, and in the project vicinity. Construction of the NE-SW Connector Project on the eastern side of the project site may overlap with a future phase of the 2015 Master Plan. However, most of the phases described in the 2015 Master Plan are located on the western portion of the cemetery parcel and would not adjacent to the proposed road project and unlikely to be visible from the new roadway. Further, the construction activities associated with a future phase would not substantially affect the visual character or quality of the site or otherwise result in long-term impacts on scenic vistas. Thus, there would be no significant construction-related cumulative impacts of the proposed project combined with all other projects.

None of the cumulative projects within the same viewshed as the proposed project include, or would include, substantial new permanent lighting. There is the potential that a future phase of the CCCVC

could include minimal new exterior lighting; however, the lighting would be low intensity and, where possible, directed downward and away from surrounding residential areas. Therefore, there would be no significant operation-related lighting and glare cumulative impacts of the proposed project combined with these projects.

Long-term visual impacts of the 2015 Master Plan, including Phase 2, would be less than significant. The proposed project would not have a substantial adverse effect on the viewshed. Each phase would be designed and sited to minimize impacts to the native landscape. The project site would be visible from public vantage points; however, the long-term impacts on the viewshed would not be significant and are not expected to combine with the impacts listed in **Table 4-1** in a manner that would result in significant long-term changes in the visual character and views of the site.

The cumulative projects combined with the proposed project would result in a less-than-significant cumulative impact to scenic vistas and visual quality of sites during construction. Once constructed, the operation of the proposed project would result in less-than-significant cumulative impacts on scenic vistas and the visual quality of the surrounding area. The proposed project would not make a considerable contribution to significant visual impacts; therefore, the cumulative impact is less than significant.

Alternative 2: Reduced 2015 Master Plan

The aesthetic impacts under Alternative 2 would be the same as the proposed project, although slightly reduced due to the smaller development footprint. This is a less-than-significant cumulative impact.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The aesthetic impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Air Quality

For localized air quality effects (such as exposure of nearby sensitive receptors to emissions from construction activities, such as diesel vehicle and equipment exhaust), the geographic scope is the vicinity of the proposed project site. The geographic scope for cumulative analysis of regional criteria pollutant air quality impacts is the air basin in which the proposed project would be constructed and operated, and any downwind air basins that may be affected by emissions from the proposed project. In this case, due to the location of the proposed project site and the predominantly west-northwest winds in the project region, the proposed project would not affect other air basins; therefore, only projects and plans applicable to the jurisdiction of the MBARD (i.e., the NCCAB) would apply. Projects throughout this region could have adverse effects on the regional air quality and the same sensitive receptors within the region.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

<u>Localized, Combined Exposures to Air Pollutants</u>

Cumulative Projects Contributing to Localized Impacts

Localized air pollutant emissions from cumulative projects may potentially impact sensitive receptors if intense construction activities (i.e., those activities with high air pollutant emissions) from two or more construction projects would occur in close proximity to each other (i.e., within 1 mile).

Construction of Phase 2 would not overlap with the projects identified above. One project listed in **Table 4-1, Projects Considered for Cumulative Analysis** of the Draft EIR/EA would be in close proximity to the proposed project (i.e., NE-SW Connector Project), and some may be expected to be under construction during the same worst-case and overlapping construction periods of the 2015 Master Plan. The exact sequence of other projects' construction is outside the control of the State, but as currently envisioned, the construction periods may potentially overlap.

Proposed Project Localized Air Pollutants Impacts

Construction of Phase 2 would not overlap with the projects identified above. Construction of future phases of the 2015 Master Plan may overlap with the construction of some of these projects. **Table ES-1,** in **Chapter ES, Executive Summary**, provides a summary of potential impacts from the proposed project and alternatives to air quality and significance determinations for construction and operational impacts. As detailed in **Section 3.3**, **Air Quality**, the following five impacts are relevant to the cumulative localized air pollutant analysis and the proposed project and action alternatives would have a less-than-significant impact related to all of them:

- AQ-1: Conflict with or Obstruct Implementation of Applicable Air Quality Plans
- AQ-2: Violate any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation
- AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Project region is Non-Attainment under an Applicable Federal or State Ambient Air Quality Standard
- AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentration
- AQ-5: Create Objectionable Odors Affecting a Substantial Number of People

The proposed project would have less-than-significant impacts from emissions on nearby sensitive receptors. The only cumulative project nearby with a construction schedule with the potential to overlap with the 2015 Master Plan is the NE-SW Connector Project. Most of the construction using heavy equipment that would generate construction emissions would be completed over a quarter mile from any sensitive receptors. Accordingly, the two projects would not result in significant cumulative impacts due to localized concentrations of pollutants or odors. Therefore, there would be no significant cumulative impacts due to localized air pollutant exposures or odors.

Cumulative Regional, Criteria Air Pollutant Emissions

For regional criteria air pollutants, the cumulative analysis is based on review of consistency with the MBARD's AQMP, as well as prediction of emissions. Consistency determinations with the AQMP are used by the District to address a project's contribution to regional air quality (i.e., ozone levels).

The MBARD prepares air quality plans which address attainment of the State ozone AAQS and maintenance of Federal AAQS. These plans accommodate growth by projecting growth in emissions based on different indicators. For example, population forecasts adopted by AMBAG are used to forecast population-related emissions. Through the planning process, emission growth is offset by basin-wide controls on stationary, area, and transportation sources of air pollution. In developing emission-based thresholds, MBARD also considered the levels for which a project's individual contribution would be cumulatively considerable to the region. Since the proposed project would be consistent with the AQMP and proposed project emissions are not predicted to exceed the MBARD's significance thresholds, the proposed project's incremental increase in emissions would not result in a cumulatively considerable contribution to existing or future regional air quality violations. The proposed

project would not make a considerable contribution to any significant cumulative regional air quality impacts.

The region is in non-attainment for the State ambient air quality standard for PM_{10}. Construction of one or more of these projects at one time could result in potentially significant PM_{10} emissions if compared to the significance threshold. Therefore, this analysis assumes that construction of multiple projects would result in a potentially significant cumulative impact. The significance thresholds used in the analysis in **Section 3.3, Air Quality**, measures whether the proposed project would make a cumulatively considerable contribution to a cumulatively significant impact. The analysis above regarding whether the proposed project would exceed the MBARD emissions thresholds provides a measure of whether the project would considerably contribute to significant air quality cumulative impacts, including exceedances/violations of air quality standards, exposure of sensitive receptors to substantial pollutants, or conflicts with air quality management plans. If the threshold is not exceeded, then one should conclude that the proposed project and alternatives would not contribute to any violation, regardless of what additional PM_{10} emissions these cumulative projects contribute.

The proposed project would not exceed the PM_{10} significance thresholds for construction emissions, the proposed project's contribution to this potentially significant cumulative impact would not be cumulatively considerable (i.e., less than the MBARD's threshold). The proposed project would not make a considerable contribution to significant cumulative regional emissions of PM_{10}; therefore, the cumulative impact is less-than-significant.

Alternative 2: Reduced 2015 Master Plan

The air quality impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The air quality impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Biological Resources

The geographic scope for cumulative impact analysis on biological resources consists of the overall region (i.e., Central Coast California) and more specifically, the former Fort Ord, in which the proposed project would be constructed. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Analysis**, projects throughout the region could have adverse effects on the same sensitive species and habitats that occur within and adjacent to the proposed project site. The cumulative impacts analysis assumes that construction and operation of other projects in the geographical area would have to comply with the same regulatory requirements and incorporate mitigation similar to those of the proposed project, which would serve to avoid and reduce many biological resources impacts to a less-than-significant level on a project-by-project basis. It is anticipated that the projects in **Table 4-1** would be implemented in accordance with both the Federal ESA and CESA. Even though some of these projects (i.e., Fort Ord HCP and OWCA) may have long-term beneficial effects, they could have short-term adverse effects on special-status species and habitats. The analysis considers whether or not there would be a significant, adverse cumulative impact associated with

project implementation in combination with past, present, and reasonably foreseeable projects in the geographical area, and, if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's cumulative impacts to rise to the level of significance.

All of the projects in **Table 4-1** may result in impacts to special-status species, sensitive habitats, wildlife corridors, local policies, and other sensitive biological resources, and are included in the analysis of the project's cumulative impacts. Environmental review has not been completed for many of the projects listed in **Table 4-1**. It is expected that the environmental impacts of these projects would be avoided or minimized to the extent feasible. Some of these projects are expected to have some short-term adverse impacts on biological resources during the construction phase and most would require compliance with ESA and CESA. For some of the projects listed in **Table 4-1**, the project proponent has, or would be, engaged in consultation with the USFWS and/or CDFW to implement the project.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

The proposed project has the potential to impact some of the same biological resources as other past, present, and probable future projects. Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. Construction of future phases of the 2015 Master Plan may overlap with the construction of some of these projects. **Table ES-1,** in **Chapter ES, Executive Summary**, provides a summary of potential impacts from the proposed project to biological resources and significance determinations for potential impacts. The proposed project's construction-related impacts would not be cumulatively considerable with implementation of the mitigation measures identified. Proposed project construction impacts to special-status species and habitat, as well as sensitive natural communities (i.e., maritime chaparral), were found to be less than significant with mitigation. Construction impacts to coast live oak trees and woodland were found to be less than significant with mitigation. Therefore, with mitigation, construction impacts from the proposed project can be reduced to a less-than-significant level. The proposed project operational impacts to the movement of native wildlife were found to be less than significant. Similarly, the proposed project's potential operational impacts to special-status species and habitat would be less than significant.

Therefore, with implementation of the mitigation measures, the impacts of the proposed project in combination with impacts of the cumulative projects would not result in a significant cumulative impact and the proposed project would not make a considerable contribution to significant cumulative impacts to biological resources. This is a less-than-significant cumulative impact.

Alternative 2: Reduced 2015 Master Plan

The biological impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The biological impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Cultural and Tribal Resources

The geographic for analysis of potential cumulative impacts on cultural and tribal resources is limited to the immediate vicinity of the proposed project site because impacts related to cultural and tribal resources are generally site-specific and depend on the specific localized resources and resource potential. As a result, most of the projects listed in **Table 4-1, Projects Considered for Cumulative Impact Analysis** in combination with the proposed project and alternatives are not expected to be additive or cumulative in nature.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

As described in **Section 3.5**, **Cultural Resources**, unknown cultural and tribal resources may be affected by the proposed project. As described in **Impacts CTR-1, CTR-2,** and **CTR-3**, construction of the proposed project may result in significant impacts to historical and/or archaeological resources, human remains, and tribal resources. These impacts would be reduced to a less-than-significant level with implementation of the mitigation measures identified.

There are several projects listed in **Table 4-1** that would result in ground-disturbing activities in the vicinity of the project site. The long- and short-term cumulative environmental impacts associated with these projects are not anticipated to combine with the impacts of the proposed project in a manner that is cumulatively considerable because impacts related to cultural resources are generally site-specific and depend on, and are limited to, the localized resources and resource potential. Potential impacts to cultural and tribal resources are site-specific and are evaluated and mitigated on a project-by-project basis.

Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. Construction of future phases of the 2015 Master Plan may overlap with the construction of some of these projects. One of these cumulative projects (i.e., NE-SW Connector Project) would be located in the project vicinity and have the potential to significantly impact cultural and tribal resources. Construction of a future phase of the 2015 Master Plan may overlap with the construction of this project. Therefore, these projects may result in cumulative impacts to cultural and tribal resources from construction-related activities. Implementation of the mitigation measures identified would reduce this impact to a less-than-significant level. Construction of the proposed project would result in less-than-significant impacts to cultural resources with implementation of the mitigation identified. No cumulative impacts to cultural resources have been identified related to ongoing operation of cumulative projects. Therefore, the proposed project would not contribute to cumulative impacts related to cultural resources.

Alternative 2: Reduced 2015 Master Plan

The cultural and tribal resources impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The cultural and tribal resources impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Energy

The geographic scope for cumulative impact analysis on energy consists of the proposed project site and State of California. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Analysis**, projects throughout the region could have adverse effects on energy. The cumulative impacts analysis assumes that construction and operation of other projects in the geographical area would be required to comply with the same regulatory requirements.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Table ES-1, in **Chapter ES, Executive Summary**, provides a summary of potential impacts from the proposed project to energy and significance determinations for potential impacts. The proposed project would result in less-than-significant impacts related to energy consumption. Future phases of the 2015 Master Plan would require minimal electrical and natural gas use. Further, sustainability is an important feature of the cemetery design. High efficiency mechanical equipment would be provided as well as low usage high-efficiency plumbing features. Finishes would be selected to contain low VOCs, rapidly renewable materials, and recycled content. Therefore, the proposed project's incremental contribution to any cumulative impacts to energy would not be cumulatively considerable. All cumulative projects would be required to comply with Federal, State, and local regulations. Therefore, the construction and operation of these projects combined with the proposed project would not result in a considerable increase in demand for energy, resulting in wasteful, inefficient, or unnecessary consumptions of energy, or conflict with any applicable plans that would result in a considerable contribution to cumulative impacts.

Alternative 2: Reduced 2015 Master Plan

The energy impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The energy impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Geology and Soils

The geographic scope for cumulative impact analysis on geology and soils consists of the proposed project site and the immediate vicinity. Geologic and seismic impacts are generally site-specific, because they result from the local geology and soil conditions at a given site and do not have additive effects with activities/projects beyond the immediate vicinity. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Impact Analysis**, there is one project within the immediate vicinity of the proposed project: the NE-SW Connector Project. This project may result in short- and/or long-term impacts related to soil disturbance and an increase in erosion potential. These potential impacts are typically mitigated through implementation of BMPs.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Because of the localized nature of the anticipated individual project impacts, the projects listed in **Table 4-1** would not combine with those of the proposed project to cause or contribute to potential cumulative geology or soils impacts. Construction of all projects would be subject to applicable codes and requirements of the California Building Standards Code (CCR Title 24), and applicable grading ordinances. Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. However, construction of a future phase of the 2015 Master Plan may overlap with the construction of some of these projects. One of these cumulative projects (i.e., NE-SW Connector Project) would be located in the project vicinity and have the potential to significantly impact geology and soils. Construction of a future phase may overlap with the construction of this project. Impacts caused by this project combined with a future phase of the 2015 Master Plan would not result in a significant cumulative impact even if they were constructed simultaneously because of the implementation of standard construction BMPs, implementation of a mitigation measure identified to mitigate potential impacts to potential paleontological resources, and required buildings code compliance. These measures would avoid and/or minimize impacts related to geology and soils. Therefore, the proposed project's incremental contribution to any cumulative impacts to geologic and soils resources or geomorphic processes would not be cumulatively considerable. The proposed project would have negligible, site-specific contributions to cumulative geologic and soil conditions during operation and maintenance activities. Therefore, impacts from operation and maintenance of the proposed project would not be cumulatively considerable.

Alternative 2: Reduced 2015 Master Plan

The geology and soils impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The geology and soils impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Greenhouse Gas Emissions

Because GHG emissions affect global climate change, the evaluation of GHG emissions is inherently a cumulative impact analysis. The geographic scope for cumulative impact analysis of GHG emissions includes the NCCAB, as well as the State of California.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

GHG emissions contribute to the environmental effect of global climate change. The impacts of cumulative projects worldwide have been acknowledged to result in significant cumulative impacts (rising sea levels, species extinction, increased hydrologic and climate changes resulting in greater numbers and more severe storms and droughts, increased and more severed human illnesses, etc.). The proposed project would not result in a cumulatively considerable contribution to GHG emissions and global climate change because the proposed project greenhouse gas emissions would be below the significance threshold as discussed in **Section 3.8, Greenhouse Gas Emissions** and the **Impact GHG-1**

analyses. As described under **Impact GHG-1,** construction and operation (including operational plus amortized construction greenhouse gas emissions) of the proposed project would not make a considerable contribution to significant cumulative impacts due to greenhouse gas emissions and the related global climate change impacts and this is a less-than-significant cumulative impact.

Alternative 2: Reduced 2015 Master Plan

The greenhouse gas emissions impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The greenhouse gas emissions impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Hazards and Hazardous Materials

Depending on the pathway of migration, the geographic scope for cumulative impacts related to hazards and hazardous materials would be the watershed boundary, groundwater basin, or extend of affected soils. Materials delivery routes would also be included in the event of a traffic accident-related spill. Cumulative hazards and hazardous materials-related impacts could arise at any point from construction or operation. Hazards associated with MEC and wildfire are inherent to the former Fort Ord. All projects on the former Fort Ord are required to comply with the local ordinances that outline special standards and procedures for digging and excavation, which reduces the potential risk of exposure to MEC to a less-than-significant level. While some of the projects listed in **Table 4-1** are in locations where fire hazards are moderate to high, these projects would meet Federal, State, and local requirements to prevent and/or respond to project-related fire hazards. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Impact Analysis**, no cumulative projects would be located sufficiently close to the proposed project site such that a combined impact from hazards and hazardous materials would occur except for the NE-SW Connector project, as discussed below.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. However, construction of a future phase of the 2015 Master Plan may overlap with the construction of some of these projects. One of these cumulative projects (i.e., NE-SW Connector) would be located in the project vicinity and have the potential to result in hazards and hazardous materials impacts. Construction of a future phase may overlap with the construction of this project. Impacts caused by this project combined with a future phase of the 2015 Master Plan would not result in a significant cumulative impact even if they were constructed simultaneously because both projects would be required to adhere to the robust body of regulations that govern hazardous materials storage and handling, water quality best management practices, construction safety, MEC safety, and fire prevention and management. Together, these measures would minimize and/or avoid exposure to hazardous materials. Therefore, the project's incremental contribution to any hazards and hazardous materials-related cumulative impact would not be cumulatively considerable.

Alternative 2: Reduced 2015 Master Plan

The hazards and hazardous materials impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The hazards and hazardous materials impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Hydrology/Water Quality

The geographic scope for cumulative impact analysis on hydrology and water quality includes the local watershed and groundwater basin. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Impact Analysis**, no cumulative projects would be located sufficiently close to the proposed project site such that a combined impact to hydrology and water quality would occur, but some may be implemented within the same timeframe.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. However, construction of a future phase of the 2015 Master Plan may overlap with the construction of some of these projects. As discussed in **Section 3.10, Hydrology and Water Quality**, construction activities associated with the proposed project would not result in the degradation of water quality from increased soil erosion and associated sedimentation of water bodies. The cumulative projects listed in **Table 4-1** could contribute stormwater runoff or other discharges to water bodies in the same watershed as the proposed project. However, in accordance with the Fort Ord Reuse Plan, all project site runoff must be retained on-site.

Because of the localized nature of the anticipated individual project impacts, the projects listed in **Table 4-1** would not combine with those of the proposed project to cause or contribute to potential cumulative surface water hydrology and water quality impacts. Construction of all projects would be subject to applicable construction and grading ordinances, local permit requirements, and State waste discharge requirements (NPDES permits). Thus, there would be no significant construction-related cumulative impacts of the proposed project combined with all other projects related to surface water hydrology and water quality beyond the impacts of individual components of each project.

While the proposed project would use a small amount of water during construction (potentially recycled water provided by the MCWD) and would introduce a small amount of impervious surface, there would be no noticeable change to groundwater levels or quality due to these construction-related changes. Construction of the proposed project would not change groundwater quality, recharge, levels, and storage in the groundwater basin on which proposed project components would be located. The operation of the proposed project would not result in a depletion of groundwater supplies or interfere with groundwater recharge. Therefore, the proposed project would not contribute considerably to cumulative impacts on groundwater resources during construction or operation.

Both the proposed project and the cumulative projects identified in **Table 4-1** would have similar and less-than-significant impacts to operational surface water quality impacts due to the requirements for projects to comply with local and State regulatory programs to control discharges and runoff to prevent water quality changes by retaining discharges and runoff on site with appropriate BMPs and low impact development standards included in the relevant permits. The impacts of each project from risks of exposure of people or structures to flooding due to levee failure, coastal inundation and seiche, tsunami or mudflow risks would not be additive.

There would be no significant cumulative construction or operational impacts to hydrology and water quality to which the proposed project would contribute. Construction of the cumulative projects and proposed project may have overlapping or close construction schedules; however, compliance with the permitting requirements of local and State agencies related to stormwater water quality and drainage would avoid and/or reduce combined impacts to less than significant.

Alternative 2: Reduced 2015 Master Plan

The hydrology and water quality impacts proposed under Alternative 2 would be slightly less than the proposed project due to the reduced development footprint. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The hydrology and water quality impacts under Alternative 3 would be the same as the proposed project, although slightly greater due to the larger development footprint. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Land Use and Planning

The geographic scope for the analysis cumulative land use impacts includes land uses in the vicinity of the project site and former Fort Ord.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Table ES-1 in **Section ES, Executive Summary,** provides a summary of potential impacts related to land use and planning, and the significance determinations at the proposed project and alternatives. The proposed project and alternatives are consistent with the land use designations and zoning for the site and would not result in a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. In most situations, the State is not subject to local ordinances, and, therefore, is not required to obtain permits from the County or Seaside. However, the State will comply with local ordinances when feasible. In addition, the State will obtain necessary excavation permits from Seaside and the County and prepare required soil management plans, as required in Chapter 15.34 of City Code and Chapter 16.10 of County Code due to the potential for UXO on the site. This is a less-than-significant impact.

Construction of Phase 2 would not overlap with the projects in **Table 4-1**. Construction of a future phase of the 2015 Master Plan may overlap with the construction of these projects. However, these projects would also be subject to Seaside and County Code. In addition, projects constructed and operating on the former Fort Ord are required to be consistent with the Reuse Plan and other governing planning documents. Therefore, when combined with other projects during construction and operation,

the proposed project would not result in significant cumulative land use impacts. This is a less-than-significant impact. The proposed project would not contribute to a significant cumulative impact related to land use.

Alternative 2: Reduced 2015 Master Plan

The land use impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The land use impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Noise

The geographic scope for cumulative impact analysis of noise and vibration effects consists of the proposed project site and the immediate vicinity around the site, in which noise could combine with noise from the proposed project to adversely affect the same sensitive receptors. Based on the list of cumulative projects provided on **Table 4-1**, no other projects have the potential to result in construction or operational noise impacts that could combine with noise impacts resulting from the proposed project.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Construction of Phase 2 would not overlap with the projects identified in **Table 4-1**. However, construction of a future phase of the 2015 Master Plan may overlap with the construction of some of these projects. As discussed in **Section 3.12, Noise**, construction activities associated with the proposed project have the potential to result in significant noise impacts. Mitigation is identified to reduce potential noise impacts to a less-than-significant level. Construction of the cumulative projects in **Table 4-1** may occur at the same time; however, the projects are not in the immediate vicinity of each other, and, therefore, would not result in a combination of noise and vibration impacts that would affect sensitive receptors. None of the cumulative development projects identified above would result in substantial permanent operational noise impacts as most projects are restoration, residential, and/or infrastructure projects that would not result in substantial noise-producing equipment or uses. Therefore, impacts from operation and maintenance of the proposed project would not be cumulatively considerable. The proposed project's incremental contribution to any cumulative noise impacts would not be cumulatively considerable.

Alternative 2: Reduced 2015 Master Plan

The noise impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The noise impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Public Services

The geographic scope for cumulative impact analysis of public services consists of the service areas of the public service providers evaluated (fire protection, police protection, schools, and parks/recreation). Based on the list of cumulative projects provided on **Table 5-1, Projects Considered for Cumulative Analysis**, cumulative projects in the service areas in which the proposed project sites are located are summarized below in the discussion of potential cumulative impacts.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Table ES-1 in **Section ES, Executive Summary**, summarizes project impacts public services. The proposed project construction and operation impacts on demand for public services were found to be less than significant. The cumulative projects in **Table 4-1** may result in impacts to public services, which may result in the need to construct new facilities that may have environmental impacts. However, most of these projects would have minimal impacts to public services similar to the proposed project. If a cumulative project would potentially impact public services and require additional facilities, the project would be required to mitigate the impact through payment of fees and/or construction of new facilitates. The operation of these projects combined with the proposed project would not result in a considerable increase in demand for public services or result in a considerable contribution to cumulative impacts.

Alternative 2: Reduced 2015 Master Plan

The public services impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The public services impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Socioeconomics and Environmental Justice

The geographic scope for cumulative impacts related to poverty and employment consists of the cities and the unincorporated area within or adjacent to the boundaries of the former Fort Ord. The proposed project is located within census tract 141.03, which is not an environmental justice community (21.54% minority, and 4.7% poverty). However, there are communities within the vicinity of the proposed project site which are considered environmental justice communities. Many of the cumulative projects listed in **Table 4-1** would be improvements to community access and employment in the project vicinity that could incrementally make a small improvement to local communities.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

EO 12898 focuses on the environmental and human health effects of Federal actions on minority and low-income populations, primarily pollution. Overall, the proposed project is anticipated to provide a net benefit to the local communities by providing burial space for veterans. Under the proposed

project, the full range of internment services including ground crypt burial (casket burial) would occur, meeting the needs of veterans and maintaining sensitivity to all cultures by providing a variety of internment services. No significant cumulative impacts to environmental justice or socioeconomics are anticipated to occur as a result of the proposed project.

Alternative 2: Reduced 2015 Master Plan

The environmental justice and socioeconomic impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The environmental justice and socioeconomic impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, if veterans from the environmental justice communities in the project vicinity desired a ground burial, veterans and their families would be required to travel to one of the seven veterans cemeteries located 100 to 400 miles from the project site offering ground burial options, potentially placing a hardship on veterans in environmental justice communities. This is a less-than-significant cumulative impact.

Transportation

The geographic scope for the analysis of cumulative impacts on transportation and circulation consists of the roadways affected by the proposed project. A list of cumulative projects is provided on **Table 4-1, Projects Considered for Cumulative Impact Analysis**.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Cumulative traffic impacts would consider the implementation of the build-out of the 2015 Master Plan, other development under the Reuse Plan, background traffic growth, and the completion of regional circulation system improvements.

The CCCVC would continue to expand in the future after the Phase 2 is filled and used for internment. The amount of vehicular traffic associated with day to day internment activities would not be appreciably different, but a large facility could incrementally attract a greater number of visitors. However, the relative traffic impacts and mitigation requirements for the CCCVC at full build-out would not be appreciably different from those associated with the existing Phase 1 or proposed Phase 2.

The proposed project would not significantly affect the existing LOS; therefore, it would not conflict with the LOS standards of the General Plans of Seaside and Monterey County. Cumulative traffic conditions are expected to meet minimum standards and the proposed project would contribute a negligible amount of peak hour traffic, thus the cumulative impact of the proposed project would not be significant. In addition, the proposed project would be required to pay the traffic mitigation fees established by FORA. There are several regional circulation system improvements, including regional highway improvements and FORA proposed in the project vicinity. A list of these improvements is provided in **Appendix I**. Paying the traffic mitigation fees established by FORA would off-set any potential cumulative traffic impacts associated with the proposed project, as the fees will help fund future road improvements that will be required as growth continues on the former Fort Ord. For these

reasons, the proposed project's contribution to significant cumulative traffic impacts would not be cumulatively considerable.

Alternative 2: Reduced 2015 Master Plan

The transportation impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The transportation impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

Utilities and Service Systems

The geographic scope for cumulative impact analysis of utilities and service systems consists of the service areas of the utility and service systems providers evaluated. For landfill capacity, the geographic scope includes the service area of the Monterey Regional Waste Management District. For compliance with solid waste statutes and regulations, the geographic scope encompasses Monterey County. Based on the list of cumulative projects provided on **Table 4-1, Projects Considered for Cumulative Analysis**, cumulative projects in the service areas in which the proposed project is located are summarized below in the discussion of potential cumulative impacts. Most of the projects listed in **Table 4-1** within the same service areas as the proposed project would create minimal amounts of construction waste and all would be required to comply with Federal, State, and local requirements in manner similar to that required under the proposed project. For the purpose of this analysis, it is conservatively assumed that even if all the waste were disposed of at off-site disposal facilities, there would be sufficient landfill capacity.

Alternative 1: Proposed Project – CCCVC 2015 Master Plan and Phase 2

Table ES-1 in **Chapter ES, Executive Summary**, summarizes project impacts utilities and service systems, which were all found to be less than significant. The utility and service systems have adequate capacity to support the construction and operation of the proposed project, and the anticipated contribution to demand on utilities and service systems from the proposed project would not be cumulatively considerable. All projects would be required to comply with Federal, State, and local regulations. Therefore, the construction and operation of these projects combined with the proposed project would not result in a considerable increase in demand for utilities and service systems or result in a considerable contribution to cumulative impacts.

Alternative 2: Reduced 2015 Master Plan

The utilities and services systems impacts under Alternative 2 would be the same as the proposed project. This is a less-than-significant cumulative impact. No mitigation measures are required.

Alternative 3: CCCVC Master Plan – Modified Phase 2

The utilities and services systems impacts under Alternative 3 would be the same as the proposed project. This is a less-than-significant cumulative impact.

Alternative 4: No Action Alternative

The proposed project would not be constructed and no physical changes to the site would occur. Therefore, no cumulative impact would occur.

4.2 GROWTH-INDUCING IMPACTS (CEQA)

CEQA requires that an EIR discuss the ways in which the proposed project could foster economic or population growth. Pursuant to the State CEQA Guidelines Section 15126.2(d), this discussion should include ways in which the proposed project could directly or indirectly foster economic or population growth or construction of new housing in the surrounding area. The discussion should include projects which could remove obstacles to population growth such as major public service expansion that allow for more construction in applicable services areas and characteristics of projects that may encourage and facilitate other activities that could result in significant impacts. According to the CEQA Guidelines, it must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significant to the environment. If a proposed project is determined to be growth inducing, an evaluation is made to determine whether significant impacts on the environment would result from that growth.

Section 15126(g) of the CEQA Guidelines provides definitions and guidance in determining the growth-inducing impacts of a proposed project. The proposed project and alternatives are not growth inducing because they do not:

- accelerate the rate of planned growth;
- remove obstacles to population growth;
- tax existing community service facilities; or
- foster, promote, or sustain economic population growth.

4.2.1 Growth and Development Potential

As discussed in **Chapter 2, Proposed Project and Alternatives**, the proposed project involves implementing the CCCVC 2015 Master Plan. The implementation of the proposed project or an alternative would not remove any constraints to development, create new or improved infrastructure that could support development, or otherwise create conditions that would induce growth in or near the project site. In addition, the proposed project would not extend roads or public services into an unserved area. Therefore, the proposed project would not induce the economic growth that would facilitate other activities that would have significant environmental effects.

In conclusion, the proposed project would not directly result in population or economic growth through the development of new residential or commercial uses, and would not induce substantial population growth due to new permanent employees or extension of roads or public services to unserved locations. Therefore, the proposed project would not directly or indirectly result in growth-inducing impacts.

4.3 SIGNIFICANT IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD RESULT FROM THE PROPOSED PROJECT (CEQA AND NEPA)

CEQA Guidelines Section 15126(c) requires that an EIR include a discussion of significant, irreversible environmental changes that would result from the implementation of a project. Irreversible environmental changes are identified as those involving a large commitment of nonrenewable resources or irreversible damage resulting from environmental accidents. Public Resources Code Section 21100.1 provides further guidance identifying when the evaluation of potential irreversible environmental changes must be included in an EIR. An EIR must evaluate the significant irreversible impacts associated with the following types of projects:

- The adoption, amendment, or enactment of a plan, policy, or ordinance of a public agency.
- The adoption by local agency formation commission of a resolution making a determination.
- A project which will be subject to the requirement for preparing an environmental impact statement pursuant to the requirements of the National Environmental Policy Act of 1969.

Similarly, NEPA requires that the environmental analysis identify "any irreversible and irretrievable commitment of resources which could be involve in the proposed action should it be implemented" (NEPA Section 102(2)(c)(v) and 40 CFR 1502.16). However, NEPA, CEQA Regulations, and NEPA Guidance to not define "resources" and how this requirement is to be applied.

The proposed project involves implementing the CCCVC 2015 Master Plan. The construction of the proposed project or alternative would result in a significant irreversible commitment of natural resources through the use of fossil fuels and construction materials. The proposed project would require the commitment of energy resources to fuel and maintain construction equipment. Accidents such as the release of hazardous materials during construction could trigger irreversible environmental damage. As discussed in **Section 3.9, Hazards and Hazardous Materials**, project construction would involve limited quantities of miscellaneous hazardous substances, such as gasoline, diesel fuel, oils and lubricants, paints and thinners, solvents, and other chemicals. On the project site, UXO could be present in excavated soil. Inadvertent releases could expose the environment, construction workers, and/or the public to contaminants. However, construction activities must comply with numerous hazardous materials and stormwater regulations designed to ensure that hazardous materials are transported, used, stored, and disposed or in a safe manner to protect worker safety and to reduce the potential for a release of construction-related fuels or other hazardous materials. Therefore, significant irreversible changes form accidental releases are not anticipated. The environmental analysis conducted for the proposed project and alternatives did not identify any significant irreversible impacts.

4.4 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY (NEPA)

In accordance with NEPA, Section 102 (40 U.S.C. 4332), an EA must include a discussion of the relationship between the short-term uses of the environment and the maintenance and enhancement of long-term productivity. The proposed project is to provide burial space for, but not limited to, Monterey County Region veterans for the next 100 years, supporting long-term productivity despite the short-term uses of the environment. Short-term impacts of the project and alternatives were evaluated in **Chapter 3, Environmental Setting and Environmental Impacts**. Specific resources that could be affected by the implementation of the proposed project and alternatives include aesthetics, air quality, biological resources, cultural and tribal resources, energy, geology and soils, greenhouse gas emissions, hazardous materials, hydrology and water quality, land use and planning, noise, public services, transportation, socioeconomics/environmental justice, and utilities and service systems. Short-term uses would be temporary in nature and would be mitigated, as described in this EIS/EA. Although the proposed project and alternatives would result in short-term uses of the environment, the proposed project would have long-term benefits.

4.5 MITIGATION MONITORING, AND REPORTING PROGRAM

Under CEQA (PRC Section 21081.6), lead agencies are required to adopt a program for monitoring or reporting on the revisions that they are required to make in the project and other measures required to mitigate or avoid significant environmental impacts; the purpose of the program is to ensure that those project revisions and measures are implemented. The Mitigation, Monitoring, and Reporting Program (MMRP) for the proposed project is included in **Appendix J**.

4.6 SIGNIFICANT UNAVOIDABLE IMPACTS

CEQA (PRC Section 21100(b)(2)(A)) requires that an EIR include a statement that summarizes any significant impacts on the environment that cannot be avoided if a proposed project is implemented. CEQA Guidelines Section 15126.2(b) states that such impacts include those that can be mitigated but not reduced to a less-than-significant level.

The implementation of the proposed project and alternatives would not result in any significant, unavoidable impacts.

4.7 CEQA FINDINGS OF FACT AND STATEMENTS OF OVERRIDING CONSIDERATION

CEQA Guidelines Section 15091 states that "no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of these significant effects, accompanied by a brief explanation of the rationale for each finding." For this Draft EIR/EA, no significant effects have been identified that could not be mitigated to levels that are less than significant. Section 15093(a) of the CEQA Guidelines allows the lead agency to determine whether the benefits of the selected alternative outweigh the unavoidable adverse environmental impacts of implementing the alternative. The lead agency can approve the selected alternative with significant unavoidable impacts if it prepares a "Statement of Overriding Consideration" that sets forth the specific reasons for making such a judgement. Since the proposed project and alternatives would not result in any significant unavoidable impacts, a Statement of Overriding Consideration is not required.

4.8 AREAS OF CONTROVERSY (CEQA)

CEQA Guidelines Section 15123(b) requires that an EIR include a description of areas of controversy known to the lead agency, including issues raised by agencies and the public and issues to be resolved, such as the choice among alternatives and whether or how to mitigate the significant impacts. Based on input received during the public scoping meeting and written input received during the public comment period for the NOP, a number of comments focused on the potential impacts on biological resources, hazardous materials (i.e., unexploded ordinance), water supply, and cultural resources. Comments also focused on the need to evaluate alternatives, and a potential alternative location was recommended. **Appendix A** provides the Notice of Preparation (NOP) and all written comments received in response to the NOP. A summary of the scoping process is provided in **Section 1.5, Scoping and Public Involvement**.

4.9 IDENTIFICATION OF THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE/ENVIRONMENTALLY PREFERABLE ALTERNATIVE (CEQA/NEPA)

4.9.1 Environmentally Superior Alternative (CEQA)

CEQA Guidelines Section 15126.6(a) and (e)(2) require that an EIR's analysis of alternatives identify the "environmentally superior alternative" among all of those considered. In addition, if the no-project alternative is identified as the environmentally superior alternative, then the EIR must also identify the environmentally superior alternative among the other alternatives. Under CEQA, the goal of identifying the environmentally superior alternative is to assist decision-makers in considering project approval. CEQA does not require an agency to select the environmentally superior alternative (CEQA Guidelines Sections 15042-15043).

CalVet has deferred identification of the environmentally superior alternative in this Draft EIR/EA. Comments received from the public and agencies on the alternatives presented in this draft document will be considered in the development of the environmentally superior alternative identified in the Final EIR/EA. Under CEQA, the environmentally superior alternative will be the staff's recommendation to agency decision-makers concerning the alternative that best fulfils the basic objectives of the project while balancing impacts on the natural and human environment.

4.9.2 Environmentally Preferable Alternative (NEPA)

NEPA requires that "the alternative or alternatives which were considered to be environmentally preferable be identified. Environmentally preferable is defined as the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA, meaning the alternative that causes the least damage to the biological and physical environment. In addition, it also means the alternative that best protects, preserves, and enhances historic, cultural and natural resources." Although CEQ regulations require the identification of the environmentally preferable alternative, it is not required that this alternative be adopted.

The USDVA has deferred identification of the environmentally preferable alternative in this Draft EIR/EA. Comments received from the public and agencies on the alternatives presented in this draft document will be considered in identification of the environmentally preferable alternative. Under NEPA, identification of the environmentally preferable alternative is within the sole discretion of the USDVA decision-maker. The environmentally preferable alternative is not the same as selecting a "preferred alternative" for implementation. The USDVA is not required to select the environmentally preferable alternative as the final preferred course of action. The USDVA will make this decision independently from CalVet, and the environmentally preferable alternative will be described in the decision document prepared for this project.

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Chapter 5.0 CONSULTATION AND COORDINATION

This chapter summarizes the scoping process, consultation, coordination, and other requirements, including a brief overview of applicable Federal Acts and Executive Orders (EOs) used to develop this Draft EIR/EA.

5.1 LEAD AND PARTICIPATING AGENCIES

The California Department of Veterans Affairs (CalVet), with the assistance from the California Department of General Services – Real Estate Services Division (DGS) is the State lead agency under CEQA and will be responsible for certifying the Final EIR, determining whether to approve the proposed project, and issuing findings for the proposed project. CalVet will be responsible for implementing the proposed project, including environmental commitments, design measures, and any required mitigation measures. DGS serves as a business manager for the State.

The U.S. Department of Veterans Affairs (USDVA) is the Federal lead agency under NEPA and will be responsible for preparing a separate decision document under NEPA for discretionary actions, such as approving grant funding. The USDVA will use this Draft EIR/EA to inform its decision-making process. In addition, the USDVA is responsible for complying with applicable Federal laws, such as the National Historic Preservation Act (NHPA) and the Federal Endangered Species Act (ESA).

5.2 PROJECT SCOPING

5.2.1 Summary of Public Scoping Meetings

Public notices were placed in local newspapers (*Salinas Californian*, *Monterey County Weekly*, and *The Monterey Herald*) informing the general public of a scoping meeting. In addition, an email inviting attendees to the public meeting was circulated to a list of 155 individuals, community members, agencies, and non-governmental organizations who may be interested in the proposed project. The email and NOP also included information on how to access the project website and comment on the proposed project.

The public scoping meeting was held on Tuesday, November 27, 2018, to present the proposed project to the public and agencies and to solicit input as to the scope and content of the EIR/EA. The meeting was informal, open house format that offered stations to share information and allow attendees to discuss their concerns with project staff. **Section 1.5, Scoping and Public Involvement** provides detailed information regarding the public scoping meeting.

5.2.2 Comments on the Notice of Preparation

The initial scoping period ran from November 14 to December 13, 2018. During this period, eight public comments were submitted, as well as comments from the Governor's Office of Planning and Research, USFWS, CDFW, OCEN, CNPS, FORA, MCWD, and two local organizations, the Fort Ord Community Advisory Group, and Keep Fort Ord Wild. A number of comments focused on the potential impacts on biological resources, hazardous materials (i.e., unexploded ordinance), water supply, and cultural resources. Comments also focused on the need to evaluate alternatives, and a potential alternative location was recommended. **Section 1.5, Scoping and Public Involvement** provides detailed

information regarding comments received during the public scoping period; **Appendix A** provides the NOP and all written comments received in response to the NOP.

5.3 LIST OF AGENCIES AND ORGANIZATIONS CONTACTED

The following agencies and organizations received notification about the proposed project:

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers, Regulatory Division
- U.S. Environmental Protection Agency
- Base Realignment and Closure, U.S. Army Fort Ord Cleanup
- California Department of Fish and Wildlife, Region 4
- California Department of Parks and Recreation
- California Regional Water Quality Control Board, Central Coast Region (3)
- California Air Resources Board
- California Department of Transportation, District 5
- California Department of Transportation, Planning
- California Highway Patrol
- California Department of Forestry and Fire Protection
- California Department of General Services
- California Department of Health Services
- Native American Heritage Society
- Office of Historic Preservation
- Office of Emergency Services
- California Public Utilities Commission
- California Resources Agency
- California State Water Resources Control Board
- California Department of Toxic Substances
- Association of Monterey Bay Area Governments
- Monterey County Resource Management Agency, Planning Department
- City of Marina Community Development Department
- City of Seaside Planning Department
- City of Del Rey Oaks
- City of Monterey Planning Office
- City of Sand City Planning Department
- City of Carmel Planning Department
- City of Salinas Planning Department
- City of Pacific Grove Planning Department
- Transportation Agency for Monterey County
- California State University Monterey Bay Planning Department
- Pacific Gas & Electric
- Monterey Peninsula College Administration
- University of California Monterey Bay Education, Science, and Technology Center of the University of California, Santa Cruz
- University of California, Santa Cruz, University Relations
- Monterey-Salinas Transit

- Monterey Peninsula Water Management District
- Ohlone/Costanoan-Esselen Nation
- Xolon Salinan Tribe
- Presidio of Monterey Fire Department
- Monterey Bay Unified Air Pollution Control District
- Bureau of Land Management, Central Coast Field Office
- Monterey County Clerk
- Monterey County Military and Veterans Affairs Office
- California Native Plant Society
- Stamp/Erickson Attorneys at Law
- Fort Ord Reuse Authority
- Fort Ord Community Advisory Group
- Fort Ord Environmental Justice Network
- LandWatch Monterey County
- Monterey Peninsula Regional Parks District
- Keep Fort Ord Wild
- Monterey Off-Road Cycling Association
- Friends of the Fort Ord Warhorse
- Marina in Motion
- Veterans Transition Center of Monterey County
- Sustainable Marina
- Sustainable Seaside
- Communities for Sustainable Monterey County
- Latino Network of Monterey County
- Fort Ord Rec Trail and Greenway
- Marina Community Partners/Shea Homes
- East Garrison Partners
- Mid-Peninsula Housing Management Corp
- Sierra Club
- League of Women Voters
- National Association for the Advancement of Colored People
- League of United Latin American Citizens
- Building Trades Council, Local
- Monterey Audubon Society
- County of Monterey Board of Supervisors
- Monterey Peninsula Unified School District

5.4 AGENCY CONSULTATION AND COORDINATION

Section 15129 of the CEQA Guidelines requires that an EIR identify all Federal, State, and local agencies as well as organizations and private individuals consulted in preparing the draft EIR and the persons, firm, or agency preparing the draft EIR.

5.4.1 Consultation Requirements

Federal Endangered Species Act

Threatened and endangered species are listed under the provisions of Section 4 of the ESA; Section 9 prohibitions provide for substantial protection of these listed species. Through Section 7 and Section 10 processes, USFWS and the National Marine Fisheries Service ensure that activities undertaken by Federal agencies and non-Federal entities do not result in jeopardy of listed species or adverse modification of critical habitat.

If Federally listed species may be affected, the Federal lead agency must informally consult with USFWS and/or the National Marine Fisheries Service to assess the consequences of its actions and to determine whether formal consultation is warranted.

For implementation of Phase 2, the CalVet on behalf of the USDVA will be preparing and submitting a Biological Assessment to the USFWS regarding potential affects to Monterey spineflower, a Federally listed plant species. If USFWS concludes that the action is not likely to adversely affect a listed species, then no formal consultation will be conducted and no biological opinion will be prepared. If the action is likely to result in adverse effects on a listed species, then the USFWS will prepare a biological opinion describing how the action will affect the listed species. The USFWS's opinion will be either a "jeopardy opinion" or a "no-jeopardy opinion." A jeopardy opinion concludes that the proposed action would jeopardize the continued existence of a Federally listed species or would adversely modify designated critical habitat. Under this finding, the biological opinion must suggest "reasonable and prudent alternatives" that would avoid jeopardy. If the USFWS issues a no-jeopardy opinion, this opinion may include "reasonable and prudent measures" to minimize adverse effects on listed species and an "incidental take statement" that specifies the allowable amount of take that may occur as a result of the action.

National Historic Preservation Act

Section 106 of the NHPA requires Federal agencies to inventory historic properties and evaluate the eligibility of those properties for listing in the National Register. The potential effects of the Proposed Action or alternatives on cultural resources, including properties listed or eligible for the National Register, and any necessary measures to avoid or reduce impacts on these resources are described in **Section 3.5, Cultural and Tribal Resources**.

The results of the 2010 Archeological Report, 2014 Cultural Resources Report, and 2019 records search did not identify any buildings, structures, sites, objects, or districts located within the project's APE that are significant historical resources or unique archeological resources. No historical resources, as defined by CEQA, and no historic properties, as defined by the regulations (35 CFR 800) implementing Section 106 of the NHPA, have been identified in the APE for proposed project. As a result, no historic properties under Section 106 of the NHPA would be affected. None of the individuals/groups recommended by the NAHC are Federally Recognized Indian Tribes (USDI/BIA, 2018), but are recognized by the State of California. Through its NCA State Cemetery Grants Program, the USDVA would provide

funds for the design and construction of Phase 2, thus necessitating compliance with Section 106. CalVet, delegated authority by the USDVA, has determined that Phase 2 would not affect historic properties. A letter dated April 9, 2019, indicating a determination of "No Historic Properties Affected" was sent to SHPO for review and concurrence. If future phases of the 2015 Master Plan would receive Federal funds, compliance with Section 106 would be required prior to grant issuance.

Clean Air Act

Section 176(c) of the FCAA requires Federal agencies to ensure that their proposed actions are consistent with the FCAA and with Federally enforceable SIPs (air quality management plans).

The conformity review process is intended to ensure that Federal agency actions will not cause or contribute to new violations of any Federal ambient air quality standards; will not increase the frequency or severity of any existing violations of Federal ambient air quality standards; and will not delay the timely attainment of Federal ambient air quality standards. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for State standards regardless of the status of the area. The proposed project is located in an attainment/unclassified area for all current NAAQS. Therefore, regional conformity requirements do not apply.

Migratory Bird Treaty Act

Migratory birds are protected by the USFWS under the provisions of the MBTA of 1916 as amended (16 U.S.C. Chapter 7, 703-712) which governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Section 704 of the MBTA states that the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take. The Secretary of the Interior, in adopting regulations, is to consider such factors as distribution and abundance to ensure that take is compatible with the protection of the species.

EO 13186 (signed January 10, 2001) directs each Federal agency taking actions that would have or would likely have a negative impact on migratory bird populations to work with the USFWS to develop a MOU to promote the conservation of migratory bird populations. Protocols developed under the MOU must include the following agency responsibilities:

- Avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
- Restore and enhance habitat of migratory birds, as practicable.
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

EO 13186 is designed to assist Federal agencies in their efforts to comply with the MBTA; it does not constitute any legal authorization to take migratory birds. Take, under the MBTA, is defined as the action of, or an attempt to, pursue, hunt, shoot, capture, collect, or kill (Title 50, CFR, Section 10.12). The definition includes "intentional" take (take that is the purpose of the activity in question) and "unintentional" take (take that results from, but is not the purpose of, the activity in question). This guidance would be utilized in informal consultation on any such activities within the project site.

5.4.2 Executive Orders

Executive Order 11990 - Protection of Wetlands

EO 11990 - Protection of Wetlands calls for no net loss of wetlands. For the regulatory process, the USACE and U.S. EPA jointly define wetlands as follows: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Federal agencies are required to implement the following procedures for any federal action that involves wetlands: 1) provide an opportunity for early public involvement; 2) consider alternatives that would avoid wetlands, and it avoidance is not possible, measures to minimize harm to wetlands must be included in the action; 3) prepare a "Wetlands Only Practicable Alternative Finding" for actions that require an EIS.

There are not wetlands within the project site.

Executive Order 13112 - Invasive Species

EO 13112 - Invasive Species requires the prevention of introduction and spread of invasive species. Invasive species are defined as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Each federal agency whose actions may affect the status of invasive species on a project site shall, to the extent practicable and permitted by law, subject to the availability of appropriations, use relevant programs and authorities to: 1) prevent the introduction of invasive species; 2) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; 3) monitor invasive species populations accurately and reliably; 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; 5) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and 6) promote public education on invasive species and the means to address them. A national invasive species management plan was prepared by the National Invasive Species Council and the Invasive Species Advisory Committee that recommends objectives and measures to implement the EO.

The design strategy for the proposed project includes primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials, that require no irrigation once established. Potential impacts related to the introduction and spread of non-native, invasive species are addressed through the implementation of **Mitigation Measure BIO-5**.

Executive Order 13514 – GHG Reduction

EO 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in Massachusetts v. U.S. EPA, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the FCAA and that the U.S. EPA has the authority to regulate GHG. The court held that the U.S. EPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's "Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles," which was published on September 15, 2009. On May 7, 2010 the final "Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards" was published in the Federal Register.

U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

The proposed project would not result in GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with applicable GHG-reduction plans, policies or regulations.

Executive Order 11988 – Floodplain Management

EO 11988 - Floodplain Management requires Federal agencies to prepare floodplain assessments for proposed projects located in or affecting floodplains. An agency proposing to conduct an action in a floodplain must consider alternatives to avoid adverse effects and incompatible development in the floodplain. If the only practicable alternative involves siting in a floodplain, the agency must minimize potential harm to or development in the floodplain and explain why the action is proposed in the floodplain.

No new structures or housing would be located within the FEMA flood hazard zone and the revised flood hazard zone would not add any existing structures to the floodplain.

Executive Order 12898 – Environmental Justice

Federal agencies are directed by EO 12898 - Federal Actions to Address Environmental Justice in Minority and Low Income Populations, as amended, to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The executive order requires Federal agencies to

consider impacts on minority and/or low-income populations during their environmental and socioeconomic analyses of projects or programs that are proposed, funded or licensed under their authority. Specifically, EO 12898 requires that:

> "To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.
>
> Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin."

The executive order also requires that "each Federal Agency shall analyze the environmental effects, including health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA."

Regulation of the Federal Government's compliance with EO 12898 and NEPA is provided by the CEQ with assistance from the U.S. EPA and other agencies.

Potential impacts related to environmental justice are discussed in **Section 3.14, Socioeconomics and Environmental Justice**. The proposed project would not disproportionately affect minority or low-income populations.

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Appendix A

Notice of Preparation and Public Comment Letters

NOTICE OF PREPARATION – NOTICE OF PUBLIC SCOPING MEETING
CALIFORNIA CENTRAL COAST VETERANS CEMETERY

To: Responsible Agencies/Interested Parties

Date: November 14, 2018

From: Terry Ash, Senior Environmental Planer
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services

Subject: Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

The California Department of Veterans Affairs (CalVet), with the assistance from the Department of General Services – Real Estate Services Division (DGS), is the lead agency responsible for the preparation of an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the California Central Coast Veterans Cemetery (CCCVC). The proposed project will receive federal funding and, therefore, a joint CEQA and National Environmental Policy Act (CEQA/NEPA) document will prepared, consisting of an EIR in satisfaction of CEQA and an Environmental Assessment (EA) in satisfaction of NEPA. The U.S. Department of Veterans Affairs (USDVA) is acting as lead agency in accordance with the requirements of NEPA.

We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR or EA when considering your permit or other approval for the project. The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study is not attached. Due to time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this Notice.

Pursuant to the public participation goals of CEQA, DGS, in coordination with CalVet, will host a Public Scoping Meeting to gather additional input on the content and focus of the environmental analysis to be conducted and presented in the EIR/EA. Interested parties, including public agencies, are encouraged to attend the meeting to learn more about the proposed project and the environmental review process, to express any concerns about the proposed project, and offer suggestions regarding the environmental impacts, including any mitigation measures and alternatives. The date, time, and location of the scoping meeting are listed below.

Date: November 27, 2018
Time: 6:00 pm to 8:00 pm
Location: Community Center at Soper Field
220 Coe Avenue
Seaside, CA 93955

Please send all comments via mail to:

Terry Ash, Senior Environmental Planer
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940

OR via email to:

cccvcproject@ddaplanning.com
(subject line: "**CCCVC Project NOP Scoping Comments**")

Attachments: Project and Scoping Meeting Information, including Project Description, Potential Environmental Effects, Vicinity Map, and Proposed Project Site

cc: State Clearinghouse, Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95812-3044

NOTICE OF PREPARATION – NOTICE OF PUBLIC SCOPING MEETING
CALIFORNIA CENTRAL COAST VETERANS CEMETERY

Date: November 13, 2018

To: State Clearinghouse, Responsible Agencies, Trustee Agencies, Federal Agencies, Interested Parties, and Organizations

Subject: Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Lead Agency: State of California Department of Veterans Affairs

Contact: Terry Ash, Senior Environmental Planer
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
Mailing Address: 947 Cass Street, Suite 5, 93940
Phone: (916) 376-3824

NOP Comment Period: November 14, 2018 to December 14, 2018

Public Scoping Meeting: November 27, 2018, 6:00 p.m. to 8:00 p.m.

PURPOSE OF NOTICE

The California Department of Veterans Affairs (CalVet), with the assistance from the Department of General Services – Real Estate Services Division (DGS), is the lead agency responsible for the preparation of an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the California Central Coast Veterans Cemetery ("CCCVC" or "proposed project") described below. The proposed project will receive federal funding and, therefore, a joint CEQA and National Environmental Policy Act (CEQA/NEPA) document will prepared, consisting of an EIR in satisfaction of CEQA and an Environmental Assessment (EA) in satisfaction of NEPA. The U.S. Department of Veterans Affairs (USDVA) is acting as lead agency in accordance with the requirements of NEPA (40 Code of Federal Regulations 1501).

Once a decision is made to prepare an EIR, the lead agency must prepare a Notice of Preparation (NOP) to inform all responsible and trustee agencies and all federal agencies approving or funding the project that an EIR will be prepared (CEQA Guidelines Section 15082). The purpose of this NOP is to provide responsible and trustee agencies, interested parties, federal agencies, and organizations with sufficient information describing the proposed project and the potential environmental effects to enable meaningful input related to the scope and content of information to be included in the EIR.

PROJECT LOCATION

The proposed project site is located at the intersection of Parker Flats Road and Parker Flats Cut-Off on the former Fort Ord within the City of Seaside and Monterey County, California (Figures 1 and 2). The approximately 79-acre project site is owned by CalVet and is undeveloped (Assessor's Parcel Numbers: 031-052-002-000 and 031-152-005-000). Within their respective general plans, the portion of the site within Monterey County is designated as Public/Quasi-Public, and the portion of the site within the City of Seaside is designated as Open Space-Recreation.

PROJECT DESCRIPTION

The proposed project would involve the adoption and implementation of a Master Plan for the cemetery site and the construction and operation of Phase 2 of the CCCVC. Phase 1 of the CCCVC was analyzed in an Initial Study/Mitigated

Negative Declaration and Environmental Assessment/Finding of No Significant Impact, and approved in August 2014. Phase 1 included 5,000 columbaria, an administration building, public information, maintenance complex, a committal service shelter, assembly area and memorial walk on approximately 17 acres in the northwest corner of the site. Construction of Phase 1 of the CCCVC was completed in 2016.

The primary purpose of the CCCVC Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. The CCCVC Master Plan will outline a process and strategy for the implementation of the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates. The CCCVC Master Plan will include a phased approach to buildout that will serve the anticipated needs of veterans for the next hundred years. As a result, the full buildout of the CCCVC Master Plan will be analyzed in the EIR/EA at a programmatic level.

Phase 2 of the Master Plan is considered a near-term project; therefore, it will be analyzed at project-level in the EIR/EA. Phase 2 would include the development of approximately 4.3 acres of the remaining site and border the existing Phase 1 development. It will include a combination of burial facilities to meet Veteran's needs, as well as road and access from the existing Phase 1 site, utilities, irrigation, landscaping, and other ancillary improvements.

RESPONSIBLE AGENCIES

For the purposes of CEQA, the term "responsible agency" includes all public agencies other than the lead agency which have discretionary approval power of the project (CEQA Guidelines Section 15381). Discretionary approval power may include such actions as issuance of a permit, authorization, or easement needed to complete some aspect of the project. Agencies whose approval may be required for the proposed project may include, but are not limited to, the City of Seaside, County of Monterey, Division of State Architect, Monterey Bay Air Resources District, California Department of Fish and Wildlife, Regional Water Quality Control Board, U.S. Fish and Wildlife Service, and Office of Historic Preservation.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Public Services, Recreation, Transportation/Traffic, Tribal Cultural Resources, and Utilities and Service Systems

PUBLIC SCOPING MEETING

Pursuant to the public participation goals of the CEQA, DGS in coordination with CalVet, will host a Public Scoping Meeting to gather additional input on the content and focus of the environmental analysis to be conducted and presented in the EIR/EA. Interested parties, including public agencies, are encouraged to attend the meeting to learn more about the proposed project and the environmental review process, to express any concerns about the proposed project, and offer suggestions regarding the environmental impacts, including any mitigation measures and alternatives. The date, time, and location of the scoping meeting are listed below.

Date:	November 27, 2018
Time:	6:00 pm to 8:00 pm
Location:	Community Center at Soper Field 220 Coe Avenue Seaside, CA 93955

The scoping meeting will be in an open house format. Agencies and individuals may attend the scoping meeting at any time to obtain information on the proposed project, ask questions of project team members, and provide comments. A brief presentation of the proposed project and the environmental review process will be given hourly. Comment forms will be available for those who wish to submit written comments during or following the meeting. Prepared written comments will be accepted during the meeting, as well as throughout the 30-day NOP review period.

COMMENTS ON THE SCOPE OF THE EIR

The NOP is being circulated for public review and comment for a period of 30 days beginning November 14, 2018. DGS welcomes all comments regarding the potential environmental impacts of the proposed project. All comments will be considered in the preparation of the EIR/EA. **Written comments will be accepted by DGS through 5:00 P.M. on December 14, 2018**. You may submit comments in a variety of ways: (1) by U.S. mail; (2) by electronic mail (email); or (3) by attending the public scoping meeting and submitting written comments at that time. Comments provided by email should include "**CCCVC Project NOP Scoping Comments**" in the subject line, and the name and physical address of the commenter should be contained in the body of the email.

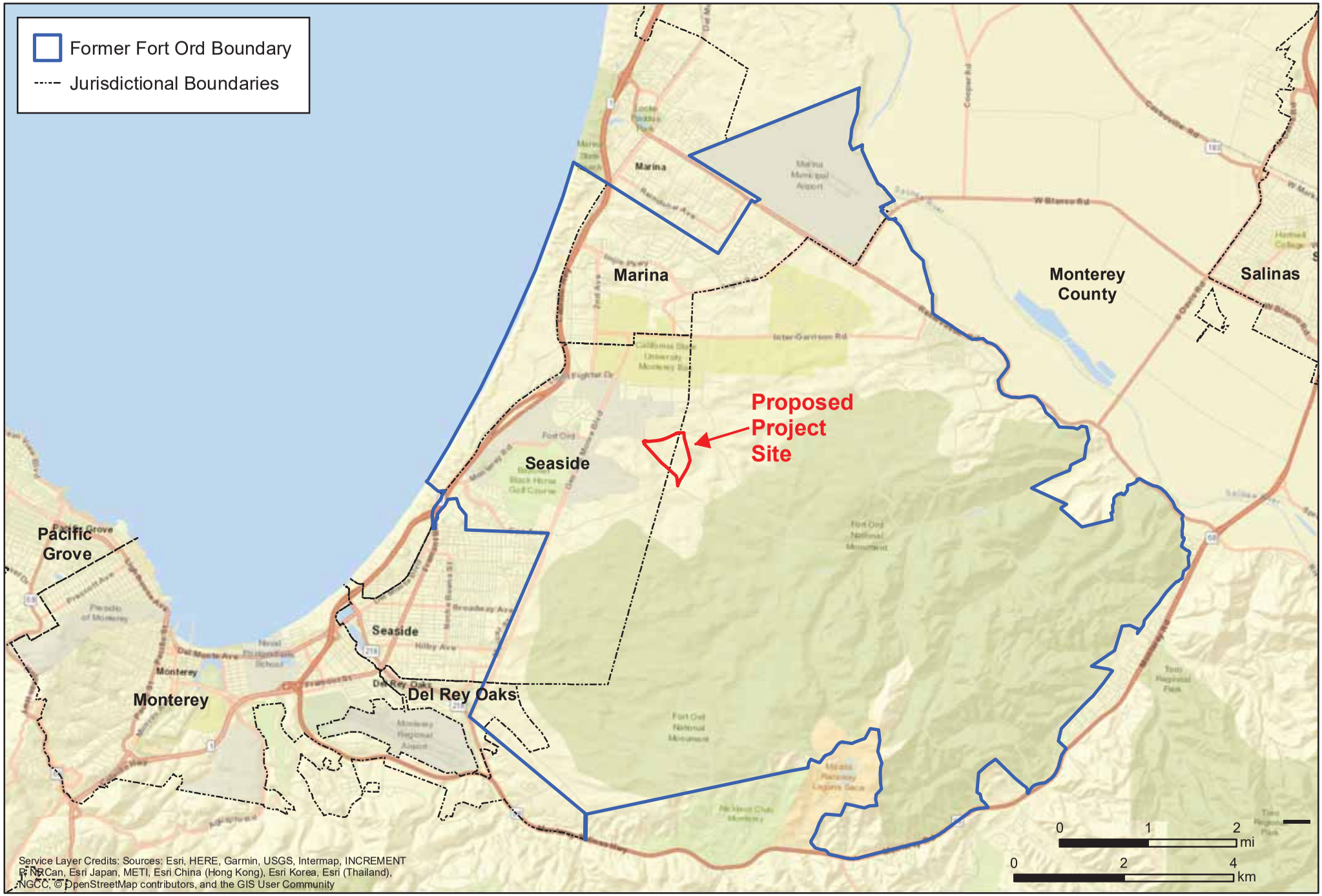
Please send all comments via mail to:

Terry Ash, Senior Environmental Planer
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940

OR via email to:

cccvcproject@ddaplanning.com
(subject line: "**CCCVC Project NOP Scoping Comments**")

Your views and comments on how the project may affect the environment are welcomed, and will be used to identify the range of action, alternatives, mitigation measures, and significant effects to be analyzed in depth in the EIR/EA. Please contact Ms. Ash if you have any questions about the environmental review process for the CCCVC Project.





Title:

Vicinity Map

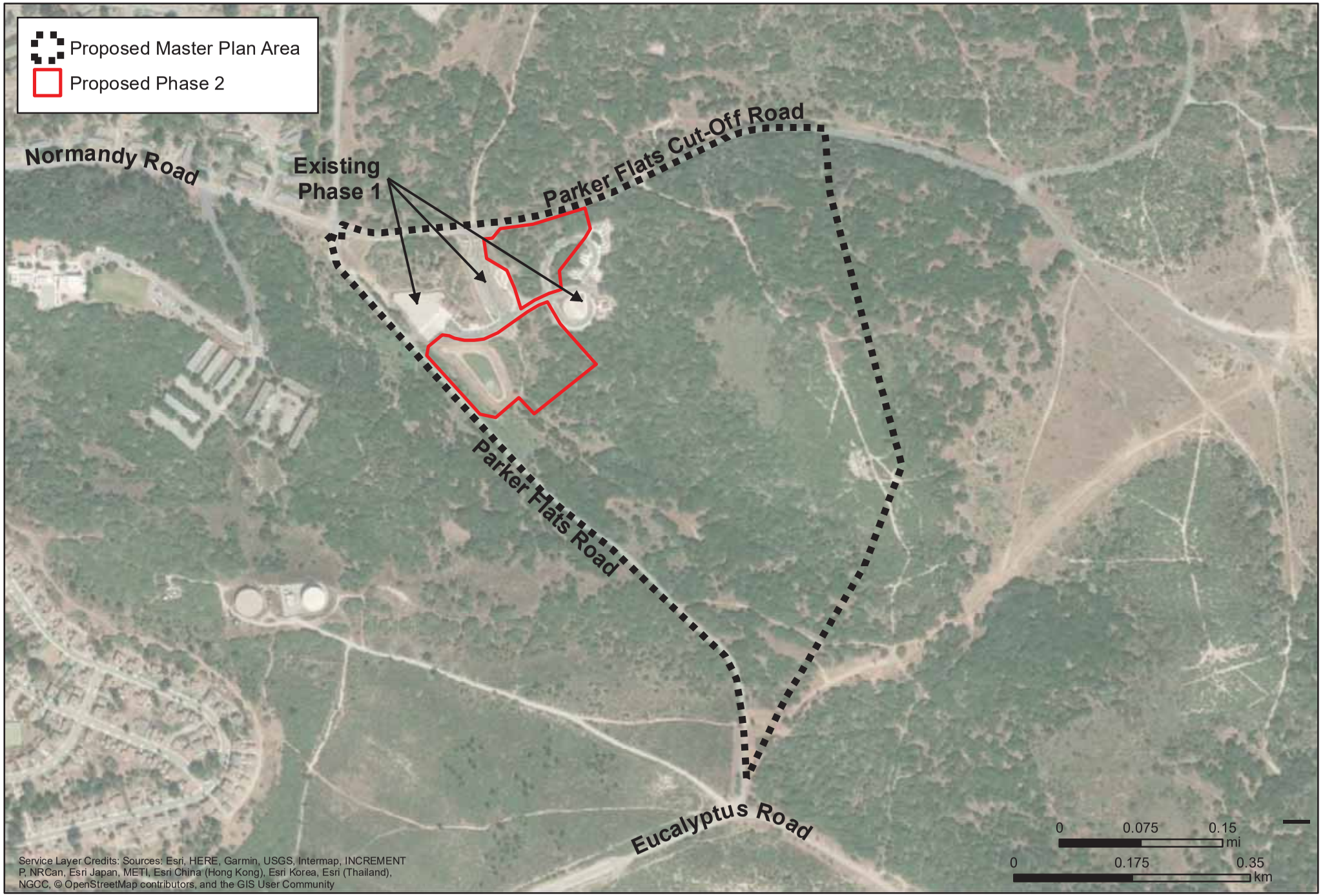
Date: 11/02/2018

Scale: 1 inch = 1.4 miles

Project: 2018-67

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure 1





Title:

Proposed Project Site

Date: 11/02/2018

Scale: 1 inch = 0.11 miles

Project: 2018-67

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure 2

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR



Notice of Preparation

November 14, 2018

To: Reviewing Agencies

Re: California Central Coast Coast Veterans Cemetary
SCH# 2018111030

Attached for your review and comment is the Notice of Preparation (NOP) for the California Central Coast Coast Veterans Cemetary draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Terry Ash
Department of Veterans Affairs
947 Cass Street, Suite 5
Monterey, CA 93940

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
1-916-322-2318 FAX 1-916-558-3184 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2018111030
Project Title California Central Coast Coast Veterans Cemetary
Lead Agency Veterans Affairs, Department of

Type NOP Notice of Preparation

Description The CCCVC Master Plan will outline a process and strategy for the implementation of the entire CCCVC. The CCCVC Master Plan will include a phased approach to buildout that will serve the anticipated needs of veterans for the next hundred years. Phase 2 of Master Plan is ocnsidered a near-term project; therefore, it will be analyzed at project lelvel in the EIR/EA. Phase 2 would include the development of approximately 4,3 acres of the remaining site and border the existing Phase 1 development. It will include a combination of burial facilities to meet Veteran's needs, as well as road and access from the existing Phase 1 site, utilities, irrigation, landscaping, and other ancillary improvements. The project is being managed by the California Department of General Services, with CalVet as lead CEQA agency, and US Department of Veterans Affairs as lead NEPA agency.

Lead Agency Contact

Name Terry Ash
Agency Department of Veterans Affairs
Phone (916) 376-3824 **Fax**
email
Address 947 Cass Street, Suite 5
City Monterey **State** CA **Zip** 93940

Project Location

County Monterey
City Seaside
Region
Cross Streets Parker Flats Cut-off Rd and Parker Flats Rd
Lat / Long 36° 38' 08" N / 121° 47' 35" W
Parcel No. 031-052-002-000/031-152-005-000
Township **Range** **Section** **Base**

Proximity to:

Highways SR 1
Airports
Railways
Waterways
Schools CSUMB, Chartwell
Land Use Public, Quasi-Public, Open-Space Recreation

Project Issues Aesthetic/Visual; Air Quality; Biological Resources; Archaeologic-Historic; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Geologic/Seismic; Forest Land/Fire Hazard; Noise; Public Services; Recreation/Parks; Sewer Capacity; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Cal Fire; Office of Historic Preservation; Department of Parks and Recreation; Department of Fish and Wildlife, Region 4; Office of Emergency Services, California; Department of General Services; Native American Heritage Commission; Public Utilities Commission; California Highway Patrol; Caltrans, District 5; State Water Resources Control Board, Division of Drinking Water; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 3

Date Received 11/14/2018 **Start of Review** 11/14/2018 **End of Review** 12/13/2018

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #2018111030

Project Title: California Central Coast Veterans Cemetery

Lead Agency: State of California Department of Veterans Affairs | Contact Person: Terry Ash

Mailing Address: 947 Cass Street, Suite 5 | Phone: 916-376-3824

City: Monterey | Zip: 93940 | County: Monterey

Project Location: County: Monterey | City/Nearest Community: Seaside/Former Fort Ord

Cross Streets: Parker Flats Cut-Off Road and Parker Flats Road | Zip Code: 93955

Longitude/Latitude (degrees, minutes and seconds): 36 ° 38 ′ 08 ″ N / 121 ° 47 ′ 35 ″ W | Total Acres: ~79

Assessor's Parcel No.: 031-052-002-000/031-152-005-000 | Section: NA | Twp.: NA | Range: NA | Base: NA

Within 2 Miles: State Hwy #: SR 1 | Waterways: None

Airports: None | Railways: None | Schools: CSUMB, Chartwell, Mag

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ☐ Other:

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI Other: ☒ Joint Document ☐ Final Document ☐ Other:

Governor's Office of Planning & Research

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan ☐ Specific Plan ☒ Master Plan ☐ Planned Unit Development ☒ Site Plan ☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.) ☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: Cemetery

NOV 14 2018

STATE CLEARINGHOUSE

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: Cemetery site, approx 79 acres

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☒ Drainage/Absorption ☒ Economic/Jobs ☐ Fiscal ☒ Flood Plain/Flooding ☒ Forest Land/Fire Hazard ☒ Geologic/Seismic ☐ Minerals ☒ Noise ☐ Population/Housing Balance ☒ Public Services/Facilities ☒ Recreation/Parks ☐ Schools/Universities ☐ Septic Systems ☒ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation ☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☐ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☐ Other: ____

Present Land Use/Zoning/General Plan Designation:

Public-Quasi-Public, Open Space-Recreation

Project Description: *(please use a separate page if necessary)*

The CCCVC Master Plan will outline a process and strategy for the implementation of the entire CCCVC. The CCCVC Master Plan will include a phased approach to buildout that will serve the anticipated needs of veterans for the next hundred years. Phase 2 of the Master Plan is considered a near-term project; therefore, it will be analyzed at project-level in the EIR/EA. Phase 2 would include the development of approximately 4.3 acres of the remaining site and border the existing Phase 1 development. It will include a combination of burial facilities to meet Veteran's needs, as well as road and access from the existing Phase 1 site, utilities, irrigation, landscaping, and other ancillary improvements. The project is being managed by the California Department of General Services, with CalVet as lead CEQA agency, and US Department of Veterans Affairs as lead NEPA agency.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

X	Air Resources Board	X	Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency	X	Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
X	Caltrans District #5	X	Public Utilities Commission
	Caltrans Division of Aeronautics	X	Regional WQCB #3
X	Caltrans Planning	X	Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of	X	SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
X	Fish & Game Region #4		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	X	Toxic Substances Control, Department of
X	Forestry and Fire Protection, Department of		Water Resources, Department of
X	General Services, Department of		
X	Health Services, Department of		Other:
	Housing & Community Development		Other:
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date November 14, 2018 Ending Date December 14, 2018

Lead Agency (Complete if applicable):

Consulting Firm: Denise Duffy & Associates, Inc.
Address: 947 Cass St, Suite 5
City/State/Zip: Monterey, CA 93940
Contact: Erin Harwayne
Phone: 831-373-4341 etx 19

Applicant: California Department of General Services
Address:
City/State/Zip:
Phone:

Signature of Lead Agency Representative: _____ **Date:** 11/13/18

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOP Distribution List

County: Monterey CR

SCH# 2018111030

esources Agency

- [ ] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  Denise Peterson
- [ ] **California Coastal Commission**
  Allyson Hitt
- [ ] **Colorado River Board**
  Elsa Contreras
- [ ] **Dept. of Conservation**
  Crina Chan
- [x] **Cal Fire**
  Dan Foster
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [x] **Office of Historic Preservation**
  Ron Parsons

Dept of Parks & Recreation
Environmental Stewardship Section

- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve Goldbeck
- [ ] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Wildlife Region 1**
  Curt Babcock
- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Craig Weightman
- [x] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6**
  Tiffany Ellis
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M**
  Heidi Calvert
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  William Paznokas
  Marine Region

Other Departments

- [ ] **California Department of Education**
  Lesley Taylor
- [x] **OES (Office of Emergency Services)**
  Monique Wilber
- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [x] **Dept. of General Services**
  Cathy Buck
  Environmental Services Section
- [ ] **Housing & Comm. Dev.**
  CEQA Coordinator
  Housing Policy Division

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Erik Vink
- [ ] **Delta Stewardship Council**
  Anthony Navasero
- [ ] **California Energy Commission**
  Eric Knight
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [x] **Public Utilities Commission**
  Supervisor
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [ ] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Cal State Transportation Agency CalSTA

- [ ] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans – Planning HQ LD-IGR**
  Christian Bushong
- [x] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Susan Zanchi
- [ ] **Caltrans, District 4**
  Patricia Maurice
- [x] **Caltrans, District 5**
  Larry Newland
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [ ] **Caltrans, District 8**
  Mark Roberts
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

Air Resources Board

- [ ] **Airport & Freight**
  Jack Wursten
  - [ ] **Transportation Projects**
    Nesamani Kalandiyur
  - [ ] **Industrial/Energy Projects**
    Mike Tollstrup
- [ ] **California Department of Resources, Recycling & Recovery**
  Kevin Taylor/Jeff Esquivel
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [x] **State Water Resources Control Board**
  Cindy Forbes – Asst Deputy
  Division of Drinking Water
- [ ] **State Water Resources Control Board**
  Div. Drinking Water #_____
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control Reg. #_____**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [x] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____
  _____
  _____
- [ ] _____
  Conservancy

Last Updated 5/22/18

From: Touth, Jane
To: cccvcproject; Danielle Fagre; Leilani Takano
Subject: CCCVC Project NOP Scoping Comments
Date: Friday, December 21, 2018 5:05:45 PM
Attachments: FED, DVA, CCC Vet Cemetary Project Phase 2.pdf

Attached is the Service's response to your request on the California Central Coast Veteran's Cemetery Project Phase 2. The original correspondence will be surface mailed on December 21, 2018. Contact Danielle Fagre with questions.

Thank you

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2019-CPA-0020

December 21, 2018

Terry Ash, Senior Environmental Planner
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5
Monterey, California 93940

Subject: Comments on the California Central Coast Veterans Cemetery Project, Phase 2

Dear Ms. Ash:

We are responding to your request, dated November 14, 2018, and received in our office on November 19, 2018, to provide scoping comments on biological information for the Central Coast Veterans Cemetery Project (Project) in Seaside, California. We provide the following comments for your consideration.

The mission of the U.S. Fish and Wildlife Service (Service) is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. To assist in meeting this mandate, the Service provides comments on public notices issued for projects that may have an effect on those resources, particularly federally listed plants and wildlife. The Service's responsibilities also include administering the Endangered Species Act of 1973, as amended (Act). The Act prohibits the unpermitted "take" of listed species [16 U.S.C. 1538(a)(l)(B)]. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Such take may be authorized by the Service in two ways: through interagency consultation for projects with Federal involvement pursuant to section 7, or through the issuance of an incidental take permit under section 10(a)(l)(B) of the Act.

We recommend conducting surveys for all federally listed species that may be in the Project area in order to determine presence or absence of listed species. According to the California Natural Diversity Database, the following species are known to be in the vicinity of the Project: California tiger salamander (*Ambystoma californiense*), Contra Costa goldfields (*Lasthenia conjugens*), Monterey gilia (*Gilia tenuiflora arenaria*), and Monterey spineflower (*Chorizanthe pungens pungens*). These are not the only species that may be present at the Project site. We further recommend that plans for Phase 2 of the California Central Coast Veterans Cemetery Project be consistent with the Fort Ord Habitat Conservation Plan that is currently being

developed by the Fort Ord Reuse Authority in coordination with the Service. This includes conservation measures outlined in the Habitat Conservation Plan for avoidance and minimization of potential impacts to listed species. Please contact Danielle Fagre at (805) 677-3339 or by electronic mail at danielle_fagre@fws.gov if you have questions regarding this letter or to arrange a meeting to discuss this issue further.

Sincerely,

Stephen P. Henry
Field Supervisor

ıited States
ent of the Interior
WILDLIFE SERVICE
ura Field Station
rtola Road, Suite B
tura, CA 93003

CIAL BUSINESS
FOR PRIVATE USE $300

SANTA CLARITA CA 913

FIRST CLASS





Terry Ash, Sr. Enviro Planner
Dept. General Services, Real Estate
947 Cass Street, Suite 5
Monterey, CA 93940

93940-452505

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, California 93710
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

December 13, 2018

Terry Ash, Senior Environmental Planner
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5
Monterey, California 93940
cccvproject@ddaplanning.com

Subject: California Central Coast Veterans Cemetery (Project), NOTICE OF PREPARATION (NOP)

Dear Terry Ash:

The California Department of Fish and Wildlife (CDFW) received a Notice of Preparation for the Project from California Department of Veterans Affairs for the above-referenced Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through exercise of our own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in our trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. For

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

example, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & Game Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code will be required.

Nesting Birds: CDFW has jurisdiction over actions with potential to result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Fish and Game Code sections that protect birds, eggs and nests include, §§ 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

PROJECT DESCRIPTION SUMMARY

Proponent: California Department of Veterans Affairs (CalVet), with assistance from the Department of General Services Real Estate Services Division (DGS).

Objective: CalVet, with assistance from DGS, proposes to adopt and implement a Master Plan for the cemetery site and construct and operate Phase 2 of the California Central Coast Veterans Cemetery (CCCVC). The primary purpose of the CCCVC Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. The CCCVC Master Plan will outline a process and strategy for implementing the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates. The CCCVC Master Plan will include a phased approach to buildout.

Location: The proposed project site is located at the intersection of Parker Flats Road and Parker Flats Cut-Off on the former Fort Ord within the City of Seaside and Monterey County, California; Assessor's Parcel Numbers 031-152-002 and 031-152-005; 36.6355, -121.7951. The approximately 79-acre project site is owned by CalVet and is undeveloped.

Timeframe: Unspecified.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist CalVet and DGS in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document.

Based on aerial imagery, species occurrence records, and the sandy soils present on the site, the Project site is known to and/or has high potential to support numerous special-status species, including CESA-listed species (CDFW 2018, CNPS 2018, UC Davis 2018). Therefore, the Project has the potential to significantly impact these species. Specifically, CDFW is concerned about potential of the Project to significantly impact the State and federally threatened California tiger salamander (*Ambystoma californiense*), the State threatened, federally endangered, and California Rare Plant Ranked (CRPR) 1B.2 Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*), the State endangered and CRPR 1B.1 seaside bird's-beak (*Cordylanthus rigidus* ssp. *littoralis*), the State Species of Special Concern northern California legless lizard (*Anniella pulchra*), and numerous California Rare Plant Ranked (CRPR) plant species including, but not limited to, the federally threatened and CRPR 1B.2 Monterey spineflower (*Chorizanthe pungens* var. *pungens*); the CRPR 1B.1 Eastwood's goldenbush (*Ericameria fasciculata*), Kellogg's horkelia (*Horkelia cuneata* var *sericea*); and the CRPR 1B.2 Fort Ord spineflower (*Chorizanthe minutiflora*), Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), northern curly-leaved monardella (*Monardella sinuata* ssp. *nigrescens*), sand-loving wallflower (*Erysimum ammophilum*), sandmat manzanita (*Arctostaphylos pumila*), and Toro manzanita (*Artostaphylos montereyensis*).

CDFW recommends that focused, protocol-level surveys for these species be conducted to evaluate impacts of the Project on these species. If results of these surveys indicate significant environmental impacts will occur as a result of Project implementation and cannot be mitigated to less than significant levels, a Mitigated Negative Declaration (MND) would not be appropriate. Further, when an MND is prepared, mitigation measures must be specific and clearly defined and cannot be deferred to a future time. The specifics of mitigation measures may be deferred, provided the lead agency commits to mitigation and establishes performance standards for implementation, when an Environmental Impact Report (EIR) is prepared. Regardless of whether an MND or EIR is prepared, the CEQA document must provide quantifiable and enforceable measures as needed that will reduce impacts to less than significant levels.

I. Environmental Setting and Related Impact

Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS?

COMMENT 1: California tiger salamander (CTS)

Issue: CTS are known to occur in the vicinity of the Project area (CDFW 2018). Review of aerial imagery indicates the presence of several seasonally flooded wetland features in the Project's vicinity, as well as a catchment basin on the Project

wetland features in the Project's vicinity, as well as a catchment basin on the Project property, which have the potential to support breeding CTS. In addition, the Project area may support small mammal burrows, a requisite upland habitat feature for CTS.

Specific impact: Without appropriate avoidance and minimization measures for CTS, potential significant impacts associated with the Project's construction include burrow collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of eggs, larvae and/or young, and direct mortality of individuals.

Evidence impact would be significant: Up to 75% of historic CTS habitat has been lost to development (Shaffer et al. 2013). Loss, degradation, and fragmentation of habitat are among the primary threats to CTS (CDFW 2015, USFWS 2017). The Project area is within the range of CTS and is bordered by suitable upland habitat. As a result, there is potential for CTS to occupy or colonize the Project area and for the Project to impact CTS.

Recommended Potentially Feasible Mitigation Measure(s) (Regarding Environmental Setting and Related Impact)
To evaluate potential impacts to CTS associated with the Project, CDFW recommends conducting the following evaluation of the Project area and including the following mitigation measures as conditions of Project approval.

Recommended Mitigation Measure 1: CTS Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment well in advance of project implementation, to determine if the Project area or its vicinity contains suitable habitat for CTS.

Recommended Mitigation Measure 2: Focused CTS Surveys

If the Project area does contain suitable habitat for CTS, CDFW recommends that a qualified biologist evaluate potential Project-related impacts to CTS prior to ground-disturbing activities using the USFWS's "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (2003). CDFW advises that the survey include a 100-foot buffer around the Project area in all areas of wetland and upland habitat that could support CTS.

Recommended Mitigation Measure 3: CTS Avoidance

CDFW advises avoidance for CTS include a minimum 50-foot no disturbance buffer delineated around all small mammal burrows within and/or adjacent to the Project construction footprint. If burrow avoidance is not feasible, consultation with CDFW is warranted to determine if the Project can avoid take.

Recommended Mitigation Measure 4: CTS Take Authorization

If through surveys it is determined that CTS are occupying the Project area and take cannot be avoided, take authorization may be warranted prior to initiating ground-disturbing activities. Take authorization would occur through issuance of an Incidental Take Permit (ITP) by CDFW, pursuant to Fish and Game Code § 2081(b). Alternatively, in the absence of protocol surveys, the applicant can assume presence of CTS within the Project area and obtain an ITP from CDFW.

COMMENT 2: Monterey gilia, Seaside bird's-beak, and CRPR plant species

Issue: Monterey gilia and the CRPR plant species mentioned above are known to occur on and in the vicinity Project area (USFWS 2008, CDFW 2018). Lands designated for development that were transferred from the Department of the Army's former Fort Ord, as is the case with the Project site, contain high quality habitat for the CESA-listed Monterey gilia (USFWS 2008). In addition, the sandy soils and Maritime Chaparral vegetation community present onsite are suitable to support CESA-listed seaside bird's-beak (CDFW 2018, CNPS 2018, UC Davis 2018). Therefore, grading and development associated with the Project have the potential to impact the species mentioned above.

Specific impact: Without appropriate avoidance and minimization measures potential impacts to special-status plant species include inability to reproduce and direct mortality. Unauthorized take of species listed as threatened, endangered, or rare pursuant to CESA or the Native Plant Protection Act is a violation of Fish and Game Code.

Evidence impact would be significant: Monterey gilia, seaside bird's-beak, and many of the CRPR plant species listed above are narrowly distributed endemic species. These species are threatened with habitat loss and habitat fragmentation resulting from development, vehicle and foot traffic, and non-native plant species (CNPS 2018). Therefore, impacts of the Project have the potential to significantly impact populations of the species mentioned above.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to special-status plants associated with the Project, CDFW recommends conducting the following evaluation of the Project area and including the following mitigation measures as conditions of Project approval.

Recommended Mitigation Measure 5: Focused Surveys

CDFW recommends that the Project area be surveyed for special-status plants by a qualified botanist following the "Protocols for Surveying and Evaluating Impacts to

Special Status Native Plant Populations and Sensitive Natural Communities" (CDFW 2018). This protocol, which is intended to maximize detectability, includes identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. In the absence of protocol-level surveys being performed, additional surveys may be necessary.

Recommended Mitigation Measure 6: Special-Status Plant Avoidance

CDFW recommends special-status plant species be avoided whenever possible by delineation and observing a no-disturbance buffer of at least 50 feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with CDFW is warranted to determine appropriate minimization and mitigation measures for impacts to special-status plant species.

Recommended Mitigation Measure 7: Special-Status Plant Take Authorization

If a State-listed plant species is identified during botanical surveys, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, take authorization through issuance of an ITP by CDFW is necessary to comply with Fish and Game Code.

COMMENT 3: Northern California legless lizard

Issue: Northern California legless lizard are known to occur in the vicinity of the Project area (CDFW 2018). These lizards are fossorial and inhabit chaparral habitat with sandy or loose loamy soils (Thomson et al. 2016). Review of aerial imagery, as well as the site's soil characteristics, indicates that the Project area is comprised of and surrounded by these requisite habitat features (CDFW 2018, UC Davis 2018).

Specific impact: Without appropriate avoidance and minimization measures for northern California legless lizard, potentially significant impacts associated with ground disturbance include burrow abandonment, which may result in reduced health or vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: Habitat loss and fragmentation resulting from agricultural and urban development is the primary threat to northern California legless lizard (Thomson et al. 2016). The Project area is within the range of northern California legless lizard and is comprised of suitable habitat (i.e. chaparral with friable soils). As a result, ground-disturbing activities associated with development of the Project area have the potential to significantly impact local populations of this species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to northern California legless lizard associated with the Project, CDFW recommends conducting the following evaluation of the Project area and including the following mitigation measures as conditions of Project approval.

Recommended Mitigation Measure 8: Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if the Project area or its immediate vicinity contain suitable habitat for northern California legless lizard.

Recommended Mitigation Measure 9: Focused Surveys

If suitable habitat is present, CDFW recommends that a qualified biologist conduct focused surveys for northern California legless lizard and their requisite habitat features to evaluate potential impacts resulting from ground- and vegetation-disturbance.

Recommended Mitigation Measure 10: Avoidance

Avoidance whenever possible is encouraged via delineation and observance of a 50-foot no-disturbance buffer around burrows.

II. Editorial Comments and/or Suggestions

Nesting Birds: CDFW encourages Project implementation occur during the bird non-nesting season. However, if ground-disturbing activities must occur during the breeding season (February through mid-September), the project's applicant is responsible for ensuring that implementation of the project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Codes as referenced above.

To evaluate project-related impacts on nesting birds, CDFW recommends that a qualified wildlife biologist conduct pre-activity surveys for active nests no more than 10 days prior to the start of ground disturbance to maximize the probability that nests that could potentially be impacted are detected. CDFW also recommends that surveys cover a sufficient area around the work site to identify nests and determine their status. A sufficient area means any area potentially affected by the project. In addition to direct impacts (i.e. nest destruction), noise, vibration, and movement of workers or equipment could also affect nests. Prior to initiation of construction activities, CDFW recommends a qualified biologist conduct a survey to establish a behavioral baseline of all identified nests. Once construction begins, CDFW recommends a qualified biologist continuously monitor nests to detect behavioral changes resulting from the project. If behavioral changes occur, CDFW recommends the work causing that change cease and CDFW consulted for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so, such as when the construction area would be concealed from a nest site by topography. CDFW recommends that a qualified wildlife biologist advise and support any variance from these buffers and notify CDFW in advance of implementing a variance.

Federally Listed Species: CDFW recommends consulting with the USFWS on potential impacts to federally listed species including, but not limited to, CTS, Monterey gilia, and Monterey spineflower. Take under the Federal Endangered Species Act (FESA) is more broadly defined than CESA; take under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting. Consultation with the USFWS, in order to comply with FESA, is advised well in advance of any ground disturbing activities.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database that may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

FILING FEES

If it is determined that the Project will impact fish and/or wildlife, an assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

CDFW appreciates the opportunity to comment on the Project to assist CalVet and DGS in identifying and mitigating the Project's impacts on biological resources.

More information on survey and monitoring protocols for sensitive species can be found at CDFW's website (https://www.wildlife.ca.gov/Conservation/Survey-Protocols). Questions regarding this letter or further coordination should be directed to Renée Robison, Environmental Scientist, at the address provided on this letterhead, by telephone at (559) 243-4014 extension 274, or by electronic email at Renee.Robison@wildlife.ca.gov.

Sincerely,

Dean Maraston for

Julie A. Vance
Regional Manager

cc: Office of Planning and Research, State Clearinghouse, Sacramento

ec: Jeff Cann, California Department of Fish and Wildlife, jeff.cann@wildlife.ca.gov

REFERENCES

California Department of Fish and Wildlife (CDFW), 2015. California Tiger Salamander Technical Review – Habitat, Impacts and Conservation. California Department of Fish and Wildlife, October 2015.

CDFW, 2018. Biogeographic Information and Observation System (BIOS). https://www.wildlife.ca.gov/Data/BIOS. Accessed 11 December 2018.

CDFW, 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. California Department of Fish and Wildlife. March 20, 2018.

California Native Plant Society, Rare Plant Program (CNPS). 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org. Accessed 11 December 2018.

Thomson, R. C., A. N. Wright, and H. Bradley Shaffer, 2016. California Amphibian and Reptile Species of Special Concern. California Department of Fish and Wildlife and University of California Press.

University of California, Davis (UC Davis), 2018. California Soil Resources Lab. https://casoilresource.lawr.ucdavis.edu/. Accessed 11 December 2018.

U. S. Fish and Wildlife Service (USFWS), 2003. Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander, October 2003.

USFWS, March 2008. Monterey Gilia Five-Year Review: Summary and Evaluation.

USFWS, 2017. Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*). U. S. Fish and Wildlife Service, Region 8, Sacramento, California. June 2017.

FORA
FORT ORD REUSE AUTHORITY
920 2ND Avenue, Suite A, Marina, CA 93933
Tel: 831 883 3672 | Fax: 831 883 3675 | www.fora.org

received
11/20/18

LETTER OF TRANSMITTAL SHEET

TO:
Terry Ash, Senior Environmental Planner

FROM:
Stan Cook
FORA ESCA Program Manager

ORGANIZATION:
Dept of General Services, Real Estate Division
Project Management and Development Branch
Environmental Services
947 Cass Street, Suite 5
Monterey, CA 93940

DATE:
15 NOV 18

RE:

Responses to Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery with attachments

☒ ADMINISTRATIVE RECORD ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

NOTES/COMMENTS:

The following documents and attachments are transmitted in response to the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery:

1. Email from Stan Cook, FORA ESCA Program Manager, to Tom Schanberger and Alonzo Arreola, both from DGS, providing information and historic timeframes for the UXO Training and Construction support requirements, dated October 25, 2018; and
2. Email from Stan Cook, FORA ESCA Program Manager, to Dale Megan, providing comments on the Veterans Cemetery Draft Phase 2 Schedule UXO Construction Support requirements, triggers and timing, dated November 5, 2018.

c: Vlado Arsov, P.E., DTSC
Maeve Clancy, EPA, Region 9

Stan Cook

From: Stan Cook
Sent: Thursday, October 25, 2018 7:17 AM
To: Schanberger, Tom@DGS; Arreola, Alonzo@DGS
Cc: Terry Ash (terry.ash@dgs.ca.gov); Stephen Crane (scrane@kemron.com); Arsov, Vlado@DTSC; Collins, William K CIV (US); Clancy, Maeve; Roman Racca (RRacca@dtsc.ca.gov); Laura Vidaurri
Subject: Veteran's Cemetery UXO Training and Construction Support requirements and potential Phase 2 project schedule impacts.

Importance: High

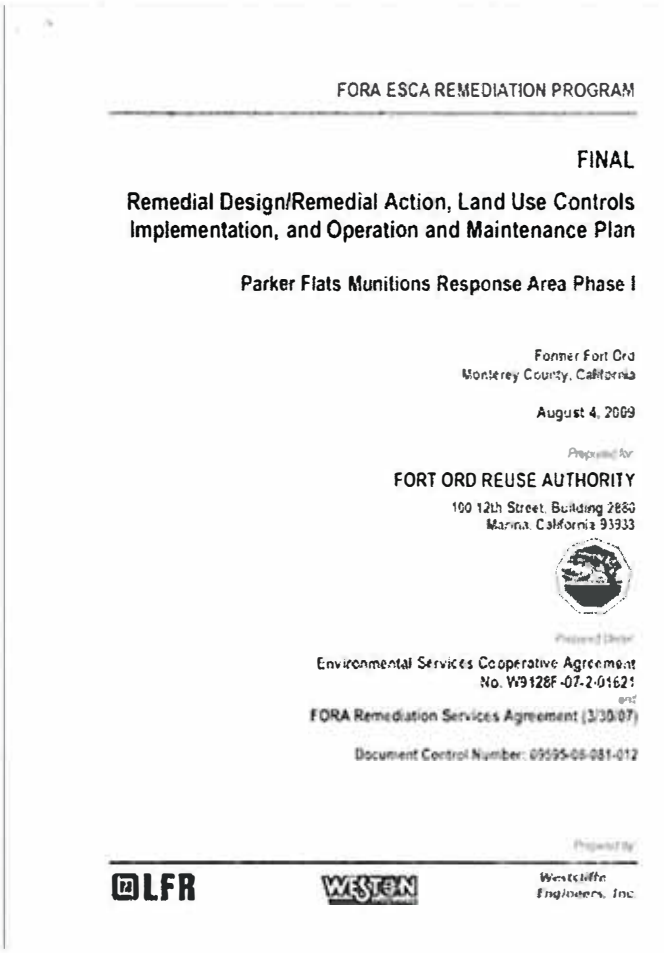
Tom and Alonzo,

I want to help the Veteran's Cemetery Phase 2 get safely off on the right foot, by providing you with information and historic timeframes for the property's UXO Training and Construction Support requirements. I would also recommend that you contact Vlado Arsov with your sister State Agency the Department of Toxic Substance Control (DTSC) early on to understand their and US EPA's oversight role on the property. (Vlado is copied with this email.)

Your team can access relevant UXO related documents at the Army Administrative Record website: www.fortordcleanup.com

The Veteran's Cemetery property UXO Training and Construction Support requirements are outlined in the Remedial Design/Remedial Action, Land Use Controls Implementation, and Operation and Maintenance Plan document below available at this link:

http://docs.fortordcleanup.com/ar_pdfs/AR-ESCA-0166//ESCA-0166_complete-report.pdf



FORA ESCA REMEDIATION PROGRAM

FINAL

Remedial Design/Remedial Action, Land Use Controls Implementation, and Operation and Maintenance Plan

Parker Flats Munitions Response Area Phase I

Former Fort Ord
Monterey County, California

August 4, 2009

Prepared for

FORT ORD REUSE AUTHORITY

100 12th Street, Building 2880
Marina, California 93933

Prepared Under

Environmental Services Cooperative Agreement No. W9128F-07-2-01621
and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-08-081-012

Prepared by

LFR WESTON Weston Solutions, Inc.

The Land Use Controls (LUCs) that are in place on the Veteran's Cemetery property are described in Section 1.2 on page 1:

1.2 Description of Selected Remedy

The LUCs that will be implemented at the Parker Flats MRA were described in the Army's Parker Flats MRA Track 2 Munitions Response Site ROD and include: (1) MEC recognition and safety training for workers that will conduct ground-disturbing or intrusive activities, (2) construction monitoring for ground-disturbing or intrusive activities to address MEC that potentially remains in the subsurface, and (3) restrictions against residential use. The following paragraphs present a summary of the LUCs described in the ROD. The discussion has been modified slightly from the ROD language to reflect that the Parker Flats MRA Phase I property, and therefore the responsibilities described in the ROD have been transferred from the Army to FORA.

Page 1

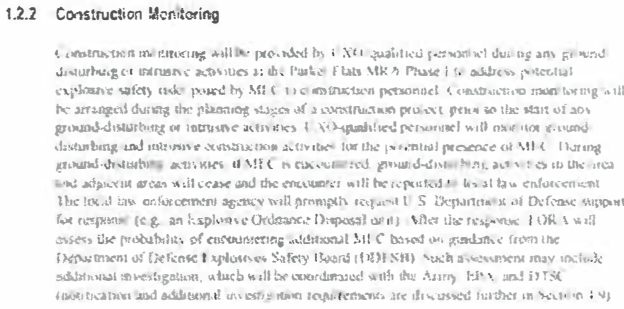
The safety training LUC requirement is described in section 1.2.1. FORA has developed website training that was approved by DTSC and US EPA to provide this training (or your UXO Consultant Kemron can provide their equivalent training). The FORA Military Munitions Recognition and Safety Training is available at this link: http://www.fortordsafety.com/

1.2.1 MEC Recognition and Safety Training

For the eight land use areas within the Parker Flats MRA addressed in this RD/RA LUC O&M Plan, ground-disturbing or intrusive activities are expected to occur. People conducting such activities will be required to attend the "MEC recognition and safety training" to increase their awareness of and ability to recognize MEC. The MEC recognition training will be modeled on the Fort Ord Site Security Program and will consist of an approximately 30-minute training session. Prior to conducting any planned ground-disturbing or intrusive activities, the landowner will be required to notify FORA or FORA's representative to arrange for MEC recognition and safety training. This training will be provided to all workers that are to perform ground-disturbing or intrusive activities.

Below is a description of "Construction Monitoring" requirement which is now called "UXO Construction Support". UXO Construction Support begins with the development of an appropriate UXO Construction support Plan. Fort Ord Reuse

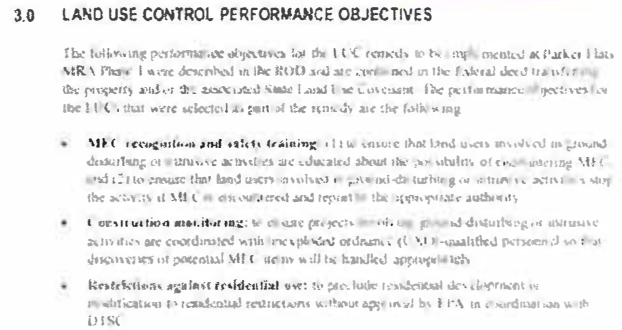
Authority (FORA) has developed a UXO Construction Support Plan template to standardize UXO Construction Support Report information collection and submittal. This template, greatly, facilitates the Construction Report Plan Review/approval process that the Army, DTSC and US EPA require. (Before ground disturbing activities exceeding 10 cubic Yards can begin) Historically, the UXO Construction Support Plan compilation thru approval process takes at least 6 months and your project construction schedule should anticipate this timing.



1.2.2 Construction Monitoring

Construction monitoring will be provided by UXO-qualified personnel during any ground disturbing or intrusive activities at the Parker Flats MRA Phase I to address potential explosive safety risks posed by MEC to construction personnel. Construction monitoring will be arranged during the planning stages of a construction project, prior to the start of any ground-disturbing or intrusive activities. UXO-qualified personnel will monitor ground disturbing and intrusive construction activities for the potential presence of MEC. During ground-disturbing activities, if MEC is encountered, ground-disturbing activities in the area and adjacent areas will cease and the encounter will be reported to local law enforcement. The local law enforcement agency will promptly request U.S. Department of Defense support for response (e.g., an Explosive Ordnance Disposal unit). After the response, FORA will assess the probability of encountering additional MEC based on guidance from the Department of Defense Explosives Safety Board (DDESB). Such assessment may include additional investigation, which will be coordinated with the Army, EPA, and DTSC. (notification and additional investigation requirements are discussed further in Section 3.0)

Further information on where to find the LUCs is below. (One of the main places to look is your property deed.)

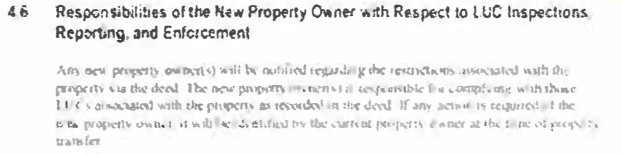


3.0 LAND USE CONTROL PERFORMANCE OBJECTIVES

The following performance objectives for the LUC remedy to be implemented at Parker Flats MRA Phase I were described in the ROD and are confirmed in the Federal deed transferring the property and/or the associated State Land Use Covenant. The performance objectives for the LUCs that were selected as part of the remedy are the following:

- **MEC recognition and safety training:** (1) to ensure that land users involved in ground disturbing or intrusive activities are educated about the possibility of encountering MEC, and (2) to ensure that land users involved in ground-disturbing or intrusive activities stop the activity if MEC is encountered and report to the appropriate authority;
- **Construction monitoring:** to ensure projects involving ground disturbing or intrusive activities are coordinated with the explosive ordnance (UXO)-qualified personnel so that discoveries of potential MEC items will be handled appropriately;
- **Restrictions against residential use:** to preclude residential development or modification to residential structures without approval by EPA in coordination with DTSC.

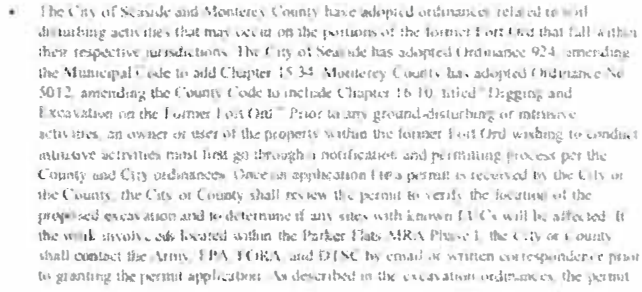
Your UXO Construction Support Plan will have reporting requirements. By using the FORA UXO Construction Support Plan template many of these requirements and standard reporting forms will be addressed.



4.6 Responsibilities of the New Property Owner with Respect to LUC Inspections, Reporting, and Enforcement

Any new property owner(s) will be notified regarding the restrictions associated with the property via the deed. The new property owner(s) is responsible for complying with those LUCs associated with the property as recorded in the deed. If any action is required of the new property owner, it will be specified by the current property owner at the time of property transfer.

Please note that through a Memorandum of Agreement between the State of California (DTSC) and the Jurisdictions all ground disturbing activities that exceed 10 cubic yard of soils movement will require local Jurisdiction Grading permits (per the ordinances called out below). Jurisdiction Grading permits will not be issued until a UXO Construction Support Plan has bee approved by the Army, DTSC and US EPA. Please include this 6+ month process for UXO Construction Support Plan approval as a milestone in your construction project scheduling. (The Cemetery property crosses both Seaside and the County so please work with their staff to determine if they will let one take the lead and require only one permit or each will require their own permit.)



- The City of Seaside and Monterey County have adopted ordinances related to soil disturbing activities that may occur on the portions of the former Fort Ord that fall within their respective jurisdictions. The City of Seaside has adopted Ordinance 924, amending the Municipal Code to add Chapter 15.34. Monterey County has adopted Ordinance No. 5012, amending the County Code to include Chapter 16.10, titled "Digging and Excavation on the Former Fort Ord." Prior to any ground-disturbing or intrusive activities, an owner or user of the property within the former Fort Ord wishing to conduct intrusive activities must first go through a notification and permitting process per the County and City ordinances. Once an application for a permit is received by the City or the County, the City or County shall review the permit to verify the location of the proposed excavation and to determine if any sites with known LUCs will be affected. If the work involves sites located within the Parker Flats MRA Phase I, the City or County shall contact the Army, EPA, FORA, and DTSC by email or written correspondence prior to granting the permit application. As described in the excavation ordinances, the permit

applicant may not move or disturb any soil unless the applicant is in compliance with the requirements placed on the property by an agreement executed between the city, the city redevelopment agency, FORA, and DTSC. The agreement shall, at a minimum, include construction support and shall be attached to and become a part of any permit issued. This process will be reviewed during the five-year review for the former Fort Ord site under CERCLA, prepared by the Army, to determine if any changes need to be implemented. However, under the ESCA, FORA should provide an evaluation of the above-mentioned notification and permitting process for inclusion in the Army's five-year review reports. In order for such evaluation, and any recommendation for changes to be incorporated into a five-year review, it must be submitted by FORA to the Army by February of the year of the review. The next five-year review will be conducted in 2012.

Bringing the UXO Construction Support Plan to the Regulators and Army for their review and approval is FORA's responsibility. I will be your project's Point of Contact for bringing the plan to the Regulators and Army.

There will be costs associated with Regulatory review which will require an agreement be developed between the Veteran's Cemetery Project and the Regulatory Agencies. Please include the timing to develop your agreements with the Regulators in your Construction Project schedule. The US EPA (Maeve Clancy) and DTSC (Vlado Arsov) representatives have been copied with this email to help facilitate setting up these agreements.

There may be costs for FORA's support. Please contact me at 831-883-3672 to discuss what agreements will need to be developed for FORA's support. (Let me know if you want the FORA UXO Construction Support Plan template at this time and I will send it.)

I hope this email helps clarify the UXO related LUCs at the Veteran's Cemetery property and the roles that FORA, Army and US EPA paly in insuring the Veteran's cemetery Phase 2 project gets safely off on the right foot. You are welcome to call me at any time.

Stan Cook
FORA Senior Program Manager
831-883-3672

Stan Cook

From: Stan Cook
Sent: Monday, November 05, 2018 6:31 AM
To: Megan Dale
Cc: Collins, William K CIV (US); Laura Vidaurri; Roman Racca (RRacca@dtsc.ca.gov); Arsov, Vlado@DTSC; Clancy, Maeve; Schanberger, Tom@DGS; Arreola, Alonzo@DGS; Stephen Crane (scrane@kemron.com)
Subject: Feedback on the Veteran's Cemetery Draft Phase 2 Schedule - UXO Construction Support requirements, triggers and timing.
Attachments: Vet's Cemetery UXO Training and Construction Support - Phase 2 project schedule.pdf; 10-30-18 CCCVC Ph2 Schedule.pdf

Importance: High

Megan,

I plan to be at the November 15th Vets Cemetery Site Visit meeting. (I understand we gather at the FORA Offices before going to the site – please confirm that is correct.)

I have reviewed the Phase 2 schedule you prepared and have a few observations that I thought I should bring up so that the UXO Construction Support requirements are begun far enough in advance to be in place when you are ready to start breaking ground.

1. See the attached email which I sent to Tom Schanberger and Alonzo Arreola at DGS for a background on the UXO requirements and the role that FORA, the Army . Ca DTSC and US EPA play.

   Of concern to me is the historic need for 6 months to develop and get a UXO Construction Support Plan finalized and the need for a Local Grading permit even though the Veteran's Cemetery is a State owned project.

2. See the yellow highlighted Task 2 – Construction Documents, Prepare Soils Management Plan and UXO Plan in the attached 10-30-18 CCCVC Ph2 Schedule document.

   The Soils Management Plan and UXO Plan line item appears to only provide 2 months for developing and getting the UXO Construction Support Plan completed, 4 moths less than the historic time required for this task.

   Developing the UXO Construction Support Plan cannot begin without two basic types of site related information:
   - A site map with the foot print of the area where ground disturbing activities will occur (this may be the entire Phase 2 property or a subset). This map defines the area where your UXO Contractor will research past UXO cleanup activities/discoveries and use that information to develop the safety procedures needed for the project and soil movement procedures.
   - A list of ground project related disturbing activities such as for example; clearing and grubbing, cut and fill earth work, crypt excavation to X' deep, land scaping, sewer, water, gas, irrigation installation, road subgrade... etc. This information will also be used to develop the safety procedures needed for the project and soil movement procedures.

Please look at your Phase 2 schedule and identify when this basic site related information can be developed (and provided to your UXO contractor developing the Project's Construction Support Plan) and then allow at least 6 months in your schedule for the UXO Construction Support Plan to be developed and reviewed by the Army, CA DTSC and US EPA.

Feel free to call me if you have questions 831-883-3672.

Stan

From:	Mike Wegley
To:	Erin Harwayne
Cc:	Keith Van Der Maaten; Brian True
Subject:	FW: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project
Date:	Tuesday, December 18, 2018 12:34:15 PM

Erin,

Sorry this is late but below is some information concerning water for the CCVC project.

Thanks,
Mike

From: Brian True <btrue@mcwd.org>
Sent: Tuesday, December 18, 2018 10:34 AM
To: Mike Wegley <MWegley@mcwd.org>
Subject: RE: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Hey Mike,
I found this e-mail bouncing around still on my listing of things To-Do…… sorry for the delay in getting this back to you, I don' believe the delay is strongly material.
Their Phase 1 work bought 7.01-EDU of potable water capacity for irrigation use and 2.08-EDU of water capacity for domestic use – this translates to 2.31-AFY for irrigation and 0.69-AFY for domestic use. They have a 15-AFY of water supply on loan from the Army until their irrigation needs diminish (as the landscape matures) and a total of 7-AFY (2-AFY from the County, 5-AFy from the Army) in permanent supply. The current phase is basically an extension of their landscaping.
My view is that the project has sufficient water allocated for the current level of their development as well as this small-ish second phase addition. This is particularly true when one considers the 15-AFY of loan water from the Army.
Let me know if you have any questions.
BTrue

From: Mike Wegley <MWegley@mcwd.org>
Sent: Monday, November 26, 2018 1:32 PM
To: Brian True <btrue@mcwd.org>
Subject: FW: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Brian,

Do we need to comment on the scope and analysis of the CCCVC Project environmental analysis? Will they need a water allocation? Did phase 1 include sufficient water and sewer infrastructure to support phase 2?

Thanks,
Mike

From: Keith Van Der Maaten <KVanDerMaaten@mcwd.org>
Sent: Monday, November 26, 2018 11:40 AM
To: Mike Wegley <MWegley@mcwd.org>
Subject: FW: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Mike,
Do we need to submit comments regarding the scope/content for the environmental analysis?

Thanks,
Keith

From: Erin Harwayne <eharwayne@ddaplanning.com>
Sent: Wednesday, November 14, 2018 4:29 PM
Subject: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Good afternoon,
The California Department of Veterans Affairs (CalVet), with the assistance from the Department of General Services – Real Estate Services Division (DGS), is the lead agency responsible for the preparation of an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the California Central Coast Veterans Cemetery (CCCVC). The proposed project will receive federal funding and, therefore, a joint CEQA and National Environmental Policy Act (CEQA/NEPA) document will prepared, consisting of an EIR in satisfaction of CEQA and an Environmental Assessment (EA) in satisfaction of NEPA. The U.S. Department of Veterans Affairs (USDVA) is acting as lead agency in accordance with the requirements of NEPA.

CalVet and DGS have prepared the attached Notice of Preparation (NOP) in accordance with CEQA and are soliciting comments as to the scope and content of the environmental analysis. Due to the time limits mandated by law, comments must be sent at the earliest possible date but not later than **December 14, 2018**.

Pursuant to the public participation goals of CEQA, DGS, in coordination with CalVet, will host a Public Scoping Meeting to gather additional input on the content and focus of the environmental analysis to be conducted and presented in the EIR/EA. The date, time, and location of the scoping meeting are listed below.
Date: November 27, 2018
Time: 6:00 pm to 8:00 pm
Location: Community Center at Soper Field
220 Coe Avenue
Seaside, CA 93955

Please submit comments to the mailing address or email address below:

Terry Ash, Senior Environmental Planer
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940
OR
cccvcproject@ddaplanning.com
(subject line: "CCCVC Project NOP Scoping Comments")

Erin Harwayne, AICP
Senior Planner/Project Manager
Denise Duffy & Associates, Inc.
947 Cass St. Suite 5
Monterey, CA. 93940
(831) 373-4341 ext 19
(831) 373-1417 (fax)
eharwayne@ddaplanning.com
website: www.ddaplanning.com

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From:	Louise Ramirez
To:	cccvcproject
Subject:	CCCVC Project NOP SCOPING COMMENTS
Date:	Wednesday, December 12, 2018 2:32:13 PM
Attachments:	CCCVC Project NOP.pdf CA Central Coast Veterans Cemetery.doc OCEN Map Taylor1856.pdf

---

Saleki Atsa,

Attached please find OCEN's request for Consultation.
Thank you.

Louise J. Miranda Ramirez
Tribal Chairwoman
Ohlone/Costanoan-Esselen Nation

www.ohlonecostanoanesselennation.org

----- Forwarded Message -----
From: Louise Ramirez <ramirez.louise@yahoo.com>
To: ccvcproject@ddaplanning.com <ccvcproject@ddaplanning.com>
Sent: Wednesday, December 12, 2018 02:24:55 PM PST
Subject: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Louise J. Miranda Ramirez
Tribal Chairwoman
Ohlone/Costanoan-Esselen Nation

www.ohlonecostanoanesselennation.org

----- Forwarded Message -----
From: Erin Harwayne <eharwayne@ddaplanning.com>
Sent: Wednesday, November 14, 2018 04:28:59 PM PST
Subject: NOP of an Environmental Impact Report and Public Scoping Meeting for the California Central Coast Veterans Cemetery Project

Good afternoon,

The California Department of Veterans Affairs (CalVet), with the assistance from the Department of General Services – Real Estate Services Division (DGS), is the lead agency responsible for the preparation of an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the California Central Coast Veterans Cemetery (CCCVC). The proposed project will receive federal funding and, therefore, a joint CEQA and National Environmental Policy Act (CEQA/NEPA) document will prepared, consisting of an EIR in satisfaction of CEQA and an Environmental Assessment (EA) in satisfaction of NEPA. The U.S. Department of Veterans Affairs (USDVA) is acting as lead agency

in accordance with the requirements of NEPA.

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Pursuant to the public participation goals of CEQA, DGS, in coordination with CalVet, will host a Public Scoping Meeting to gather additional input on the content and focus of the environmental analysis to be conducted and presented in the EIR/EA. The date, time, and location of the scoping meeting are listed below.

Date: November 27, 2018

Time: 6:00 pm to 8:00 pm

Location: Community Center at Soper Field

220 Coe Avenue

Seaside, CA 93955

Please submit comments to the mailing address or email address below:

Terry Ash, Senior Environmental Planer

Department of General Services, Real Estate Division

Project Management and Development Branch, Environmental Services

947 Cass Street, Suite 5, Monterey, CA 93940

OR

cccvcproject@ddaplanning.com

(subject line: “CCCVC Project NOP Scoping Comments”)

Erin Harwayne, AICP

Senior Planner/Project Manager

Denise Duffy & Associates, Inc.
947 Cass St. Suite 5
Monterey, CA. 93940
(831) 373-4341 ext 19
(831) 373-1417 (fax)
eharwayne@ddaplanning.com

website: www.ddaplanning.com

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Ohlone/Costanoan-Esselen Nation

Previously acknowledged as
The San Carlos Band of Mission Indians
The Monterey Band
And known as
O.C.E.N. or Esselen Nation
P.O. Box 1301
Monterey, CA 93942

www.ohlonecostanoanesselennation.org.

December 12, 2018

Terry Ash, Senior Environmental Planer
California Central Coast Veterans Cemetery
cccvcproject@ddaplanning.com

Saleki Atsa,

Ohlone/Costanoan-Esselen Nation is an historically documented previously recognized tribe. OCEN is the legal tribal government representative for over 600 enrolled members of Esselen, Carmeleno, Monterey Band, Rumsen, Chalon, Soledad Mission, San Carlos Mission and/or Costanoan Mission Indian descent of Monterey County. Though other indigenous people may have lived in the area, the area is the indigenous homeland of our people. Included with this letter please find a territorial map by Taylor 1856; Levy 1973; and Milliken 1990, identifying Tribal areas.

Ohlone/Costanoan-Esselen Nation objects to all excavation in known cultural lands, even when they are described as previously disturbed, and of no significant archaeological value. Please be advised that it is our priority that our ancestor's remains be protected and undisturbed. We desire that all sacred burial items be left with our ancestors on site or as culturally determined by OCEN. We request all cultural items returned to Ohlone/Costanoan-Esselen Nation. We ask for the respect that is afforded all our current day deceased, by no other word these burial sites are cemeteries, respect for our ancestors as you would expect respect for your deceased family members in today's cemeteries. **Our definition of respect is no disturbance.**

OCEN request consultation with the lead agency and with all soil disturbance.

OCEN's Tribal leadership desires to be provided with:

Archaeological reports/surveys, including subsurface testing, and presence/absence testing.
OCEN request to be included in mitigation and recovery programs,
OCEN request that Cultural and Tribal mitigation measures reflect request for OCEN Tribal Monitor,
Reburial of any of our ancestral remains, burial artifacts,
Placement/return of all cultural items to OCEN, and that
A Native American Monitor of Ohlone/Costanoan-Esselen Nation, approved by the OCEN Tribal Council is used within our aboriginal territory.

Please feel free to contact me at (408) 629-5189. Nimasianexelpasaleki. Thank you

Sincerely and Respectfully Yours,

Louise J. Miranda Ramirez, Chairperson
Ohlone/Costanoan-Esselen Nation
(408) 629-5189

Cc: OCEN Tribal Council

Distribution of Ohlone/Costanoan-Esselen Nation Tribal Rancherias, Districts, Landgrants and Historic Landmarks

OCEN DIRECT LINEAL DESCENT

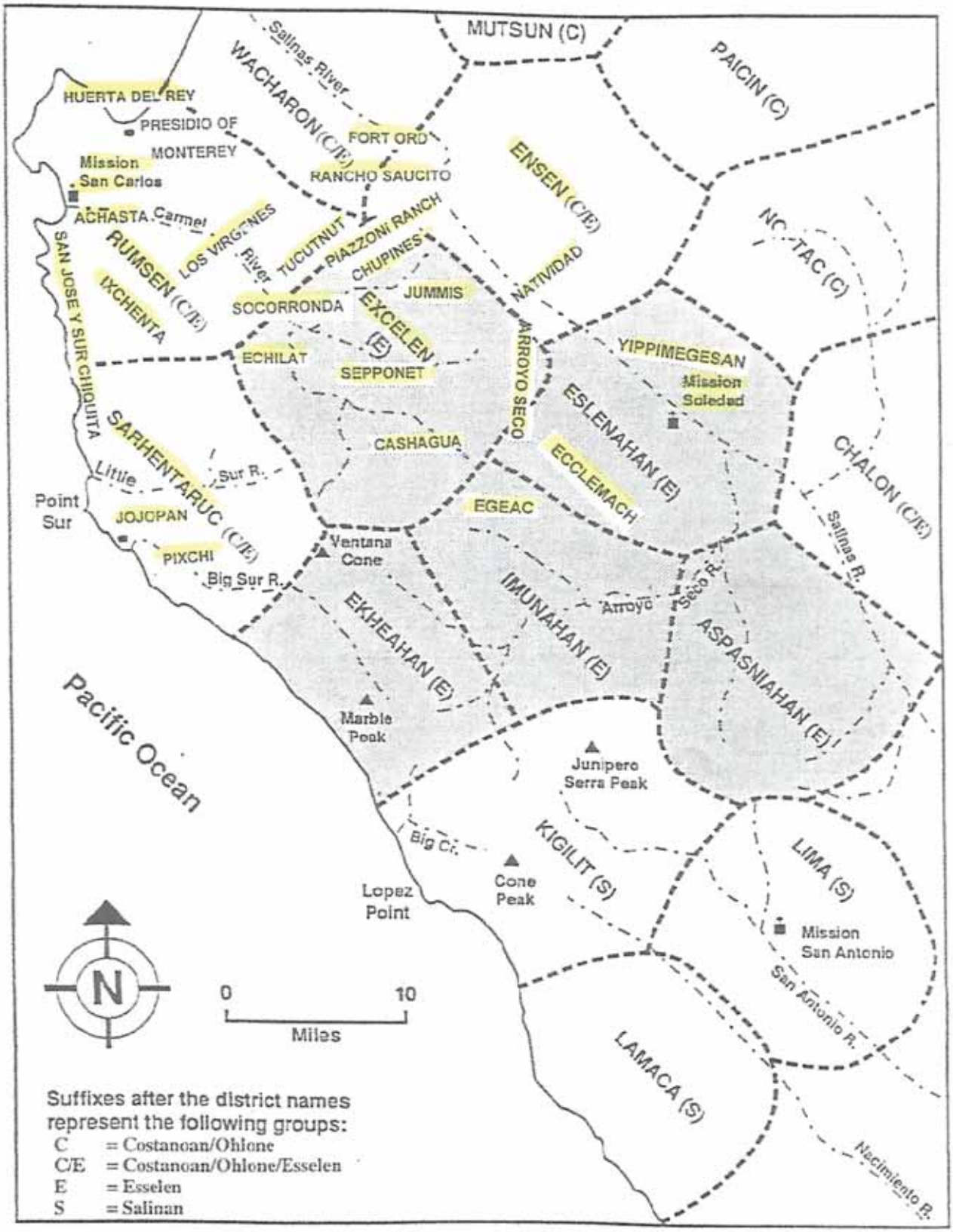


Figure 2:

Map after Taylor 1856; Levy 1973; Hester 1978; Milliken 1990

From: Donna Burych
To: cccvcproject
Subject: CCCVC Project NOP Scoping Comments
Date: Friday, December 14, 2018 1:54:55 PM
Attachments: VC.pdf

See attached. Thank you.

California Native Plant Society
Monterey Bay Chapter, P.O. Box 221303, Carmel, CA 93922

December 14, 2018

Hard Copy of email Sent 12/14

Terry Ash, Senior Environmental Planner
Dept. of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940
cccvcproject@ddaplanning.com

Comments on Notice of Preparation of an Environmental Impact Report for the California Central Coast Veterans Cemetery Project

The Monterey Bay Chapter sent comments on July 16,2014 regarding the Draft EA and IS/MND for the Phase 1 of the CCCVC project. We expressed concerns over the lack of an EIR for the entire CCCVC with projected severe impacts to contiguous oak woodlands of over 50 acres and up to 9000 trees and known occurrences of endangered Monterey Spine Flower. We also expressed concerns that limited biological surveys conducted during a severe drought did not adequately allow for assessment of the extent of sensitive plant species.

Given that Phase 1 has already been constructed, it seems odd to be conducting an EIR for the Master Plan for the entire CCCVC at this stage. We need to be assured that the EIR will actually cover the entire 79 acre parcel and consider the total impact from full build out of all phases of the CCCVC. The piecemeal approach of analyzing by phases, as was done for Phase 1, should not be repeated at this time.

We request that the EIR must include a complete survey for all CNPS listed plants (rank 1,2,4) and federally or state listed plants that are known to occur in the project vicinity. The survey should be conducted at several times such as in April, June, and August to adequately capture different flowering times for various plants and over a couple of years to minimize weather impacts on the annual plants. The EIR should also survey the oak woodlands for tree numbers and size distribution and associated native plants in the understory and degree of invasive plants, i.e. the health of the woodlands.

We request that the EIR must fully document the observed impacts that Phase 1 produced such as how much oak acreage was removed and how many Monterey Spine flowers were found in predevelopment surveys. We also request that the EIR list the mitigations that were implemented for the Phase 1 impacts and whether they were successful. That way we can gauge the possible success of mitigation proposed in the pending EIR review.

We request that mitigation for special status plants should include 1:1 replacement acreage set aside elsewhere or at least establishment of new populations on site or in neighboring Fort Ord lands. We also request that any mitigation monitoring plan is long enough to ensure new plant populations are surviving over dry and wet periods, e.g. 7 to 10 years.

We request that oak woodland habitat be mitigated for on a 1:1 acreage by preservation of non-protected oak woodlands elsewhere in the project vicinity of equivalent biologic richness. Planting of oak trees in existing woodlands does not mitigate for the loss of the contiguous woodlands. Planting of oak trees on degraded lands has a very limited chance to successfully create oak woodlands as the woodlands are composed of an assemblage of native plant species and mycorrhizal hosts that would not be present.

We are concerned about the fragmentation of the oak woodland habitat and the potential and likely degradation from invasive plants that would occur. Impacts should especially focus on invasive grasses and other non-native plants that can greatly alter the understory and ecology of what is left of the oak forest.

We also would request that alternatives with a smaller footprint be considered so that some contiguous portions of oak woodlands would be preserved. Priority should be to preserve oak woodlands contiguous to preserved woodlands on adjoining lands.

Sincerely,

Donna Burych

Donna Burych, Conservation Chair

Ms Donna Burych
22 Montsalas Dr
Monterey, CA 93940-5285



TERRY ASH, SENIOR ENVIRONMENTAL PLANNER
DEPT. OF GENERAL SERVICES, REAL ESTATE DIV.
PROJECT MANAGEMENT AND DEV. BRANCH
ENVIRONMENTAL SERVICES
947 CASS ST, SUITE 5
MONTEREY CA 93940

93940$4525 C029

From:	Michael Weaver
To:	cccvcproject
Subject:	"CCCVC Project NOP Scoping Comments""
Date:	Friday, December 14, 2018 4:12:21 PM
Attachments:	Untitled.pdf

Please find the attached comments, suggestions, recommendations.

If for some reason the attachment will not open, please call and it can be faxed to you.

831-484-6659

Thank you,

Mike Weaver

Fort Ord Community Advisory Group

"The Fort Ord Community Advisory Group (FOCAG) is a public interest group formed to review, comment, and advise on the remediation (cleanup) of the Fort Ord Army Base Superfund Site, to ensure that human health, safety, and the environment are protected to the greatest extent possible." - Mission Statement

By definition: A Superfund site is any land in the United States that has been contaminated by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment.These sites are placed on the National Priorities List (NPL). Included are lands judged not fit for human habitation.

To: Terry Ash, Senior Environmental Planner (via email)
Department of General Services, Real Estate Division
Project Management and Development Branch, Environmental Services
947 Cass Street, Suite 5, Monterey, CA 93940
OR
cccvcproject@ddaplanning.com
(subject line: “CCCVC Project NOP Scoping Comments”)

Subject: FOCAG response to Notice of Preparation as to the scope and content of the environmental analysis regarding the construction of Phase 2 of a California Central Coast Veteran’s Cemetery.

December 14, 2018

Dear Terry Ash,

The Fort Ord Community Advisory Group was formed at the suggestion of, and with the assistance of, the California Department of Toxic Substance Control. This followed, but was not the result of, the Army’s forced dissolution of the Fort Ord Restoration Advisory Board (Fort Ord R.A.B.)

The closure of former Fort Ord in the early 1990’s resulted in a two-pronged path to its future;

1) Ideas, maps, planning for reuse, to recover economically from the base closure.
2) Attempting to clean up decades of dangerous under ground munitions and chemicals from the soil. Unfortunately reuse and clean-up took off on different paths. Local politicians taking over on part 1 and the Army taking over on part 2. However, communication and coordination of the two became difficult and broke down. Planning for development where it was least dangerous became political, and often broke down.

I am Co-Chair of the FOCAG. Briefly my personal history with Fort Ord is the following;

FOCAG member Mike Weaver's earliest memories of Fort Ord correspond to a You Tube Video regarding the beginnings of CDEC at Fort Ord and Fort Hunter Liggett, (a.k.a. Camp Roberts). That date was 1956.
Here's the link to the unclassified You Tube Video. (Skip forward to 9:36, Fort Ord)

https://www.youtube.com/watch?v=ZY0apW2ow6g

Young Mike regularly watched war games being played out from a hilltop directly across from Fort Ord. The 1950's included attacking and retreating "Army Infantry's", also Infantry soldiers that dug in with foxholes, and were subject to artillery fire and automatic weapon fire. Most of the ammunition were "blanks"
although tracer bullets could be seen crossing areas of hillside. There were also flares in the sky, and Army tanks. These war game maneuvers would go on late, to dawn. Mike could and did watch much of it, from the distance, while at the bedroom window, and go to sleep with the sounds of bullets, bombs, tanks, planes, flares, parachutes.
The 1960's and early 70's transitioned to the use of more helicopters being used in these war games. The Army issue field shovels. Soldiers would dig foxholes to
defend themselves and the territory from attack. The war games would sometimes go on for several days. Then, all would be quiet again.
Following this, would be the time some youngsters would hike to the area of the maneuvers, being careful not to touch anything. However, there were the remains of munitions littered all over. The foxholes often were still in place, some with munitions at the bottom of them. Then an Army bulldozer would arrive and dig a trench up to ten-feet deep. All remaining munitions, bullet cases, and all would be shoved into the trench, then covered up, along with any remaining foxholes. It was scraped clean and buried for safety reasons, for the next exercise.

The bulk of the old records and evidence included lots and lots of classified documents and photographs, these were Fort Ord records, that were boxed up and shipped off-site to another military installation soon after the Army's closure of Fort Ord. Many of us heard stories of documents going to either Georgia or Alabama. The point to this is, not much was left to help with evaluation.

The FOCAG has always supported a Veteran's Cemetery on former Fort Ord. However, the location that was selected for the Columbarium and now a Master Plan for below ground burials is one of the worst possible places on former Fort Ord to locate a ground burial cemetery. That is because the location is near the base of what was called Artillery Hill during weapons training days.

Artillery Hill was used extensively as a backstop for artillery training, and rifle launched grenades, and mortars. Because Army recruits were training with weapons, some of the firing went high, some of the shells fell short.

Also, Parker Flats was an Army Tank Training Area among other uses.

It is estimated that approximately 10% of the munitions used during training were duds, especially during training for the 7th Division WWII soldiers. Munition factories were cranking out ammunitions as rapidly as they could. Quantity was more important than quality at the time.

Following training, often munitions were buried, by troops that did not want to walk them back to the barracks area, or that were duds, or rolled down Artillery Hill. Army bulldozers dug deep trenches to bury tons of munitions.

Looking for buried munitions with metal detectors can often locate them if they are only buried 1.5 to 3-ft. below ground. However, buried munitions are often 6-ft. or deeper below ground. And, metal detectors cannot locate plastic explosives.

Please do reference the extensive FOCAG comments and document submitted by the FOCAG for the previous review for a Fort Ord Cemetery.

FOCAG Scoping recommendations:

1) **Locate below-ground burials on former Fort Ord in a much safer area than at the base of Artillery Hill.**
2) **One suggested alternative location would be at the former Beach Ranges on a portion of the State Park. The Beach Ranges (known collectively as Site #3) were used primarily for rifle target practice. Thus, remaining munitions are mostly spent lead bullets or lead bullet fragments.**

3) A Veteran's Cemetery next to the Pacific Ocean would be an appropriate place because;

(Wikipedia)

"The 7th Infantry Division was an infantry division of the United States Army. Today, it exists as a unique 250-man administrative headquarters based at Joint Base Lewis-McChord overseeing several units, though none of the 7th Infantry Division's own historic forces are active.

The division was first activated in December 1917 in World War I, and based at Fort Ord, California for most of its history. Although elements of the division saw brief active service in World War I, it is best known for its participation in the Pacific Ocean theater of World War II where it took heavy casualties engaging the Imperial Japanese Army in the Aleutian Islands, Leyte, and Okinawa.

Thank you for the opportunity to comment.

Sincerely,

Mike Weaver
Co-Chair, FOCAG
831-484-6659

From:	MICHAEL SALERNO
To:	cccvcproject
Subject:	CCCVC Project NOP Scoping Comments
Date:	Friday, December 14, 2018 2:44:51 PM
Attachments:	KFOW Scoping Comments CCCVC.docx

Please see attached comments from Keep Fort Ord Wild.

Thank You

December 14, 2018

Via Email
cccvcproject@ddaplanning.com

Re: California Central Coast Veterans Cemetery Project

Keep Fort Ord Wild (KFOW) submits the following comments relating to the Notice of Preparation.

(1) Figure 2 "Proposed Project Site" Map in Notice of Preparation is Unclear

Figure 2 in the Notice of Preparation is unclear. The map proports to show existing Phase 1 and a red outline for a proposed Phase 2. However, areas within the red outline clearly include areas that are have already been cleared or disturbed in Phase 1 construction. For example, a retention pond already built in Phase 1 is shown as part of Phase 2. It is difficult to determine what whole the action of Phase 2 and therefore where the Master Plan area might be. KFOW requests accurate maps be circulated as part of a corrected NOP.

(2) Mitigation For Phase 1 Has Not Been Started, Location and Viability of Mitigation Area Now Unclear

KFOW and its members were familiar with approval process of Phase 1. Part of the condition of approval of Phase 1 was mitigation of the 400+ oak trees removed for that phase. To date, successful mitigation has not taken place. It has not started. KFOW and its members have attended multiple public meetings related to the choice of the mitigation area for Phase 1.

In 2017, after an exhaustive public process involving the Fort Ord Committee and consultant Denise Duffy and Associates, a Phase 1 mitigation area was selected.

In the interim, the Fort Ord Reuse Authority has planned a new roadway directly over the selected mitigation area for Phase 1. The proposed alignment for FORA's new roadway divides this area and adds a new intersection degrading the opportunity for successful mitigation and isolating the replanting area. KFOW and the public are confused as to the status of the Phase 1 mitigation. Multiple statements by public officials indicated mitigation for Phase 1 had to be complete before other phases can move ahead. It now appears other phases are moving ahead before a successful mitigation of Phase 1. The mitigation of Phase 1 is still required and cannot be abandoned.

(3) EIR Should Include an Updated Forest Resource Evaluation

KFOW and its members are familiar with the Master Plan area. It contains some of the densest oak forest on Fort Ord. In November 2010, a Forest Resource Evaluation (Staub) was prepared for an earlier version of the project. By inspection, the Master Plan area in the 2018 NOP is different and larger. Since significant time has passed and the study area has changed, an updated Forest Resource Evaluation should be prepared as part of the EIR process.

(4) EIR Should Evaluate and Identify Mitigation Areas for Future Phases

Again, KFOW and its members have attended multiple public meetings related to the choice of the mitigation area for Phase 1. Public presentations by consultant Denise Duffy and Associates have shown how extremely difficult it is to mitigate (replant) relatively small numbers of oaks. (Few suitable locations are available on Fort Ord.)

According to the 2010 Forest Resource Evaluation, the Master Plan area contains at least 9,200+ oaks. Many thousands would be removed if all the (unknown) number of phases were constructed in the Master Plan outline area in Figure 2 of the NOP. The EIR should clearly identify mitigation areas in advance and if they are feasible.

(5) EIR Should Evaluate and Identify On-Site Munitions Hazards

KFOW and its members were familiar with approval process of Phase 1. For many years, KFOW and its members have also attended public meetings related to munitions hazards and toxics that remain on Fort Ord. The current proposed location for Phase 2 and the larger Master Plan is a former live-fire training range area, presenting risk and potential environmental hazards. During the Phase 1 approval process in 2013, KFOW contacted the Department of Veterans Affairs. At the time officials stated it was very unlikely that future in-ground phases would ever occur due to the uncertainty of remaining munitions hazards and the difficult logistics associated with the site. The EIR for the Master Plan should evaluate these conditions.

(6) **EIR Should Evaluate and Identify Project Alternatives**

Given, (1) the difficulty of mitigating large areas of oak forest, (2) the steep topography of the site, and (3) the unknown munitions hazards, the EIR should fully evaluate and identify project alternatives. Alternatives could include different locations or a reduced project size, new designs, etc.

Request:

Keep Fort Ord Wild requests to be placed on the distribution list for all notices related to this project. Notices can be sent to mlsalerno3209@comcast.net and/or erickson@stamplaw.us

Keep Fort Ord Wild appreciates the opportunity to comment.

Sincerely,

Michael Salerno
Keep Fort Ord Wild

Appendix B

2015 Master Plan for the California Central Coast Veterans Cemetery

MASTER PLAN

California Central Coast Veterans Cemetery

Seaside, California



Prepared for:

State of California
Department of General Services
Real Estate Services Division
Project Management Branch

September 2015

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

WOOD RODGERS

September 30, 2015

Mr. Dave Edwards
Department of General Services
Real Estate Services Division
707 3rd Street, 4th Floor
West Sacramento, CA 95605

RE: **California Central Coast Veterans Cemetery**
Master Plan, September 2015

Dear Dave:

We have reviewed comments from the U.S. Department of Veterans Affairs (USDVA) received via e-mail on August 24, 2015. These comments are included within the body of this letter, along with responses that were developed in conjunction with the California Department of Veterans Affairs (CalVet).

It is CalVet's intent to finalize the Master Plan in its current form. This letter, along with the attachments to it, is to be included at the front of the Master Plan dated September 2015. This will memorialize the comments received, along with the responses. At a future date when a subsequent phase is ready to be designed, these comments will be taken into account and implemented into the design documents.

We have included an updated *Figure 8-1: Master Plan Phasing Exhibit*, and *Table 8-2: Summary of Casket Burials* to provide further clarity on the key layout changes and burial counts that the USDVA comments affected.

USDVA Comments and Responses

1. Roadway widths should be increased to 29' where possible to allow for parking along one side of the road and allowing for continued 2 way traffic. This width is not excessive and allows for circulation and parking especially at large gatherings on site.

   Response: Roadway widths will be widened to 29-feet wide where possible. To be addressed in subsequent phases of the cemetery.

2. We will provide funding for "Oversized Pre-placed Crypts" which should occur along the ends of the burial sections. 1% of the crypt fields should allow for adequate burials – if you have different information (higher percentages) on this let me know. Size of oversized crypts is approximately 4' by 9'. Each section should include oversized pre-placed crypts.

   Response: 1% "oversized pre-placed crypts" will be provided and placed along the ends of the burial sections. To be addressed in subsequent phases of the cemetery.

3. The Section 1 Phase 2 pre-placed crypts between the Administration Building and the Cortege Assembly area is problematic. How and where would someone park to visit these gravesites? People would most likely parking in the Cortege Assembly Area which will cause problems. Is this section really necessary?

   Response: The Section 1, Phase 2 pre-placed crypts between the Administration Building and the Cortege Assembly area will be removed. The area marked Section 4, Phase 3 was re-allocated to Phase 2. The remaining sections were renumbered. The attached Amended Figure 8-1 provides a depiction of the revised layout. The attached Amended Table 8-1 provides the revised burial counts. This change will be carried into subsequent phases of the cemetery.

4. If the proposed fire loop is not required because there are no buildings along the future sections, we would recommend not installing this loop. If the loop might be needed to fight fires that would occur in the natural vegetation to remain at the cemetery we would consider funding this.

   Response: Due to the high fire danger on site and with the amount of natural vegetation present, CalVet intends to keep the fire water loop (figure 4-3 shows the fire water loop installed under the main "loop" drive, supplying water to fire hydrants located around the subsequent phases of the cemetery). This loop may be removed at a future date, but only at the State Fire Marshal's direction.

5. Irrigation is shown and might be needed in drip form for swaths of trees and shrubs/perennials planted in and around burial sections. Please verify.

   Response: Yes, irrigation will be needed during the plant establishment period in future phases.

6. As the cemetery is developed and the roadway systems around it are improved, consideration of the type and height of fencing surrounding the cemetery should be determined. Ornamental Fencing should be considered.

   Response: Ornamental fencing around perimeter of cemetery as the cemetery develops will be considered in subsequent phases of the cemetery.

7. The Master Plan shows 11 phases for development. Based upon a 10 year build, this means that the cemetery life should be approximately 100+ years – very good!

   Response: Noted.

8. Are you going to provide flower watering stations within all of the cemetery?

   Direction: Will provide additional flower watering stations in subsequent phases of the cemetery.

Please let me know if you have any questions or comments.

Sincerely,
Wood Rodgers, Inc.



Pete Tobia, PE 49799
Vice President

Attachments:

Amended Figure 8-1: Master Plan Phasing
Amended Table 8-1: Summary of Casket Burials

9,800
(101 OVERSIZE)

8,000
(74 OVERSIZE)

6,400
(100 OVERSIZE)

7,440
(140 OVERSIZE)

8,800
(120 OVERSIZE)

6,800
(104 OVERSIZE)

9,760
(130 OVERSIZE)

8,240
(123 OVERSIZE)

6,480
(87 OVERSIZE)

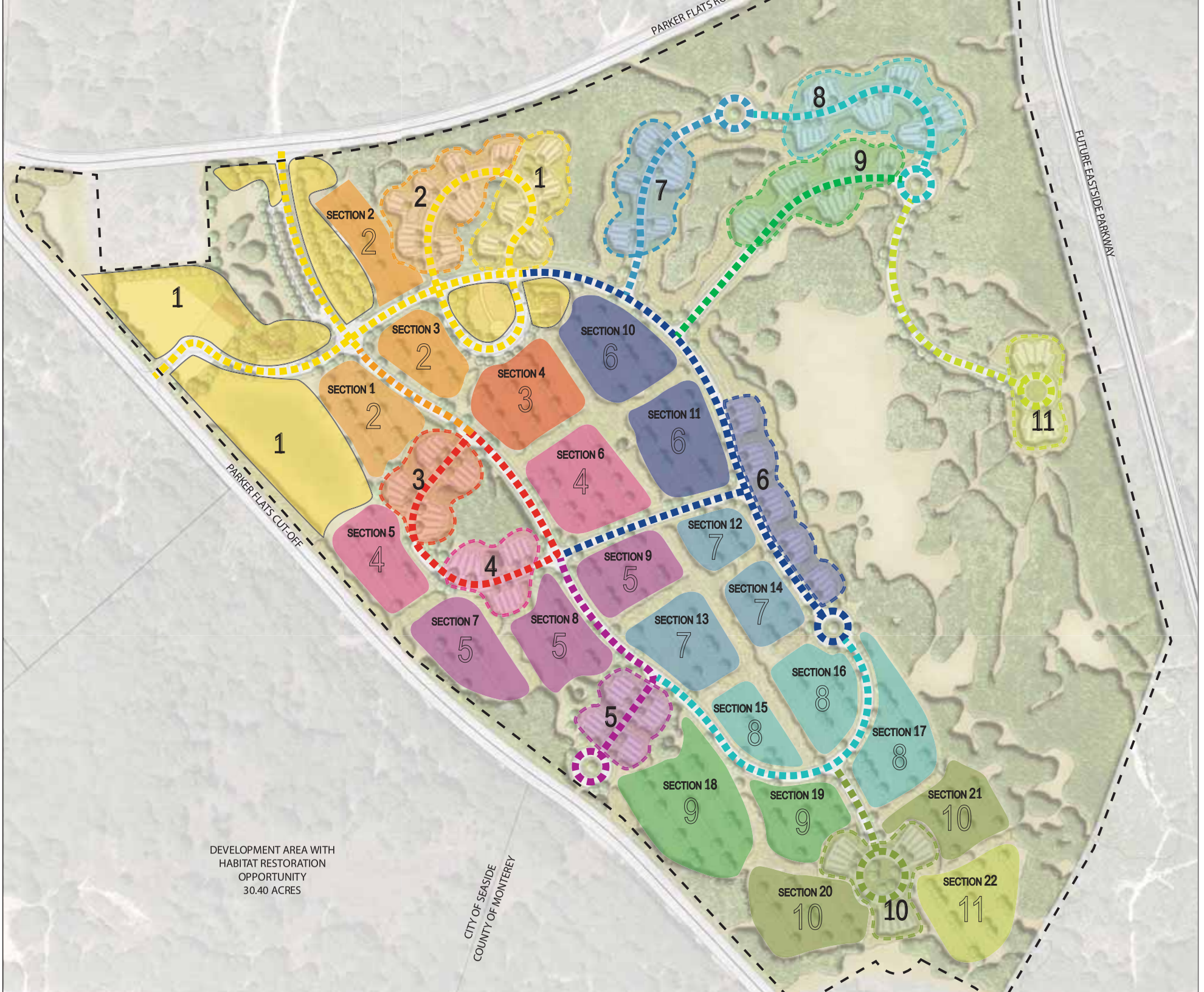
4,320
(52 OVERSIZE)

RIA *

RIALS

CRYPTS

PLOTS



Amended Table 8-1: Summary of Casket Burials

Section Number	Number of Crypts	Number of Oversized Graves	Total per Section	Phase	Phase Total
1	**855**	**31**	**886**	**2**	
2	**837**	**43**	**880**	**2**	
3	**1082**	**27**	**1109**	2	2875
4	**1329**	**74**	**1403**	3	1403
5	**1046**	**29**	**1075**	**4**	
6	**1301**	**71**	**1372**	4	2447
7	**1164**	**31**	**1196**	**5**	
8	**1117**	**29**	**1146**	**5**	
9	**862**	**79**	**941**	5	3283
10	**1188**	**70**	**1258**	**6**	
11	**1270**	**50**	**1320**	6	2578
12	**545**	**31**	**576**	**7**	
13	**1034**	**49**	**1083**	**7**	
14	**723**	**24**	**747**	7	2406
15	**641**	**50**	**691**	**8**	
16	**1094**	**42**	**1136**	**8**	
17	**1282**	**38**	**1320**	8	3147
18	**1906**	**85**	**1991**	**9**	
19	**827**	**38**	**865**	9	2856
20	**1265**	**57**	**1322**	**10**	
21	**891**	**30**	**921**	10	2243
22	**1230**	**52**	**1282**	11	1282
Total	23490	1030	24520		24520

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APPENDIX

Appendix A: State Cemetery Grants Program – Master Plan Requirements
Appendix B: Geotechnical Investigation for Proposed California Central Coast Veterans Cemetery, October 7, 2010
Appendix C: Geotechnical Investigation for Proposed California Central Coast Veterans Cemetery, July 17, 2014
Appendix D: Phase 1 Improvement Plans (CD Only), June 2014
Appendix E: Final Initial Study & Mitigated Negative Declaration/Environmental Assessment, (CD Only)
Appendix F: CCCVC Phase 1 Estimate, May 30, 2014

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
BRAC	Base Realignment and Closure
CBC	California Building Code
CCCVC	California Central Coast Veterans Cemetery
CLOMR	Conditional Letter of Map Revision
CSUMB	California State University, Monterey Bay
DSA	Division of State Architect
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FFCB	Federal Facilities Cleanup Branch
FORA	Fort Ord Reuse Authority
LOMR	Letter of Map Revision
MCWD	Marina Coast Water District
NCA	National Cemetery Administration
PBC	Public Benefit Conveyance
RW	Reclaimed Water
SCGP	State Cemetery Grants Program
SCGS	State Cemetery Grants Service
UXO	Unexploded Ordinance
VA	U.S. Department of Veterans Affairs
VOC	Volatile Organic Compounds

1. Executive Summary

The purpose of the California Central Coast Veterans Cemetery (CCCVC) Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues remaining following the construction and completion of Phase 1 for the development of the Cemetery. To that end, the Master Plan outlines a process and strategy for the implementation of the entire Cemetery including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates.

Design of the Cemetery

The overall design intent of the site plan is to create a monument to the service and sacrifice of California State Veterans. Part of this goal is accomplished through the inclusion of features that will make a lasting and memorable impression on Veterans visiting the Cemetery. The Cemetery will have a combination of burial facilities to meet Veterans' needs, including columbaria, standard burial plots, over-sized plots and a scatter garden.

Phase 1 of Project

Phase 1 of the Cemetery is under construction, and treated in this document as an existing condition.

Architecture

As part of Phase 1, architectural plans have been approved for all buildings to be included in the Cemetery. These plans are comprehensive in the design and layout of each building based on the intended function of each building. Future expansion of the maintenance and administration buildings has been accounted for in Phase 1 and may occur in future phase(s).

Landscaping

The landscape design incorporates the U.S. Department of Veterans Affairs (VA) mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. In addition, minimized water usage, critical for the Monterey Peninsula, will be achieved through the use of decomposed granite or crushed rock atop burial areas instead of the traditional sod.

Infrastructure

The assessment of existing site conditions at the Cemetery property supplies a basis for infrastructure improvements needed for utilities, roadways and services. Phase 1 constructs all of the required offsite utility extensions.

Geotechnical Soil Survey for Burials

Two geotechnical reports have been prepared for the Cemetery. The reports include the drilling of exploratory borings and percolation test holes in the area of the CCCVC project site to determine subsurface characteristics and the percolation rates expected on-site. The sandy

conditions encountered in the reports do not pose any major issues to the construction of the Cemetery buildings and will help to minimize the amount of drainage utilities required due to the high percolation rates of the site.

Grading

The site has varying terrain and the Cemetery layout generally occurs on the less steep western side of the site. The soils are mostly sandy silt. The overall grading seeks to balance the excavation and fill needed. Deed restrictions on the property prohibit export of material. Due to the risk of unexploded ordinance (UXO) on the site, grading operations in previously undisturbed areas will require direct observation by UXO trained personnel.

Phasing

The Cemetery layout has been developed to include flexibility through sequential phases which allows the Cemetery to be completed on an as-needed basis determined by the burial demands anticipated over the next 100 years. The phased build out is based on the existing site conditions and topography, utilities, construction cost, plot burial size, layout, overall site organization and layout. A total of 11 phases will complete the Cemetery at full build out with Phase 1 constructing the core infrastructure and facilities needed for cemetery operation.

Signage

A signage system for the CCCVC has been established with the construction of Phase 1 improvements. This system adheres to VA standards and is designed to provide visitors with information, direction and regulations for the Cemetery.

Cost Estimates

A detailed estimate for Phase 1 was prepared in May 2014 and forms the basis for projection of costs of future phases. Cost estimates for future phases (Phase 2 – Phase 11) have been developed by Wood Rodgers and are included in this report. The Phase 1 cost (as-bid) was $6.2 million, with bids ranging from $6.2 million to $7.2 million. The estimated construction cost for the remaining phases is approximately $70,000,000 (2015 dollars).

Biological Resources

The site presents an opportunity to allow appropriate development while incorporating native habitat and species elements into the overall landscape design. A biological resource survey was done by the Army upon base closure in 1994. A more detailed Initial Study and Mitigated Negative Declaration/Environmental Assessment was conducted for Phase 1 improvements. An Environmental Assessment for the remainder of the site will need to be completed. The environmental assessment completed for Phase 1 is included in **Appendix E** (CD only).

State Cemetery Grants Program

Through its National Cemetery Administration (NCA) State Cemetery Grants Program (SCGP), the VA will provide funds for design and construction of the Cemetery. The process to apply for the federal SCGP includes three steps: pre-application, preparation of interim report and assessment requirements, and application. The SCGS at the VA National Cemetery

Administration is the final arbiter of a State's proposed cemetery design. Through the three-level program, the VA ensures a collaborative process that contributes to likely success for the State in meeting all requirements, and reduces the chances for failed attempts.

The Master Plan has been developed to include the content requirements published by the NCA. A copy of these requirements can be found in **Appendix A**. **Table 1-1** provides a summary of the submission requirements and where they are (primarily) addressed in the Master Plan.

Table 1-1: Matrix of SCGP Requirements in the CCCVC Master Plan

Section	SCGP Master Plan Requirements - Submissions	Location In Master Plan	Comments
1, 1a	Topographic Surveys	Section 1	Included with Phase 1 Improvement Plans. See Figures 2-5, 2-6, 2-7
1, 1a	Utility Surveys	NA	Refer to Phase 1 Improvement Plans. All offsite utilities installed with Phase1
1, 1a	Landscape Surveys	Section 1	See Figure 2-8
1b	Site Characteristics Report	Section 2 & 4 & Appendix E	
2	Graphic & Narrative Description	Section 2	
3	Vicinity Map	Section 2	See Figure 2-1
4a	Site Constraints	Section 2 & 4	
4b	Site Entrances – Public/Maintenance	Section 4	See Figure 2-9
4c	Site Organization – Burial, Maintenance & Staff	Section 4	
4d	Onsite Utility Studies	Section 4	Completed with Phase 1.
4e	Offsite Utility Studies	Section 4	Completed with Phase 1.
5	Geotechnical Soil Survey for Burials	Section 5	Appendices B & C have complete geotechnical reports
6	Multiple Items		Spread throughout the Master Plan
7	Roadway System	Section 6	See Figure 6-1
8	Grading & Drainage Plan	Section 7	See Figure 4-1
9	Phasing Plan	Section 8	See Figure 8-1
10	Burial Sections	Section 9	See Figure 8-1
11	Planting Plan	Section 3	See Figure 3-1 & Figure 3-2
12	Irrigation Plan	Section 3	See Figure 3-3
13	Signage Plan	Section 9	See Figures 9-1 to 9-5
14	Architectural Plans & Concept	Section 10	See Figures 10-1 to 10-9
15	Interior Design Scheme/Furniture	Section 10	See Figures 10-1 to 10-9
16	Natural Resources & Utilities	Section 4	
17	Letters (Memoranda of		All offsite utilities installed

	Understanding)		with Phase1
18	Wells for Water Source	--	None required.
19	Existing Electrical Services		In place with Phase 1
20	SCGP Space Program Analysis	Section 10	See Figures 10-3, 10-4
21	HVAC	Section 11	See Figures 10-1 to 10-9
22	Mechanical & Electrical Room Floor Plans	Section 11	See Figures 10-1 to 10-9
23	Master Plan Cost Estimate Summary Sheet	Section 12	
24	Cost Estimate Summary Sheet: Phase 1	Section 12	
25	Cost Estimate Summary Sheet: Phases 2-11	Section 12	

2. Introduction

The CCCVC at Fort Ord is dedicated to the men and women who have served the State of California and Nation with unequaled distinction and honor. The Cemetery will provide for the burial needs of Veterans in the four counties of Monterey, Santa Cruz, San Benito, and Santa Clara. The proposed Cemetery site is at the former Fort Ord Army Base, located in the Pacific coastal region of Monterey County.

At full build out, the Cemetery will supply 106,476 gravesites with 81,040 columbaria and 25,436 casket burial sites – enough to serve the anticipated needs of veterans for the next hundred years. The Cemetery will be completed in phases with the first phase currently under construction. Phase 1 includes 5,000 columbaria, an administration building/ public information/ maintenance complex, a committal service shelter, assembly area and memorial walk.

Phase 1 design has a planned completion in Summer 2016. The overall Master Plan is fully consistent with the Phase 1 improvements. While there may be some minor changes during construction, the Phase 1 improvements are treated as existing for the purposes of this document.

The following will be complete and in place following Phase 1. They are presented as such herein:

1. Administration Building and adjacent Public Information Building – connected by a breezeway.
2. Maintenance Building (with future expansion)
3. Maintenance Yard
4. Committal Service Shelter
5. Assembly Area
6. Memorial Walk
7. Sewer, water, electric, and telecom services.
8. Entry roads and entry features

Physical Settings

Located on the former Fort Ord Army Base, The CCCVC site is 78.8 acres of rolling topography. The site is well suited for the development of a veterans' cemetery as it is currently undeveloped and shares the undulating, chaparral-covered hills and depressions characteristic of the Fort Ord backcountry.

Parker Flats Road currently provides access to the site and connects to a major collector, General Jim Moore Boulevard. Eastside Parkway has yet to be constructed, but will eventually border the site on the east and will provide additional access in the future.

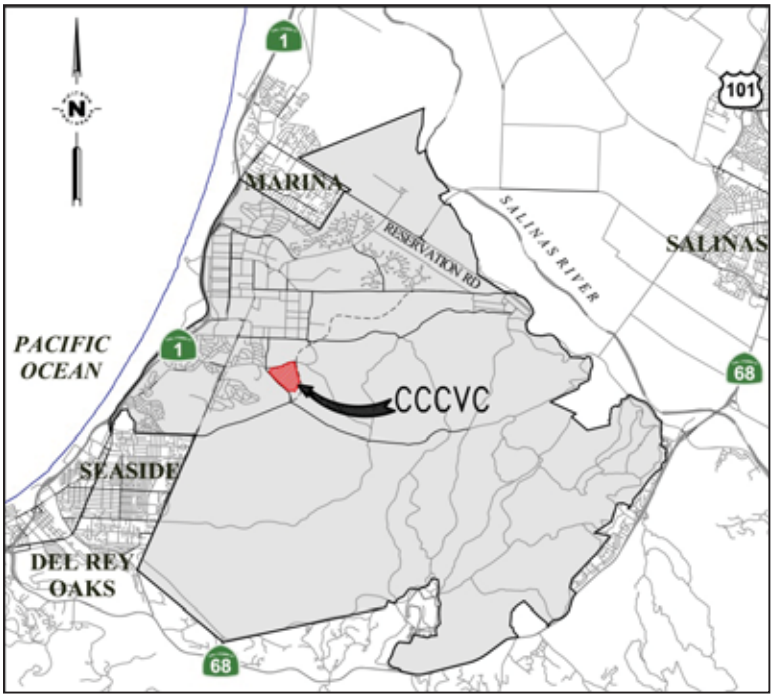


Figure 2-1: Vicinity Map

A rolling, densely oak-covered ridgeline forms the project's southern and east boundary. The western half of the site is composed of hilly topography ranging from 2 to 7 percent slopes with large oak forests over much of this portion of the site. Grasses and shrubs cover a small depression, located in the middle of the site. Runoff from winter rains collects in this depression before percolating into the sandy soil and replenishing groundwater supplies. This area in the Master Plan is preserved as the percolation area for the site. Overlooking the site is Artillery Hill, one of the most prominent features in the area. This shrub-and-grass-covered hill is located on the eastern border of the Cemetery site and commands views from the ocean to Salinas Valley.



Figure 2-2: View of Site from Artillery Hill



Figure 2-3: View from Front Entry Point of the Site

Site topography will be one of the main constraints for purposes of the Cemetery. Areas suitable for crypt development are limited to the western half of the site. Benching will be required in most crypt areas to create the maximum 2 percent slopes necessary to sustain the use of decomposed granite as the ground plane cover. (Steeper slopes lead to migration of the decomposed granite material.) The slopes in the eastern half, while not accommodating crypts, will accommodate some columbarium development. Refer to **Figure 2-5** and **Figure 2-6** for site topography taken from the Phase 1 Improvement Plans. **Figure 2-7** overlays the site contours on an aerial of the site.

Another constraint that will need consideration for the development of the Cemetery will be the soil management required due to the former use of the site as a staging area for military operations and therefore having the potential of unexploded ordinance. The site has been cleared to a non-residential level of clearance, which equates to an approximate depth of 4 feet. Any grading operations are required to comply with regulations regarding retaining soil on site and supervision of all grading operations.

The oak woodland will be one of the major opportunities and also constraints to development. There are four identified heritage oaks on site, but the oak woodland vegetation matrix has been identified as a key resource for Fort Ord. Refer to **Figure 2-8** for a map of the existing habitat.

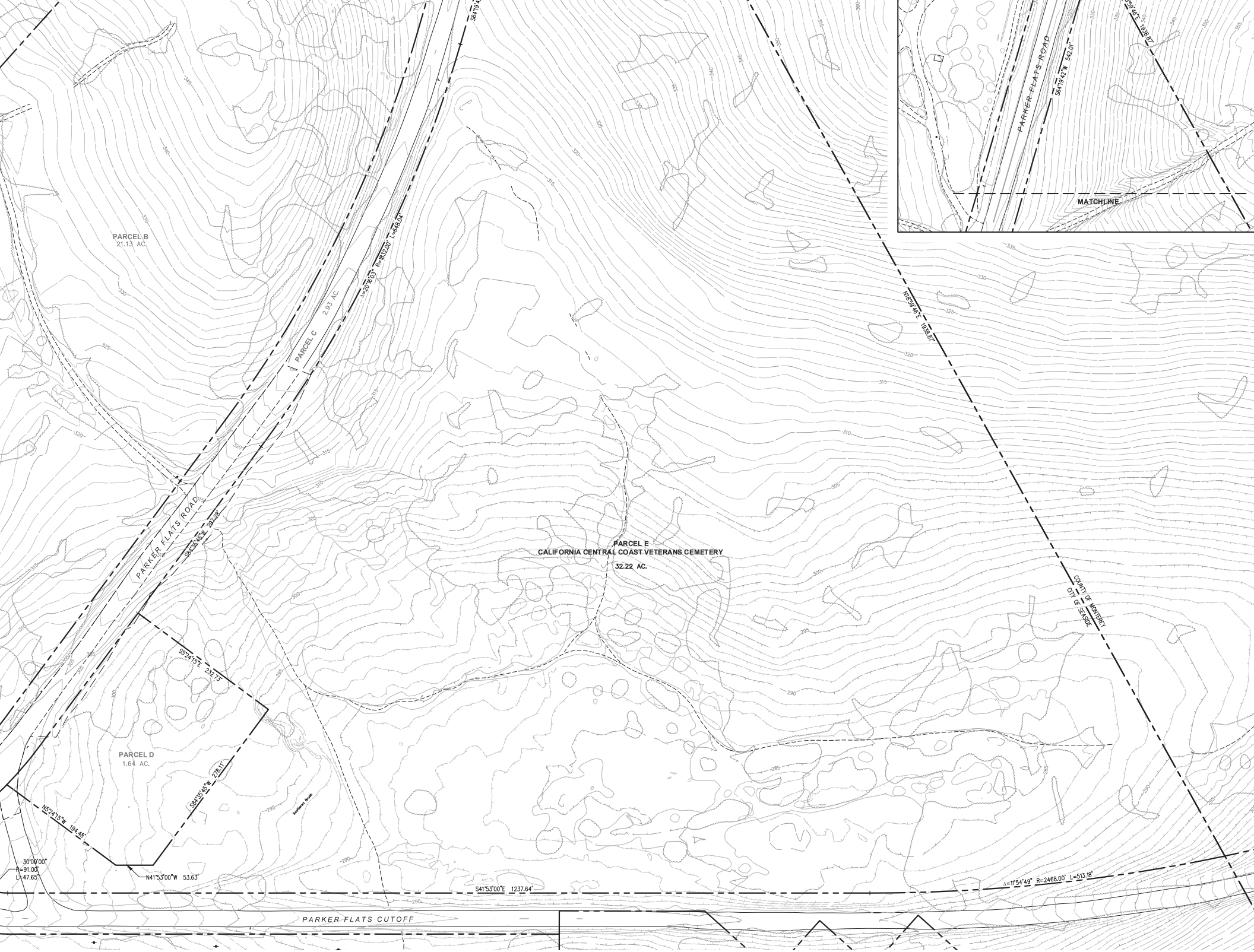


Figure 2-4: Oak Woodland on Site

Layout

The Cemetery layout is designed to enhance the visitor experience by preserving much of the oak forest and yet maintain an intuitive layout pattern. The main visitor facilities can be easily found as the Administration complex, memorial walk and wall, committal service shelter and assembly area are located adjacent to the entrance within the Phase 1 development area. In the Master Plan, a loop road organizes the spaces within the Cemetery, with smaller loops and cul-de-sacs branching off the loop. At build out, the loop will offer visitors alternate routes if there is a conflict at any point on the road. A secondary loop extends up to the top of Artillery Hill, eventually giving visitors a view across the adjacent open space to the coastal hills and to the ocean. Refer to **Figure 2-9** for the overall site layout, including roadways and entrance locations.

The burial sections and columbaria are organized around these loops. Each burial section has a maximum of 220 feet to the furthest grave from the roads. Columbaria are located on secondary loops or cul-de-sacs or on the back of the major loop to minimize traffic conflicts. The oak forest will be preserved wherever possible. This will be accomplished by locating columbaria within the forest. Other sections are preserved between burial sections. Where there will be major grading, new oaks will be planted, to maintain the sense of immersion in an oak forest throughout the Cemetery.


PARCEL B
21.13 AC.
PARCEL C
2.93 AC.
PARCEL D
1.64 AC.
PARCEL E
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
32.22 AC.
PARKER FLATS ROAD
PARKER FLATS CUTOFF
MATCHLINE
COUNTY OF MONTEREY
CITY OF SEASIDE
S64°19'42"W 542.01'
N89°59'45"E 1938.87'
S64°35'45"W 201.28'
S72°41'5"E 232.73'
S64°35'45"W 228.11'
N5°24'15"W 194.48'
N41°53'00"W 53.63'
S41°53'00"E 1237.64'
Δ=11°54'49" R=2468.00' L=513.18'
30°00'00" R=91.00' L=47.65'
L=20°06'07" R=662.00' L=646.04'
Southeast Brush

NOTES:


PARCEL Q
222.61 AC.
PARCEL M
22 AC.
PARCEL A
8.38 AC.
PARCEL B
13 AC.
PARCEL C
2.93 AC.
PARCEL D
EL/MUSEUM SITE
AC.
PARKER FLATS ROAD
PARKER FLATS CUTOFF
PARCEL K
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
52.18 AC.
PARCEL E
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
52.22 AC.
COUNTY OF MONTEREY
CITY OF SEASIDE
PARCEL G
PARCEL F
4.69 AC.
PARCEL I
7.24 AC.
PARCEL J
3.64 AC.
PARCEL H
12.29 AC.
N69°49'53"W 249.09'
S4°34'26"E 255.58'
27°50'55" R=468.00' L=227.47'
0°59'30" R=468.00' L=8.10'
S64°19'42"W 542.01'
Δ=20°36'01" R=852.00' L=548.04'
S64°35'45"W 257.46'
S5°24'15"E 123.72'
S64°35'45"W 278.11'
N41°53'00"W 53.63'
S41°53'00"E 1237.64'
(S14°47'14"E 1369.35' R2,012)
N16°39'46"E 1938.87'
(S20°28'20"W 520.57' R2,012)
N30°46'05"E 313.86'
N59°56'41"W 185.18'
N30°46'05"E 397.71'
Δ=64°30'09" R=245.00' L=275.82'
S48°26'44"W 151.26'
1°44'28" L=19.21'
Δ=19°44'01" L=217.67'
Δ=21°28'29" R=632.00' L=236.88'
S21°50'19"E 356.31'
N25°53'24"E 276.02'
S43°18'48"E 400.48'
1°48'08" R=2468.00' L=77.63'
Δ=12°17'09" R=1302.00' L=279.18'
Δ=11°54'49" R=2468.00' L=513.18'

NOTES:

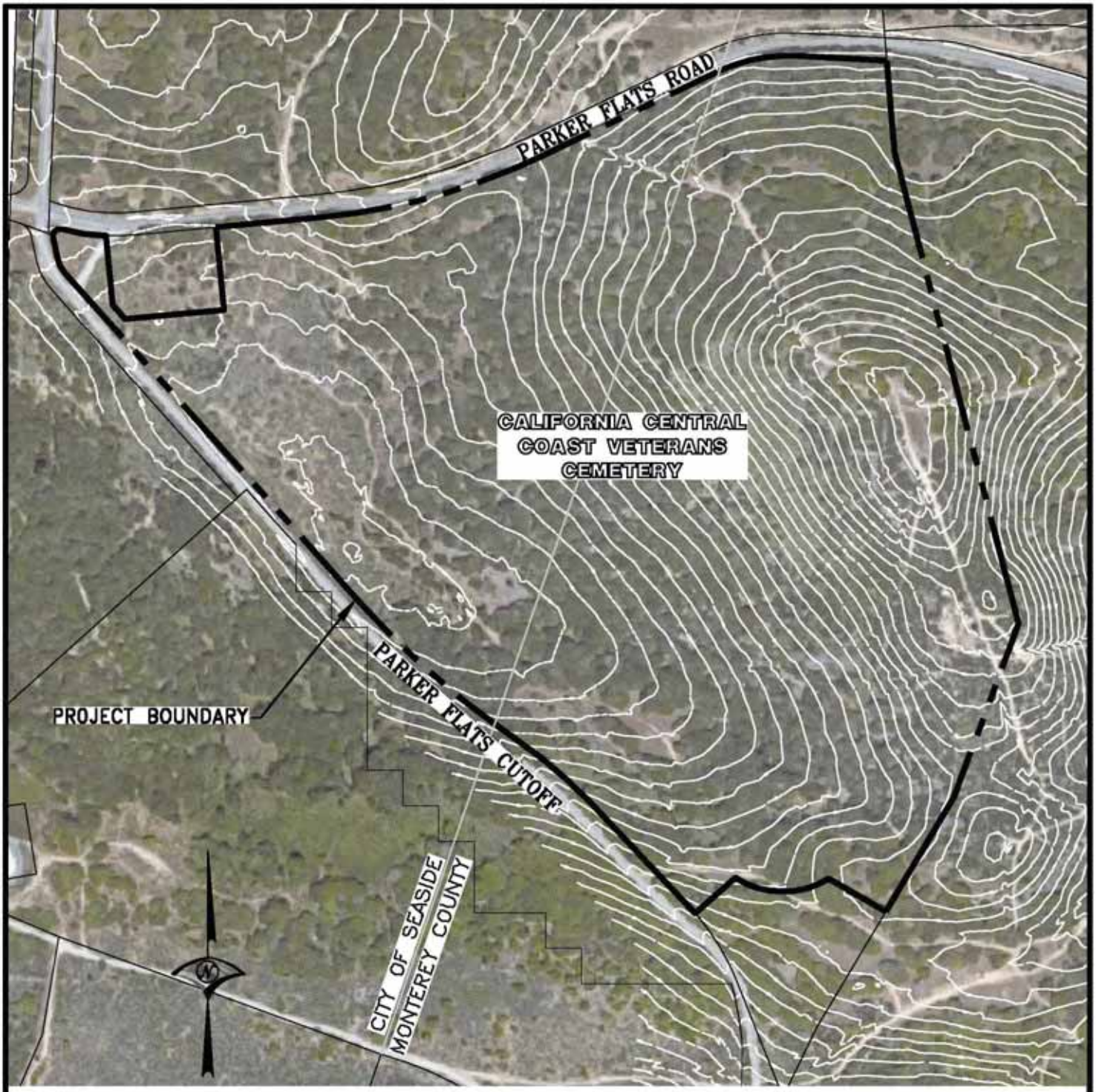


FIGURE 2-7: EXISTING CONDITIONS MAP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

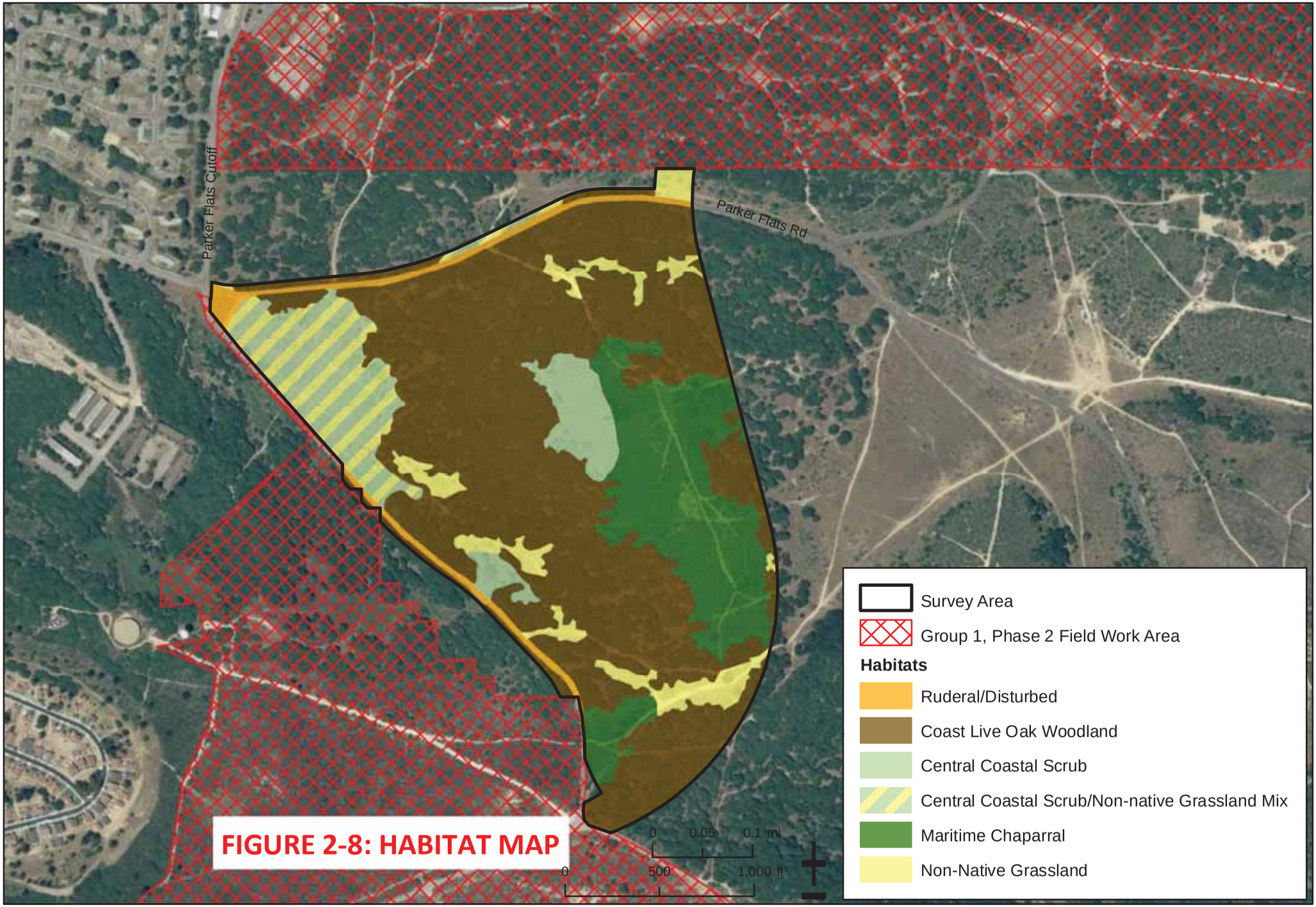


FIGURE 2-8: HABITAT MAP



Title: Habitat Map

File: Habitat Map South.mxd

Date: 09-20-10

Scale: 1 inch = 0.12 miles

Project: 2010-14 Vet Cemetery

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure 2C


TRADITIONAL CASKET BURIAL, TYP.
PLANTED MEDIAN WITH FLAGS
ENTRY GATES
DUAL CORTEGE LANES
EXISTING WOODLAN
NEW OAK WOODLAN
L WALL
L WALK
INTENANCE YARD
NANCE BUILDINGS
TRATION & PUBLIC MATION BUILDING
ASSEMBLY AREA
SERVICE SHELTER
DETENTION BASIN
SECONDA
COLUMBA COURTYA
FLAGPOLE ARTILLERY
PARKER FLATS CUT-OFF
FUTURE EASTSIDE PARKWAY
COLUMBARIUM COURTYARDS, TYP.
SECONDARY ROAD
PRIMARY ROAD
HERITAGE TREE TYPICAL OF 4
COLUMBARIUM COURTYARDS, TYP.
SECONDARY ROAD
COLUMBARIUM COURTYARDS, TYP.
CITY OF SEASIDE
UNTY OF MONTEREY

3. Landscape Architecture

Planting and Irrigation

Strategy

The planting design of the CCCVC landscape builds upon standards established by the Fort Ord Reuse Authority (FORA). The design strategy employs primarily California coastal native plants as well some adapted non-invasive trees, shrubs, groundcovers, and perennials that require no irrigation once established. These plants reflect the character of Seaside and the surrounding region of Monterey County and meet the necessary demand of low water usage. The Cemetery has a minimal water allocation that will not support the traditional lawns of most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and season variation. Hardscape complements plant material in areas where vehicular or heavy foot traffic is anticipated.

Climate

The community of Seaside is located along California's Central Coast and has a Mediterranean climate with cool summers, mild winters, and frequent coastal fog. An annual average of about 21 inches of precipitation falls primarily between November and March. High relative humidity and cool temperatures mean that evapotranspiration is relatively low.

Plant Zones

As shown in **Figure 3-1: Master Plan Planting**, the landscape has five distinct zones, including: a significant vegetated edge; the Avenue of the Flags streetscape; a buffer zone; columbarium gardens; and a naturalized landscape featuring erosion control and stormwater detention zones. The design of these areas conforms to the overall landscape strategy but each zone is differentiated by the choice and combination of plant material and programmatic need. Refer to **Figure 3-2: Master Plan Planting Images** for photos of the various plant types.

- Significant Vegetated Edge
  The significant vegetated edge is located along the main entry drive, at key intersections, and around buildings and plazas. It is designed to meet the following criteria:
  - Shrubs and groundcovers do not exceed 36 inch in height for visibility.
  - A mixture of evergreen and deciduous plants follow a pattern of varying textures, colors, and heights to provide seasonal interest.
  - Native oaks are used to integrate this area into the natural landscape.
- Avenue of the Flags
  The median and roadway edges along the Avenue of the Flags are designed to meet the following criteria:
  - Shrubs and groundcovers do not exceed 18 inch in height for maximum visibility and to avoid interference with the flags.
  - A mixture of evergreen and deciduous plants creates a pattern of varying textures, colors, and heights to provide seasonal interest.
- Buffer Zone
  A vegetated screening buffer along the maintenance area and adjacent properties is designed to meet the following criteria:

- Primarily evergreen shrubs provide year-round screening.
- Trees and shrubs are planted in non-linear formations to mimic the natural landscape pattern.

➢ Columbarium Gardens
Columbarium gardens are designed to meet the following criteria:
- Shrubs and groundcovers do not exceed 36 inch in height for visibility from the road to the structures.
- A mixture of evergreen and deciduous plants creates a pattern of varying textures, colors, and heights to provide seasonal interest.
- Plant material are selected and arranged for appreciation at a small scale.
- Native oaks are used to integrate the columbarium gardens into the natural landscape.

➢ Naturalized Landscape
The naturalized landscape will be designed to meet the following criteria:
- Native grasses and perennials will be used to stabilize soil quickly.
- The selection of plant material will complement and provide visual continuity into the native landscape.
- Native oaks will be planted to reinforce the natural landscape.

Irrigation

Irrigation will be temporary and is intended only for the establishment of new plants, due to the limited water resources available to the project. Landscape irrigation maximizes efficiency while delivering water in the method most appropriate for the species in each hydrozone, including drip emitters and tree bubblers. Future burial areas will not be planted and irrigated but will be covered with decomposed granite; however, burial areas will have aisles set aside for potential future irrigation and planted where necessary to provide slope stabilization. Refer to **Figure 3-3: Master Plan Irrigation Plan** for a layout of the proposed irrigation system.

The system incorporates several strategies to maximize irrigation efficiency and water reduction:

- Smart controllers are used. These are controllers that are tied to local weather conditions and that can be programmed for maximum efficiency.
- Rain sensors prevent unnecessary watering.
- Moisture sensors stop over-watering
- Plants are grouped in hydrozones with similar watering requirements
- Trees are on separate valves
- Each zone is isolated by use of gate valves, to permit shut-off of water if repairs are needed and to allow cut-off of water to each zone once the plants in a zone are established.
- The main line, sized according to the water pressure conditions and water use requirements for the site, parallels main roads and is located in the landscape buffer between the roads and the burial areas.
- Along the main line are quick coupler valves every one hundred feet to aid in maintenance operations. Automatic control valves are located in this corridor in banks of valves with a gate valve to at each group to allow shut down of a single area. Detection wires will also be placed on all irrigation utilities so they can be easily located and identified before any excavation takes place. This will help prevent damage to the system once burial parcels become occupied.

- Since the Cemetery is expected to experience a high volume of visitors during daylight hours, the irrigation system will have to be designed to water within a maximum 12 hour watering window. This will allow users to walk and visit the Cemetery without the interference of a running irrigation system. This window should occur between closing and opening hours and will ideally water the entire Cemetery requiring water for establishment during this period.

Site Design

The primary objective of the design for the CCCVC is to create a place that commemorates the service and sacrifice of the State's Veterans by providing a dignified, serene and beautiful setting. The planning and design employs a regionally sensitive approach, working with the existing site features as much as possible, while meeting the programmatic needs. The program accommodated in Phase 1 includes 5,000 columbarium, administration / maintenance complex, ceremonial entrance, a cortege assembly area, committal service shelter, a flag / assembly area, memorial walkway / donations area and supporting roads. The design locates these facilities in a manner that takes advantage of the topography and the open areas in the existing oak forest. To diminish impact to the site and reduce cost, the plan concentrates the Phase 1 program at one end of the overall site.

Entrance Area (Phase 1)

The main entrance to the Cemetery is located in a natural break in the oak forest, on the site of an existing pathway. Large decorative main entry walls and gates frame the entrance, to signify the importance of this place. The walls are stucco over cement block, capped by red clay tile, in the Spanish mission style of the Monterey County area and in keeping with the proposed building architecture. The gates and adjacent fencing are black ornamental steel pickets. The great seal of California is set on the central wall segment that separates the entry and exit lanes. Signage for the Cemetery has been located adjacent to the entry side.

A divided road leads from the gate down the gentle slope to the Administration / Maintenance complex. Filled with low colorful plantings the median of this road contains the Avenue of the Flags. A dual lane cortege assembly road leads off the entry road to the right shortly after the gate, ending adjacent to the Administration area. Designed for thirty cars, the lane was engineered for ease of access and located to be visible from the Director's office.

A colorful significant vegetated edge frames this main entry road, separating it from future burial. The planting section of this report discusses the planting concept in detail.

Administration/ Maintenance Complex Site Design (Phase 1)

The location of the complex was chosen for its visibility and access to the adjacent Parker Flats Cutoff which will allow maintenance and delivery access. Parking for eleven visitors and staff is located in front of the administration building. Walks and a small plaza lead to the visitors' entrance, to the gravesite locator computer and to the restrooms. The plaza has trees and benches to provide comfort for visitors. Adjacent to the Administration building and on axis with visitors' site lines as they enter the Cemetery are the State and MIA flags on poles thirty feet tall.

The Administration building is surrounded by colorful shrubs and ornamental grasses (see planting description).

The maintenance complex parallels Parker Flats Cutoff Road at a ninety degree angle from the administration building. The maintenance buildings form a partial screen from burial areas. Fencing and large evergreen trees and shrubs complete the screening. The maintenance yard has been sized for the turning radius of semi-trucks. For Phase 1 concrete paving has been used in the area adjacent to the maintenance building. Gravel provides a stable surface for the rest of the yard.

Columbarium (5,000 units in Phase 1, remainder in future phases)

The layout of the columbarium focuses on utilizing the beauty of the existing site to create a serene environment for the visitors. Where viable, units are set within the canopy of existing oak forest along a loop road, taking advantage of existing breaks in the forest wherever possible. Varying from 920 to 1,200 units, the columbarium clusters change in size, depending on the existing grade and forest opening.

Each cluster can be accessed directly from the road on accessible concrete pathways. A small garden area separates the units from the road with an adjacent bench for visitor comfort. Floral watering stations are located on the road within fifty feet of each cluster.

The units are arranged in radial pattern from the road, to maximize visibility. Units are set a minimum of ten feet apart for accessibility and to give visitors a sense of private space in front of each unit. The columbarium are five units high in multiples of eight units long, capped with a cast stone cap. The end columns of stucco mimic the Mission architecture of the buildings and entry wall.

Committal Service Shelter Area (Phase 1)

The siting of the committal service shelter takes advantage of the existing forest to create a sense of enclosure and privacy for the space. Located on a separate loop road, the shelter sits at the end of the loop with the back drop of a grove of existing oaks. Designed to accommodate thirty cars, the road is approached on the right for ease of turning for the cortege.

The shelter sits at the end of a loop road, providing direct access for the hearse and the family vehicle. To provide sufficient standing area for internment services, a large concrete patio extends from under the roof of the shelter and is supplemented by an additional area of decomposed granite. Trees on the edges and in grates on the patio provide additional shade.

Flag Assembly Area (Phase 1)

In the center of the committal service shelter loop is the flag assembly area. To accommodate large numbers of visitors on the national holidays, the center of the loop is graded to be flat and covered primarily with decomposed granite paving. Colorful plantings and new oaks flank the site. The American flag is flown on a 50-foot pole at the back of the assembly area, within concrete paving. A concrete path provides access from the Administration area to the site.

Memorial Walk (Phase 1)

Adjacent to the entry drive, opposite the Administration complex, is the memorial walkway. The concrete path meanders from the intersection up the hill parallel to the entry road. Selected for its adjacency to the administration complex, the meandering form takes advantage of existing trees in the area. Along the path are areas for future memorials. The path terminates in a loop adjacent to a memorial wall. The memorial walkway is for formal memorial walls only, and donor memorials are to be located at other selected areas of the cemetery.

Flag Plaza (Phase 11)

At the top Artillery Hill, will be the Flag Plaza and a circular terrace for accommodation of the relocated Fort Ord Drill Sergeant statue.

(ROADSIDE + COLUMBARIUM AREAS)

ANK TREES

S (QTY: 4)

ANK PLANTING

EGETATED EDGE

ZONES

ES

GRANITE

L4.01 FOR PHOTOS)

	COMMON NAME
	STRAWBERRY TREE
	MONTEREY CYPRESS
	SWAN HILL FRUITLESS OLIVE
	VICTORIAN BOX
	COAST LIVE OAK
	MEXICAN ELDERBERRY

ROSION CONTROL

NAME	COMMON NAME
LEFOLIUM	WHITE YARROW
A CALIFORNICA	CALIFORNIA POPPY
ARITIMA	SWEET ALYSSUM
LOR	PYGMY-LEAF LUPINE
NATUS	CALIFORNIA BROME
CUS	BLUE WILDRYE
TUSIFLORUM	CLOVER
STACHYS	THREE-WEEKS FESCUE

	COMMON NAME
	FERN LEAF YARROW
'BIG SUR'	BIG SUR MANZANITA
POINT REYES'	POINT REYES MANZANITA
RT'S DESIRE'	MOUNTAIN LILAC
OLIOLOSUM	CALIFORNIA BUCKWHEAT
VAR. MARITIMA	COASTAL CALIFORNIA POPPY
	ATLAS FESCUE
	SPANISH LAVENDER
	SLENDER VELDT GRASS
POINT'	COASTAL COFFEEBERRY
OSTRATUS'	CREEPING ROSEMARY
	CLEVELAND SAGE
	BLACK SAGE

PARKER FLATS CUT-OFF

CITY OF SEASIDE
COUNTY OF MONTEREY



ARBUTUS 'MARINA'
STRAWBERRY TREE



CUPRESSUS MACROCARPA
MONTEREY CYPRESS



EUROPAEA 'SWAN HILL' SWAN
HILL FRUITLESS OLIVE



PITTOSPORUM UNDULATUM
VICTORIAN BOX



RCUS AGRIFOLIA COAST LIVE
OAK



BUCUS MEXICANA MEXICAN
ELDERBERRY





ACHILLEA 'MOONSHINE' FERN LEAF
YARROW





ARCTOSTAPHYLOS EDMUNDSII
'BIG SUR'
BIG SUR MANZANITA





ARCTOSTAPHYLOS UVA-URSI
'POINT REYES'
POINT REYES MANZANITA





ERIOGONUM FASCICULATUM
FOLIOLOSUM
CALIFORNIA BUCKWHEAT





ESCHSCHOLZIA CALIFORNICA VAR.
MARITIMA
COASTAL CALIFORNIA POPPY



FESTUCA MAIREI
ATLAS FESCUE





LAVANDULA STOECHAS
SPANISH LAVENDER





RHAMNUS CALIFORNICA 'SALT
POINT'
COASTAL COFFEEBERRY





ROSMARINUS OFFICINALIS
'PROSTRATUS'
CREEPING ROSEMARY





SALVIA CLEVELANDII
CLEVELAND SAGE





SALVIA MELLIFERA
BLACK SAGE





PENNISETUM SPATHIOLATUM
SLENDERVELDT GRASS





CEANOTHUS GLORIOSUS 'HEART'S
DESIRE'
MOUNTAIN LILAC





ACHILLEA MILLEFOLIUM
WHITE YARROW





ESCHSCHOLZIA CALIFORNICA VAR.
MARITIMA
COASTAL CALIFORNIA POPPY





LOBULARIA MARITIMA
SWEET ALYSSUM







BROMUS CARINA
CALIFORNIA BR



ELYSUM GLAU
BLUE WILD

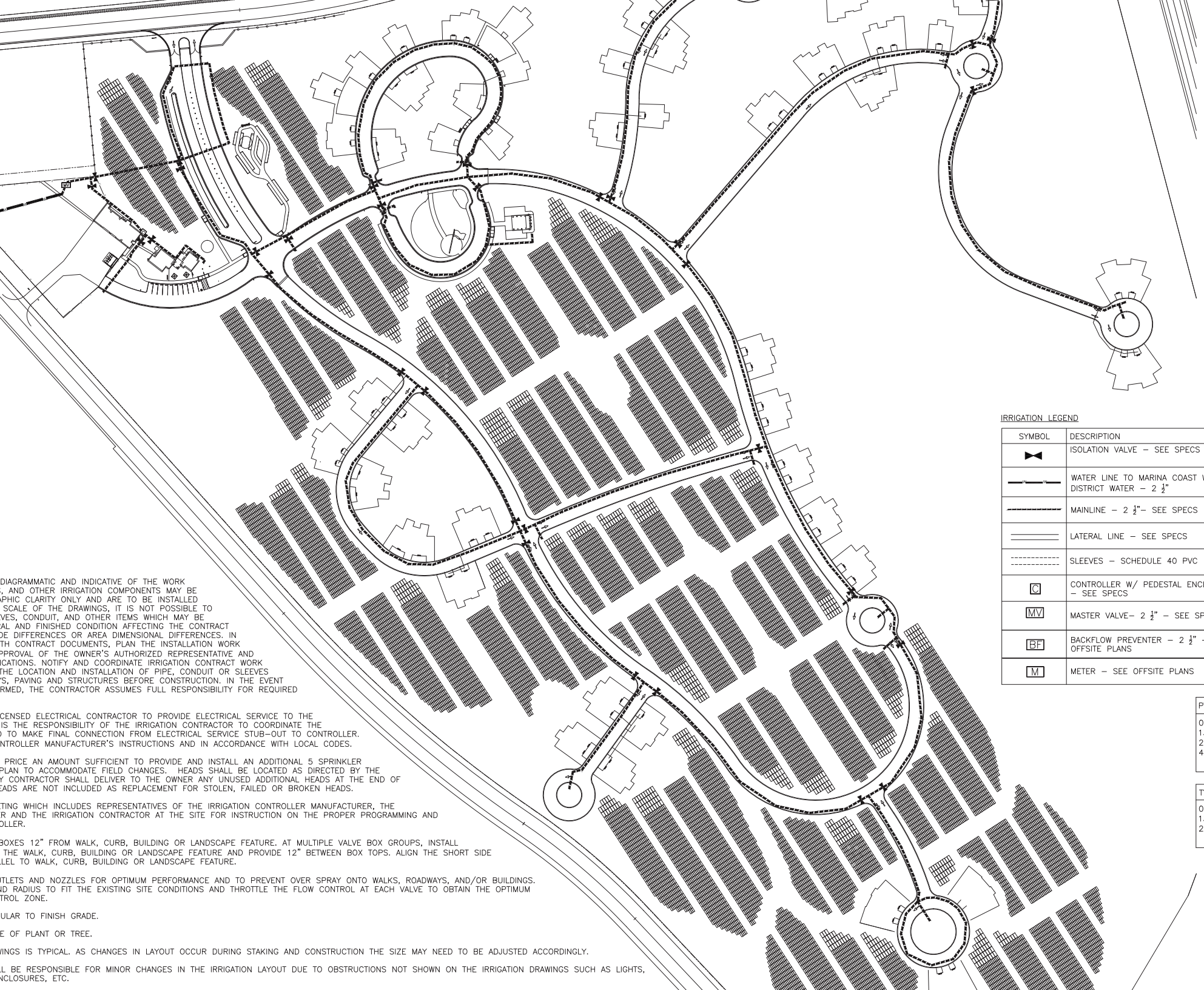


TRIFOLIUM OBTUSIFLOR
CLO





VULPIA MICROSTAC
THREE-WEEKS FES



IRRIGATION LEGEND

SYMBOL	DESCRIPTION	NOTES
	ISOLATION VALVE – SEE SPECS	
	WATER LINE TO MARINA COAST WATER DISTRICT WATER – 2 ½"	
	MAINLINE – 2 ½"– SEE SPECS	
	LATERAL LINE – SEE SPECS	
	SLEEVES – SCHEDULE 40 PVC	
C	CONTROLLER W/ PEDESTAL ENCLOSURE – SEE SPECS	
MV	MASTER VALVE– 2 ½" – SEE SPECS	
BF	BACKFLOW PREVENTER – 2 ½" – SEE OFFSITE PLANS	
M	METER – SEE OFFSITE PLANS	

PVC LATERAL LINE S
00 – 12 GPM: 1.0"
13 – 28 GPM: 1.5"
29 – 45 GPM: 2.0"
46 – 65 GPM: 2.5"

TYPICAL VALVE SIZIN
00 – 12 GPM: 1.0"
13 – 28 GPM: 1.5"
29 – 45 GPM: 2.0"

DIAGRAMMATIC AND INDICATIVE OF THE WORK
, AND OTHER IRRIGATION COMPONENTS MAY BE
APHIC CLARITY ONLY AND ARE TO BE INSTALLED
SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO
VES, CONDUIT, AND OTHER ITEMS WHICH MAY BE
AL AND FINISHED CONDITION AFFECTING THE CONTRACT
DE DIFFERENCES OR AREA DIMENSIONAL DIFFERENCES. IN
TH CONTRACT DOCUMENTS, PLAN THE INSTALLATION WORK
PPROVAL OF THE OWNER'S AUTHORIZED REPRESENTATIVE AND
ICATIONS. NOTIFY AND COORDINATE IRRIGATION CONTRACT WORK
THE LOCATION AND INSTALLATION OF PIPE, CONDUIT OR SLEEVES
'S, PAVING AND STRUCTURES BEFORE CONSTRUCTION. IN THE EVENT
RMED, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR REQUIRED

CENSED ELECTRICAL CONTRACTOR TO PROVIDE ELECTRICAL SERVICE TO THE
IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO COORDINATE THE
TO MAKE FINAL CONNECTION FROM ELECTRICAL SERVICE STUB–OUT TO CONTROLLER.
NTROLLER MANUFACTURER'S INSTRUCTIONS AND IN ACCORDANCE WITH LOCAL CODES.

PRICE AN AMOUNT SUFFICIENT TO PROVIDE AND INSTALL AN ADDITIONAL 5 SPRINKLER
PLAN TO ACCOMMODATE FIELD CHANGES. HEADS SHALL BE LOCATED AS DIRECTED BY THE
Y CONTRACTOR SHALL DELIVER TO THE OWNER ANY UNUSED ADDITIONAL HEADS AT THE END OF
EADS ARE NOT INCLUDED AS REPLACEMENT FOR STOLEN, FAILED OR BROKEN HEADS.

TING WHICH INCLUDES REPRESENTATIVES OF THE IRRIGATION CONTROLLER MANUFACTURER, THE
R AND THE IRRIGATION CONTRACTOR AT THE SITE FOR INSTRUCTION ON THE PROPER PROGRAMMING AND
OLLER.

BOXES 12" FROM WALK, CURB, BUILDING OR LANDSCAPE FEATURE. AT MULTIPLE VALVE BOX GROUPS, INSTALL
THE WALK, CURB, BUILDING OR LANDSCAPE FEATURE AND PROVIDE 12" BETWEEN BOX TOPS. ALIGN THE SHORT SIDE
LEL TO WALK, CURB, BUILDING OR LANDSCAPE FEATURE.

UTLETS AND NOZZLES FOR OPTIMUM PERFORMANCE AND TO PREVENT OVER SPRAY ONTO WALKS, ROADWAYS, AND/OR BUILDINGS.
ND RADIUS TO FIT THE EXISTING SITE CONDITIONS AND THROTTLE THE FLOW CONTROL AT EACH VALVE TO OBTAIN THE OPTIMUM
TROL ZONE.

ULAR TO FINISH GRADE.

E OF PLANT OR TREE.

WINGS IS TYPICAL. AS CHANGES IN LAYOUT OCCUR DURING STAKING AND CONSTRUCTION THE SIZE MAY NEED TO BE ADJUSTED ACCORDINGLY.

L BE RESPONSIBLE FOR MINOR CHANGES IN THE IRRIGATION LAYOUT DUE TO OBSTRUCTIONS NOT SHOWN ON THE IRRIGATION DRAWINGS SUCH AS LIGHTS,
NCLOSURES, ETC.

4. Site Characteristics Report

Analysis of Infrastructure

Drainage

Nearly all the existing site run-off and small amount of off-site run-on currently collect in a natural depression within the project boundary, where it percolates into the soil. Site soils are of the Oceano Series. The USDA Soil Survey characterizes the Oceano Series as "excessively drained" soils of 2 to 15 percent slope with rapid permeability. Expected percolation rates for the area are between 6 and 20 inches per hour.

The FORA Base Reuse Plan, requires all new development to contain 100 percent of storm water runoff on site by retention and percolation. Therefore future offsite development will capture offsite flows that currently might overland onto the site.

A portion of the project site is identified as being within a 100-year floodplain by the Federal Emergency Management Agency (FEMA). The pre-project mapping was not accurate, and as part of Phase 1 the floodplain limits were updated and a Letter of Map Revision (LOMR) was issued by FEMA that revised the 100-year floodplain as that area below elevation 286 feet. Refer to **Figure 4-1**. The Phase 1 project avoided placement of fill in this area. Upon development of future phases that will be filling this area, additional excavation will be required to provide the required storage in a reduced footprint. Phase 1 created some of this storage by additional excavation in the retention area to better balance Phase 1 earthwork.

Prior to placing any fill in the defined FEMA floodplain, a Conditional Letter of Map Revision (CLOMR) will need to be submitted to FEMA showing the proposed improvements along with analysis showing the post project floodplain. Upon approval of the CLOMR and construction of the improvements, FEMA would then issue a LOMR that has the floodplain limits consistent with the master plan layout. Because a detailed analysis was completed with Phase 1, the future CLOMR/LOMR process is anticipated to be straightforward.

Drainage improvements within the Cemetery Parcel will use low impact design methods by conveying runoff in a combination of sheet flow, swales and conveyance piping.

The natural drainage patterns of the project site will be preserved to the maximum extent possible, in line with the stormwater management policies of FORA, the City of Seaside and Monterey County.

Due to the small expected increase in stormwater volumes due to development of the proposed Cemetery, and the large area available for storm water retention/percolation, there are no significant constraints posed by storm water management. Refer to **Figure 4-2: Master Plan Grading and Drainage Plan** for the proposed drain network and grading layout.

Water

In 1996, Marina Coast Water District (MCWD) was selected by FORA to take over operations of the water and wastewater systems at the former Ford Ord military base. In November of 2001, water and wastewater systems were conveyed through a Public Benefit Conveyance (PBC) to

MCWD. MCWD is now responsible for providing water and wastewater service throughout the former Fort Ord military base.

Long term water demand for the Cemetery is anticipated to be a maximum pf 5 acre-feet/year (afy). Of this, the combined potable water demand for the proposed Cemetery facilities (office and maintenance yard) is anticipated to be 0.8 afy. The irrigation demand for the plant establishment period (the first 2 to 3 years after construction) is estimated to be up to 4 afy, per phase of construction. Since this is only a temporary demand, this may only be a temporary allocation and not a long term allocation. Through the use of local, drought-tolerant species, a long term water demand of 1 to 2 afy for landscape and general Cemetery maintenance may be achieved after the initial plant establishment periods for each phase.

Existing Water Infrastructure

The project is located within the Marina Coast Water District (MCWD). MCWD Pressure Zones D and E are currently located to the north-west and south-west of the project, respectively. Both are fed from reservoirs abutting the south-west corner of the project. MCWD has stated that the Zone D system currently has the capacity to handle the development of the Cemetery. The majority of the subject development is within the Zone D service elevation range of 300 to 400 feet. The only conceptual element currently outside Zone D is the monument (flag pole) area at elevation 417 feet ±. If necessary, this area could be served off the Zone D system with the use of a booster pump to provide additional pressure.

Water System Improvements

An existing 24 inch Zone D water main crosses Normandy Road approximately 100 feet west of the intersection of Parker Flats Cutoff and Normandy Road and is approximately 150 feet west of the project boundary. This is the point of connection for the Cemetery. Fire hydrants spread throughout the site are assumed to be required, though given the lack of buildings and limited landscaping it is possible this requirement may be waived Refer to **Figure 4-3: Master Plan Water Plan** for the proposed water network layout.

Phase 1 extends domestic, irrigation, and fire sprinkler water to the building improvements.

Sanitary Sewer System

MCWD will provide sanitary sewer service to the site. An existing 12-inch sanitary sewer main is located in Normandy Road approximately 120-feet west of the intersection of Normandy Road and Parker Flats Cutoff (approximately 740 feet west of the CCCVC main entrance) and flows to the west. Due to the depth of the existing sewer and the elevation of the proposed improvements, gravity sewer to the system is not possible. Therefore, a sewer pump station will be installed as part of Phase 1 along with a 2 inch sewer force main that will discharge at the existing MCWD manhole. Additional 4 inch gravity sewer lines that lead to the pump station will provide service to the administration complex as well as the maintenance building. Refer to **Figure 4-4: Master Plan Sewer Plan** for the Phase 1 sewer network layout that will serve the entire project.

The only areas of the project generating sewage are at the administration complex and maintenance building.

Phase 1 builds out the project's sewer infrastructure.

Sanitary Sewer Treatment

Sewage will be treated at the Monterey Regional Water Pollution Control Agency Regional wastewater treatment plant.

Recycled Water

The City of Seaside requires that the project's irrigation systems be plumbed for reclaimed water (RW) in anticipation of the availability of recycled water for the Cemetery. This requirement is not likely to have a significant cost associated with it, since the on-site irrigation system is run separately from the potable water system. Recycled water signage will be installed when and if recycled water is available.

To date, MCWD has installed a trunk RW line in General Jim Moore Boulevard from Coe Avenue to Inter-Garrison Road, as well as several trunk lines within the CSUMB campus. The time frames for when the system will go on-line and when recycled water will become available are unknown. It is therefore assumed that potable water will be used for irrigation until such time as recycled water is available.

If a significant irrigation water demand is required in the future by the Cemetery, MCWD may require the developer to provide a connection to the existing recycled water main at General Jim Moore Boulevard at his own expense when recycled water is made available.

Because of the very limited supply of potable water, the possibility of using Basin A as a reclamation pond was considered. This concept was not deemed feasible, however, because the high permeability of the local soils, proposed land uses, and small catchment area result in a very high cost-benefit ratio.

Electrical and Gas

The proposed development is located within the jurisdiction of Pacific Gas and Electric (PG&E) for electric services.

Phase 1 constructs the entirety of the Cemetery's electric infrastructure.

Natural gas service is not being provided.

Table 4-1: Utility Infrastructure Summary

	Point of Connection	Off-Site Infrastructure	Proposed On-Site Infrastructure	Comments
Water	Normandy Road, 150 feet from the project boundary (MCWD Zone D)	190 linear feet of water main (Phase 1)	6,200 linear feet of water main, with a booster pump for Artillery Hill	
Reclaimed Water	General Jim Moore Boulevard	None	7,500 linear feet of reclaimed water main	Potable water will be used for irrigation until reclaimed water

				is available.
Sewer	Normandy Road, 200 feet from the project boundary	275 linear feet of 2-inch sewer force main (Phase 1)	640 linear feet of 2-inch sewer force main, 210 linear feet of 4 inch gravity sewer	Complete with Phase 1
Gas	Intersection of Normandy Road & Park Flats Cutoff	None	None	
Electric and Telephone	Normandy Road, 150 feet from the project boundary	150 linear feet of joint trench (gas, electric and telephone) (Phase 1)	800 linear feet of joint trench (Phase 1)	Complete with Phase 1
Cable	General Jim Moore Boulevard	None	None	
Storm Drain	None	None	LID design including bio-swales, culverts and a central retention/percolation facility	On-site storm water must be retained and infiltrated on-site

Offsite Utility Improvements

All utility points of connection are located on Normandy Road near the project entrance. Water, sewer, electric, and telephone are all located within 150 feet of the project boundary and being connected to in Phase 1. The nearest recycled water point of connection is at General Jim Moore Boulevard. It is assumed that the 3,500 linear feet of new reclaimed water main required to connect the project site to the main in General Jim Moore Boulevard will not be constructed by the Cemetery because of its low anticipated irrigation water demand.

Burial Options

The Cemetery has a combination of burial facilities to meet the desires of all Veterans. The proposed 106,476 burials will be accommodated by approximately 76 percent columbarium for cremains and 24 percent in-ground casket burials.

For cremated remains, burial will be in niches in freestanding double columbarium walls. Walls are arranged in courts of three to six walls for a total of 960 to 2160 niches in a single court. Many of the courts are woven into the existing oak forest-which frames the courts and gives a serene setting. The courts will be constructed in phases with clusters of 5,000 to 9,800. The architectural style of the walls is in the mission vernacular of the area, which matches the architectural style of the Cemetery buildings as well. The end columns are stucco with column numbers on granite plaques shaped with the curves of the mission architecture. Cast stone caps extend over the columns and protect the granite niche covers.

Of the 25,436 full casket burials planned for the Cemetery, 95 percent will be 3 feet x 8 feet plots, with the remaining 5 percent as over-sized 5 feet x 10 feet plots. Full casket burials will utilize pre-placed double depth vaults. The burial areas are divided into 23 burial sections ranging in size from 576 to 1991 plots. The sections are separated by vegetated edges and

slopes. Due to the limited amount of water available for the Cemetery, the cover for the burial sections will be decomposed granite (a local crushed rock) rather than turf. The sections will be benched into the existing slopes to flatten areas to no more than 2 percent to accommodate the decomposed granite. The intent is to restore in these boundary areas the oak woodland removed by grading. Edges along the street would be planted with a colorful significant vegetated edge.

In addition to burial sites, the plan incorporates a memorial wall for those who do not desire burial on site but want to be memorialized as a veteran. The wall consists of 40 plaques in five rows mounted on a stucco wall with a cast stone cap flanked by stucco columns. Wall sections will be added as demand increases.

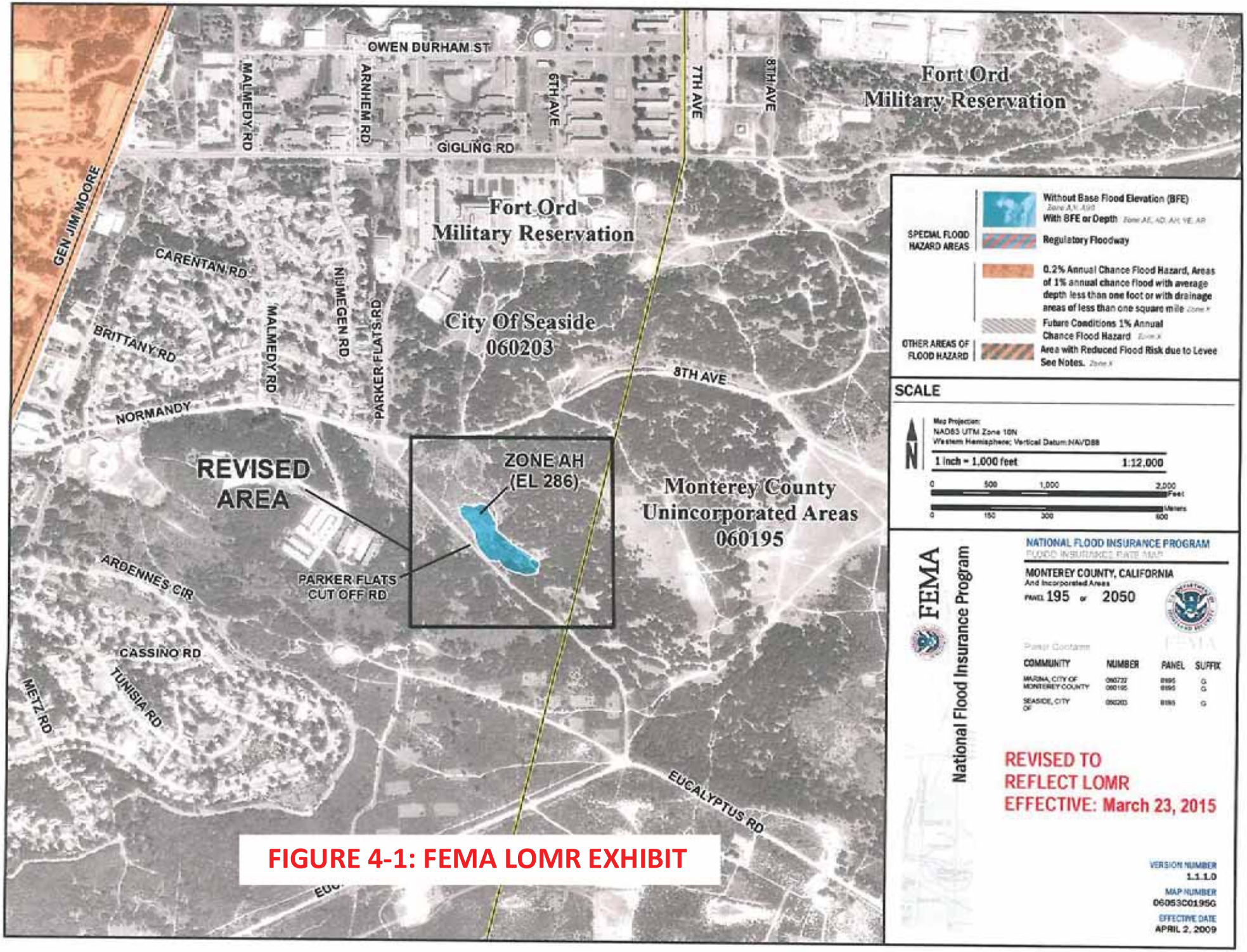
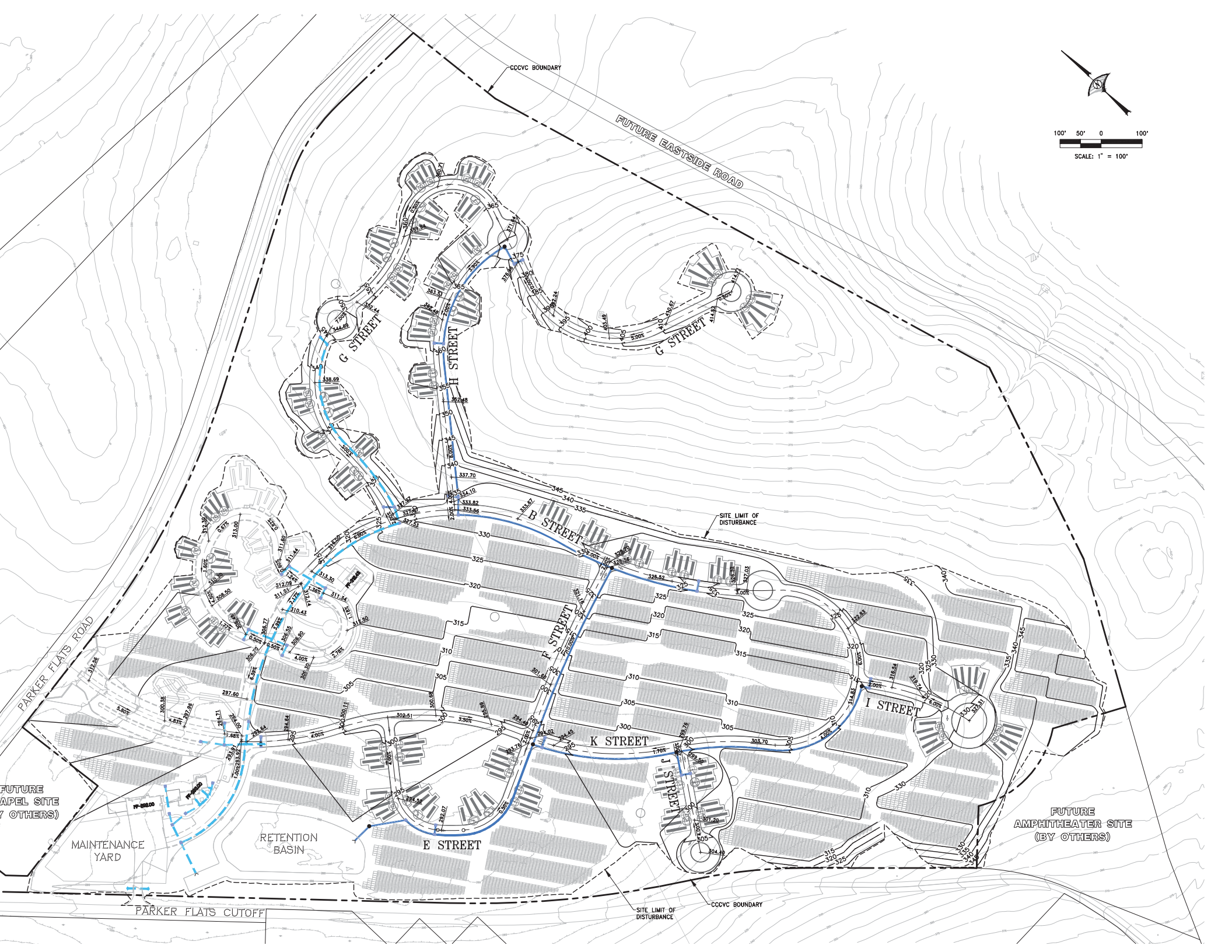
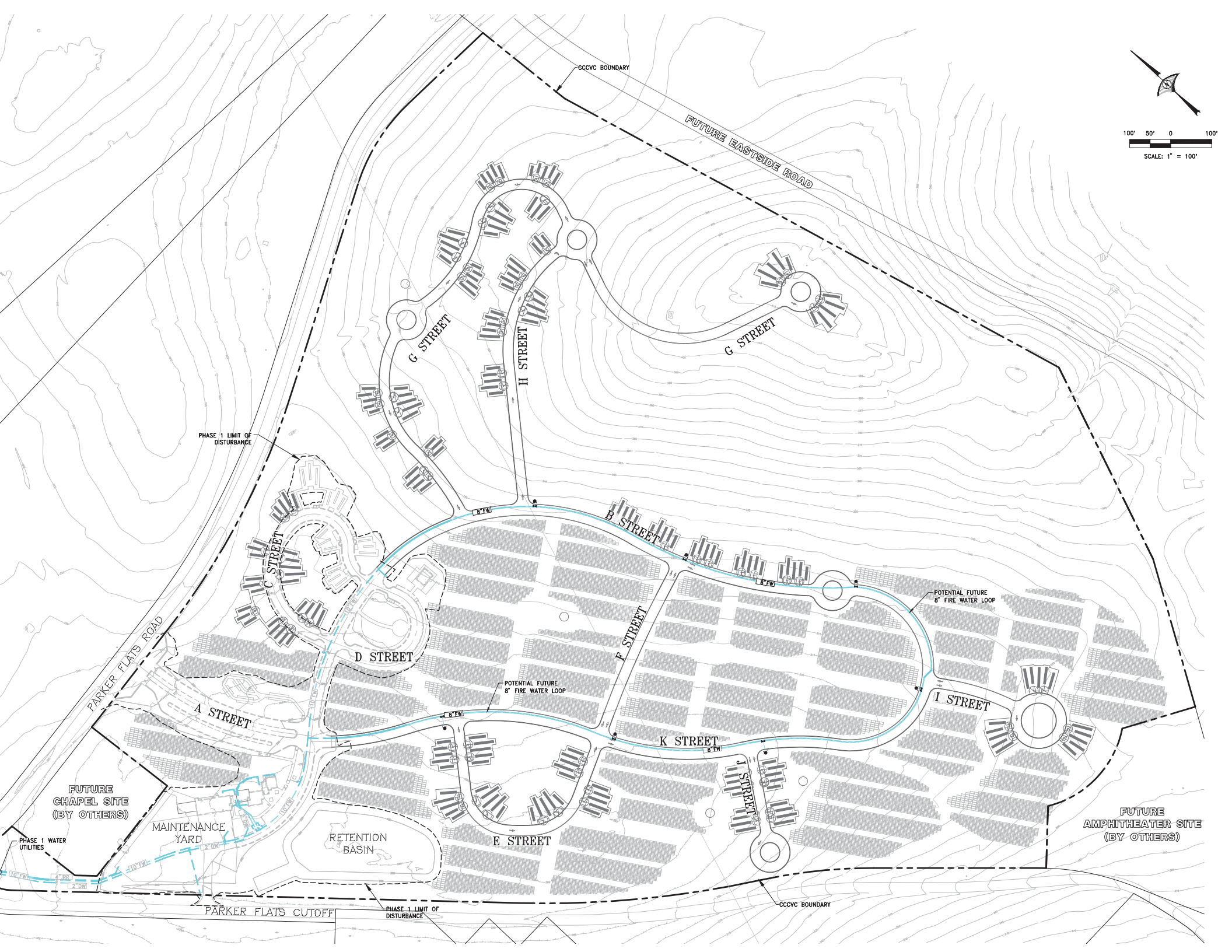


FIGURE 4-1: FEMA LOMR EXHIBIT


CCCVC BOUNDARY
FUTURE EASTSIDE ROAD
100' 50' 0 100'
SCALE: 1" = 100'
G STREET
H STREET
G STREET
B STREET
SITE LIMIT OF DISTURBANCE
F STREET
I STREET
K STREET
J STREET
E STREET
PARKER FLATS ROAD
MAINTENANCE YARD
RETENTION BASIN
FUTURE AMPHITHEATER SITE (BY OTHERS)
PARKER FLATS CUTOFF
SITE LIMIT OF DISTURBANCE
CCCVC BOUNDARY


CCCVC BOUNDARY
FUTURE EASTSIDE ROAD
100' 50' 0 100'
SCALE: 1" = 100'
G STREET
H STREET
G STREET
PHASE 1 LIMIT OF DISTURBANCE
C STREET
B STREET
8"FW
8"FW
POTENTIAL FUTURE 8" FIRE WATER LOOP
PARKER FLATS ROAD
D STREET
F STREET
A STREET
POTENTIAL FUTURE 8" FIRE WATER LOOP
8"FW
I STREET
K STREET
8"FW
J STREET
FUTURE CHAPEL SITE (BY OTHERS)
MAINTENANCE YARD
RETENTION BASIN
E STREET
FUTURE AMPHITHEATER SITE (BY OTHERS)
PHASE 1 WATER UTILITIES
10"FW
4"IRR
2"DW
10"FW
2"DW
PARKER FLATS CUTOFF
PHASE 1 LIMIT OF DISTURBANCE
CCCVC BOUNDARY


CCCVC BOUNDARY
FUTURE EASTSIDE ROAD
100' 50' 0
SCALE: 1" = 100'
G STREET
H STREET
G STREET
PHASE 1 LIMIT OF DISTURBANCE
B STREET
C STREET
D STREET
F STREET
I STREET
K STREET
J STREET
E STREET
A STREET
PARKER FLATS ROAD
FUTURE CHAPEL SITE (BY OTHERS)
4"S
4"S
4"S
4"S
2"FM
2"FM
2"FM
MAINTENANCE YARD
RETENTION BASIN
PARKER FLATS CUTOFF
PHASE 1 LIMIT OF DISTURBANCE
CCCVC BOUNDARY
FUTURE AMPHITHEATER SITE (BY OTHERS)

5. Geotechnical Soil Survey for Burials

A geotechnical investigation and percolation report was prepared and submitted by Kleinfelder on October 7, 2010 for the CCCVC site followed by a subsequent report dated July 17, 2014, that undertook borings in the vicinity of the building sites. The second report was completed to provide additional subsurface information in the Phase 1 area of construction. The primary geotechnical concerns presented in the reports include excavation and fill stability of the on-site sandy soils and the presence of near-surface loose soil. The following sections provide a summary of the reports prepared by Kleinfelder. Refer to **Appendix B and Appendix C** for the complete geotechnical reports.

Subsurface Investigation

As part of the report completed in 2010, the subsurface exploration program included drilling a total of 21 exploratory borings and 12 percolation test holes on July 26, through July 28, 2010, using a truck mounted B-53 drill rig. The borings were drilled in undeveloped areas of the open lots along the project site. Borings were drilled adjacent to paved roadways and unpaved trails. See **Figure 5-1** and **Figure 5-2** for maps taken from the geotechnical report showing the location of the exploratory borings and the percolation tests. Soils encountered across the CCCVC project site consisted of various shades of brown to gray, moist, non-plastic, poorly graded sand with silt, sand with silt, silty sand, and sandy silt to the maximum depth of exploration of about 50 feet below existing grade.

The report prepared in 2014 included drilling a total of three exploratory borings using a track mounted Simco 2400 drill. The borings were drilled to a depth of about 31 ½ feet below the existing ground surface. The borings were drilled in undeveloped areas of the open lot. See **Figure 5-3** for a map taken from the geotechnical report showing the location of the exploratory borings. Soils encountered across the CCCVC project site consisted of various shades of brown, moist, non-plastic, poorly graded sand with silt sand and silty sand to the maximum depth of exploration of about 31 ½ feet below existing grade.

Groundwater was not encountered in any of the borings drilled for either investigation to the maximum depth of exploration specified in both reports, respectively. It must be noted that seasonal fluctuations in the groundwater level may occur due to variations in rainfall, temperature, groundwater withdrawal, and possibly other factors that were not evident at the time of our investigation.

Percolation Testing

Percolation testing was performed on August 13, 24, and 25, 2010. A ten minute test interval was used. The adjusted percolation test rates ranged from about 33 inches per hour to 0.7 inches per hour across the Cemetery site and three roadway corridors. On the Cemetery site itself, the adjusted percolation test rates ranged from about 13.6 inches per hour to 7.5 inches per hour. **Table 5-1** below provides a summary of the percolation test results.

Table 5-1: Percolation Test Summary

Percolation Test Summary
California Central Coast Veterans Cemetery

Hole No.	Section	Location Latitude (Degrees North)	Location Longitude (Degrees West)	Soil Type	Hole Depth (feet)	Hole Dia. (inches)	Perc. Rate min/inch	Adjusted Perc. Rate min/inch	Adjusted Perc. Rate inch/hour
P-1	Parker Flats Cutoff & State Cemetery	36.635754	121.796814	(SM-ML)	1.0	12	4.4	4.4	13.6
P-2	Parker Flats Cutoff & State Cemetery	36.634605	121.795161	(SM-ML)	1.0	12	8.0	8.0	7.5
P-3	Eastside Road	36.632695	121.789212	(SM-ML)	5.0	8	20.0	45.3	1.3
P-4	Parker Flats Road	36.638698	121.791987	(SM)	5.0	8	4.4	10.0	6.0
P-5	Parker Flats Road & Eastside Road	36.639078	121.790234	(SM)	4.1	8	1.5	3.4	17.7
P-6	Eastside Road	36.645109	121.781575	(SM-ML)	5.0	8	40.0	90.6	0.7
P-7	Eastside Road	36.643813	121.783266	(SM)	1.2	8	8.0	18.1	3.3
P-8	Eastside Road	36.647597	121.777209	(SM)	5.0	4	7.3	14.2	4.2
P-9	Eastside Road	36.648571	121.767961	(SP-SM)	5.0	8	5.7	12.9	4.6
P-10	Eastside Road	36.655375	121.757958	(SM)	4.0	8	4.0	9.1	6.6
P-11	Eastside Road	36.655477	121.752598	(SM)	4.7	8	0.8	1.8	33.1
P-12	Eastside Road	36.655476	121.747415	(SM)	2.8	8	4.0	9.1	6.6

Notes: (SM) = Silty Sand
(SM-ML) = Sand with Silt
(SP-SM) = Poorly Graded Sand with Silt

Discussion and Conclusion

Based on the results of the field exploration and laboratory testing, the near surface soils in portions of the Cemetery were loose in their condition at the time and could compress under the new building loads. These near surface soils should be excavated and recompacted as engineered fill to be suitable for support of structures sensitive to settlement, such as buildings. In addition, the on-site sandy soils consisted of sands with little or no cohesion which are prone to sudden collapse in vertical cut areas. This could present excavation difficulties for in-ground burial areas. Excavations extending into the on-site granular soils will require substantial shoring to protect personnel and to provide temporary stability. Recommendations for excavations, subgrade preparation and engineered fill construction are presented in the complete geotechnical reports.

UXO

The cleanup of UXO has been an integral part of the process of title transfer of Fort Ord lands from the Army to public and private property owners. The entire 78.7-acre Cemetery site has already been cleaned to “development” standard which is suitable for cemetery construction. The organizations tasked with implementation of the cleanup were the FORA, a federally appointed entity accountable to the regulatory agencies, U.S. EPA Region 9’s Superfund FFCB and the California- EPA DTSC. FORA, FFCB, and DTSC comprise the Fort Ord BRAC Cleanup Team.

Monitoring during grading operations by UXO trained technicians is a requirement of development.

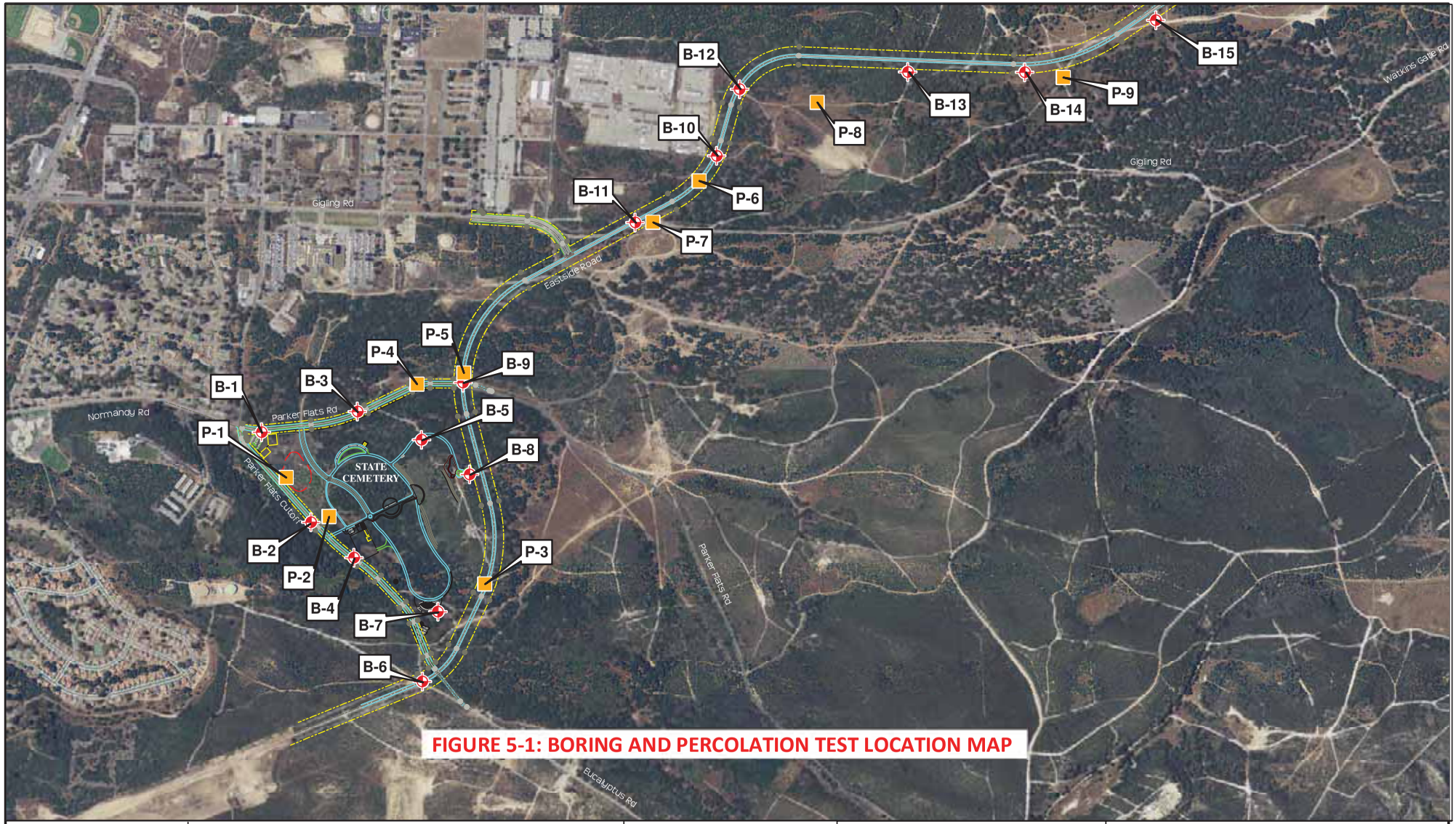


FIGURE 5-1: BORING AND PERCOLATION TEST LOCATION MAP

0 500 1,000 Feet

Locations are Approximate

NAD 1983 StatePlane California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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KLEINFELDER
40 Clark Street, Unit J
Salinas, California, 93901
Ph: (831) 755-7900 Fax: (831) 755-7909

Drawn By: KFH | Checked By: RH | Date: 09/27/10

SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2a**

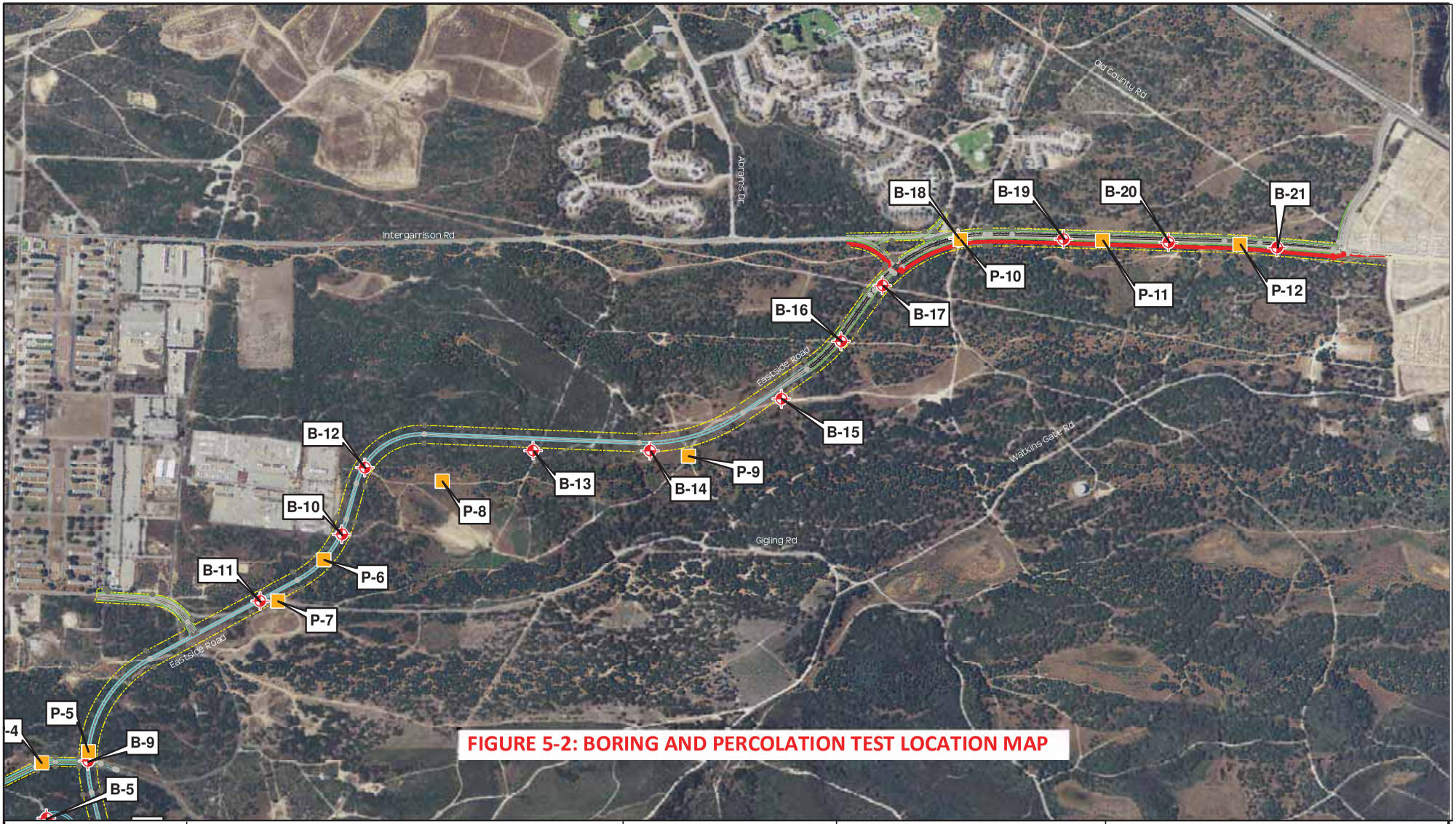


FIGURE 5-2: BORING AND PERCOLATION TEST LOCATION MAP

0 500 1,000 Feet

Locations are Approximate

NAD 1983 StatePlane California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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Drawn By: KFH | Checked By: RH | Date: 09/27/10

SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2b**

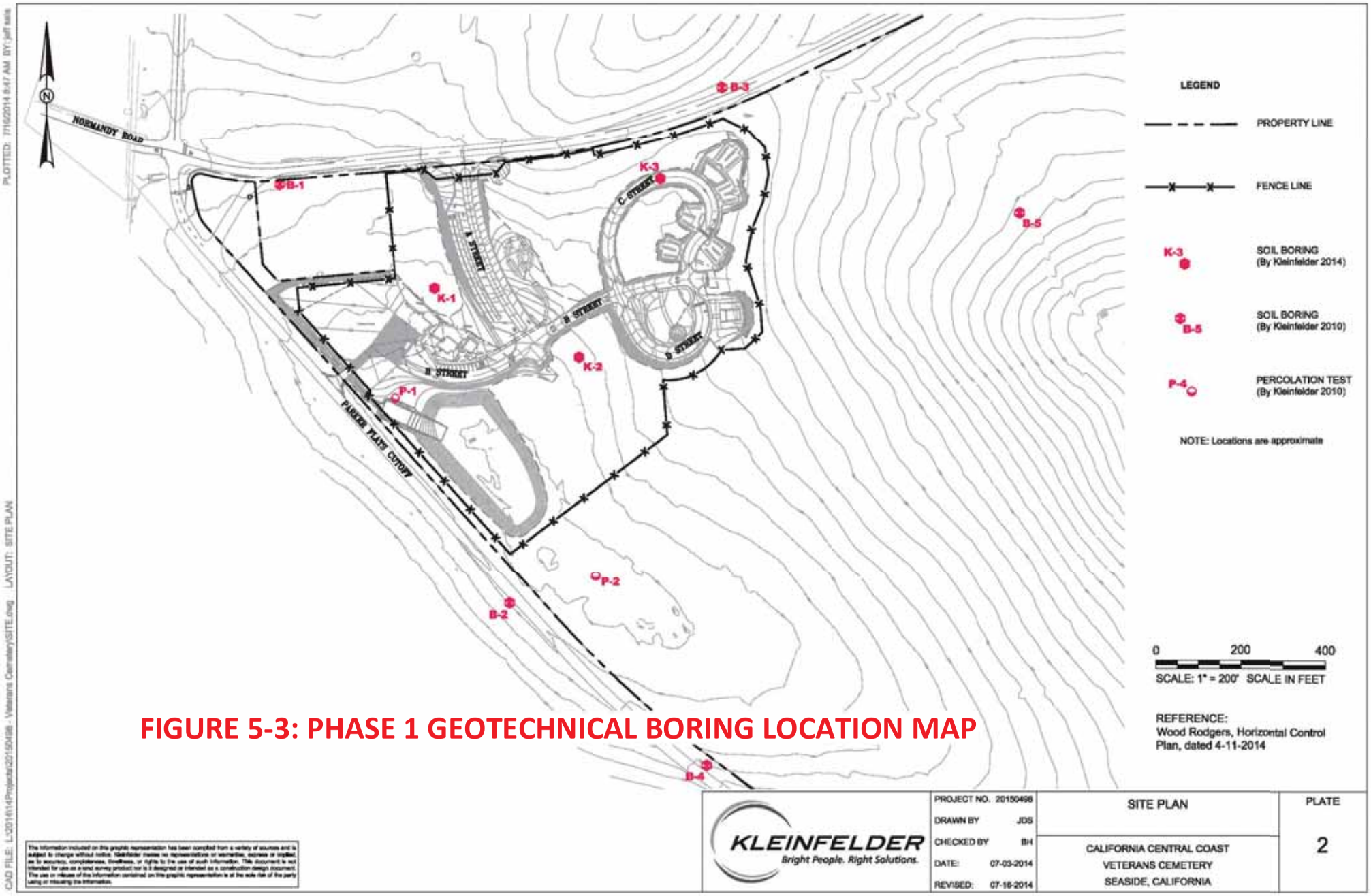


FIGURE 5-3: PHASE 1 GEOTECHNICAL BORING LOCATION MAP

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.	20150498
DRAWN BY	JDS
CHECKED BY	BH
DATE:	07-03-2014
REVISED:	07-16-2014

SITE PLAN

CALIFORNIA CENTRAL COAST
VETERANS CEMETERY
SEASIDE, CALIFORNIA

PLATE 2

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PLOTTED: 7/16/2014 8:47 AM BY: jeff sala
CAD FILE: L:\2014\14Projects\20150498 - Veterans Cemetery\SITE.dwg LAYOUT: SITE PLAN

6. Roadway System

Phase 1 Improvements

Roadway improvements include a main entry roadway, an access road, a primary road forming a loop and multiple secondary roadways. The main entry street from Parker Flats Road, A Street, is being constructed as a one lane each direction roadway with a center median. The west side of A Street includes a two lane cortege assembly which can accommodate up to 30 vehicles. B Street is the access road which leads to columbaria, the committal service shelter and the flag/assembly areas and will eventually, at full build-out, serve as part of the main road that loops through the Cemetery. Street C is a one-way loop off the main loop that will serve the columbarium area.

D Street is the road which serves the committal service shelter and flag/assembly areas. It is a 30-foot wide one-lane (one way) roadway with parking allowed on both sides.

The visitor/employee parking area for the administration and maintenance buildings includes 10 standard parking spaces and 1 accessible parking space and provides access to the maintenance yard.

The maintenance yard has a non-public secondary access via Parker Flats Cutoff, which will normally be utilized for large delivery vehicles only. The secondary access also serves as an Emergency Vehicle Access for the site.

Sidewalks are provided between the visitor/employee parking and cortege assembly areas and the administration and maintenance buildings. Sidewalks are also provided along ‘B’ Street to connect the administration building to the memorial walk, flag/assembly area, and committal shelter area.

Phase 2-11 Onsite Improvements

B Street/ K Street forms a loop that runs the length of the Cemetery. Streets J, I and G are cul-de-sacs off the main loop that provide access to additional columbaria in future phases and also the Flag Plaza in the case of G Street. E Street forms a one-way loop off the main loop that will serve a columbarium area. Streets F and H provide alternative routes of travel along the main loop and to the Flag Plaza, respectively.

The future roadways are shown as 24-ft wide (face of curb to face of curb) which is the NCA standard. In some cases the Phase 1 roadways were wider based on discussions with the City of Seaside Fire Department and the CA DSA, the agencies having jurisdiction for fire access and access compliance, respectively. The fire department wanted wider access to structures, as these were all constructed with Phase 1, there are not expected to be concerns with the future road widths with regard to fire access. DSA requested wider widths for some roadways, which the project design accommodated due to having available space. The widths provided were not driven by code requirements.

Parking and Circulation at Columbaria/Burial Sites

Accessible parking was provided at the Phase 1 columbaria clusters, with accessible sidewalk connecting the units. The Master Plan does go into the detail of showing these facilities at the

future columbarium clusters, but they are anticipated to be provided. In areas where steep slopes occur, such as H Street, waivers may be requested to the accessible parking requirement.

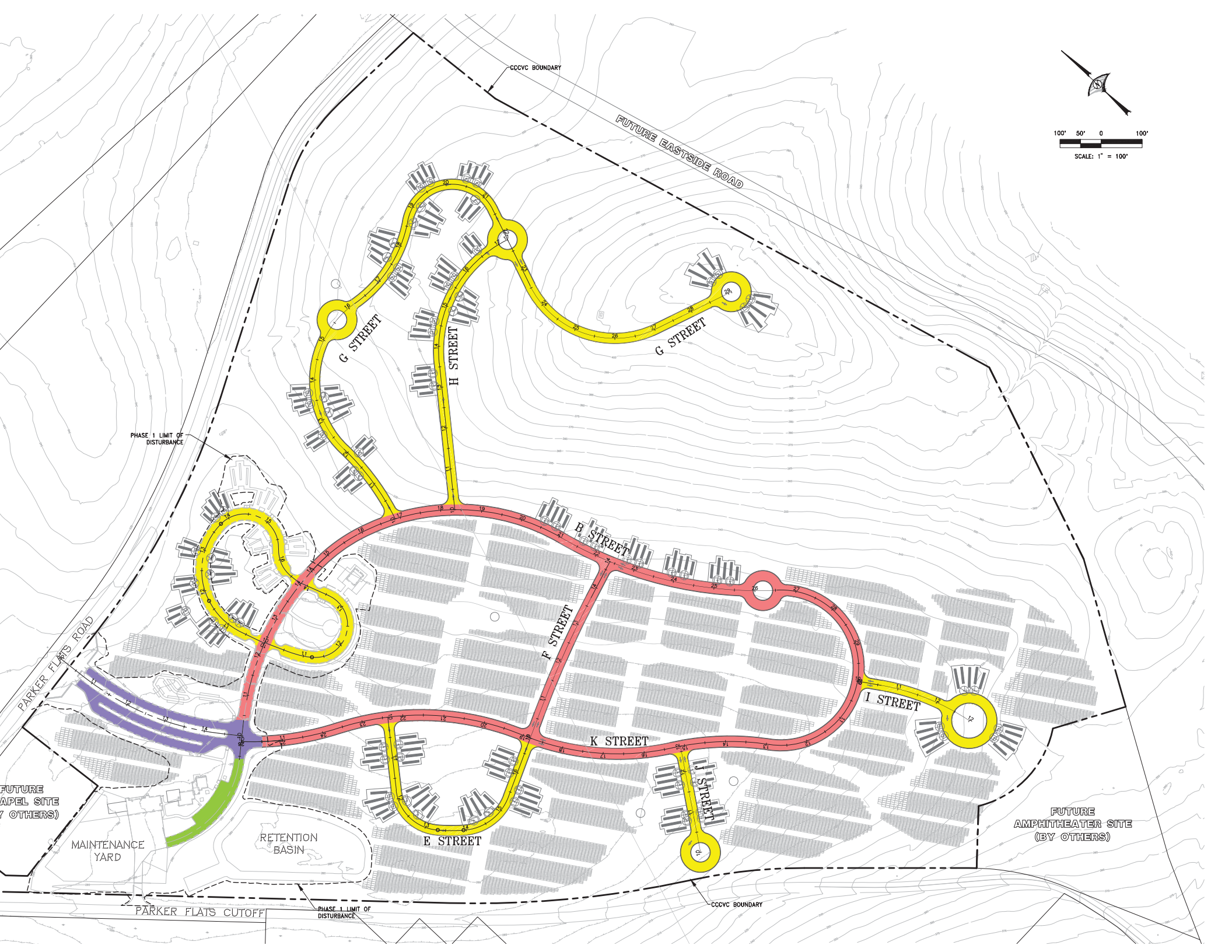
The burial sites do not have accessible access directly from adjacent roadway parking. Visitors needing assistance can request this at the administration building and will then be escorted to the specific burial location.

Offsite Improvements

As part of Phase 1, Parker Flats Road was widened from Parker Flats Cutoff to the Cemetery entrance. Curb and gutter was installed, and provisions were made for possible future sidewalk installation. It is unknown at this time whether the Cemetery will be responsible for any additional future frontage improvements along Parker Flats Road. This document assumes that the Cemetery has no future responsibility for offsite roadway improvements to Parker Flats Road.

Parker Flats Cutoff is a rural two-lane road with no shoulders. This document assumes that the Cemetery has no future responsibility for offsite roadway improvements to Parker Flats Cutoff.

A new county road, Eastside Parkway, is planned for construction along the eastern project boundary. It is intended to serve as an alternate route between Salinas and Seaside. Artillery Hill will serve as a visual and sound buffer for traffic on this future parkway. The preliminary design alignment of Eastside Parkway does not appear to impact this project.


CCCVC BOUNDARY
FUTURE EASTSIDE ROAD
100' 50' 0 100'
SCALE: 1" = 100'
G STREET
H STREET
G STREET
PHASE 1 LIMIT OF DISTURBANCE
B STREET
F STREET
I STREET
K STREET
J STREET
E STREET
PARKER FLATS ROAD
FUTURE CHAPEL SITE (BY OTHERS)
MAINTENANCE YARD
RETENTION BASIN
FUTURE AMPHITHEATER SITE (BY OTHERS)
PARKER FLATS CUTOFF
PHASE 1 LIMIT OF DISTURBANCE
CCCVC BOUNDARY

7. Grading and Drainage Plan

Grading and soil movement cannot occur without a Soils Management Plan due to a deed restriction for all Fort Ord remediated parcels, and ordinances by the City of Seaside and Monterey County on digging and excavating on the former Fort Ord. In 2007 the VA Cemetery Site was remediated by being cleared of unexploded ordinance to a non-residential Development Standard; however a deed restriction on the land requires adherence to these ordinances. These codes require a plan to ensure that any soil from the site is stored on site or in an acceptable location. In addition, munitions monitoring must be performed during site excavation. This plan will be prepared during the construction document phase for each phase of work.

A unique challenge for Cemetery development is that it requires a substantial amount of earthwork and excavation to accommodate the burial sites and, in particular, the burial crypts which create a void of 5.3 cubic yards each. The crypt construction will require raising the site in many areas to accommodate this excess fill. In addition, it is necessary that all potential areas that would receive any type of burial be excavated and the soil cleaned, in order to avoid the cost and delay of having unexploded ordinance technicians on site during excavation of each burial. Ideally, earthwork would be balanced by phase, though this is not readily achievable. Therefore, moving of materials in following phases (either export or import) would be used to minimize earthwork costs.

Refer to **Figure 7-1** for the CCCVC Overall Cut/Fill Exhibit.

OVERALL CUT/FILL EXHIBIT FOR

CENTRAL COAST VETERANS CEMETERY

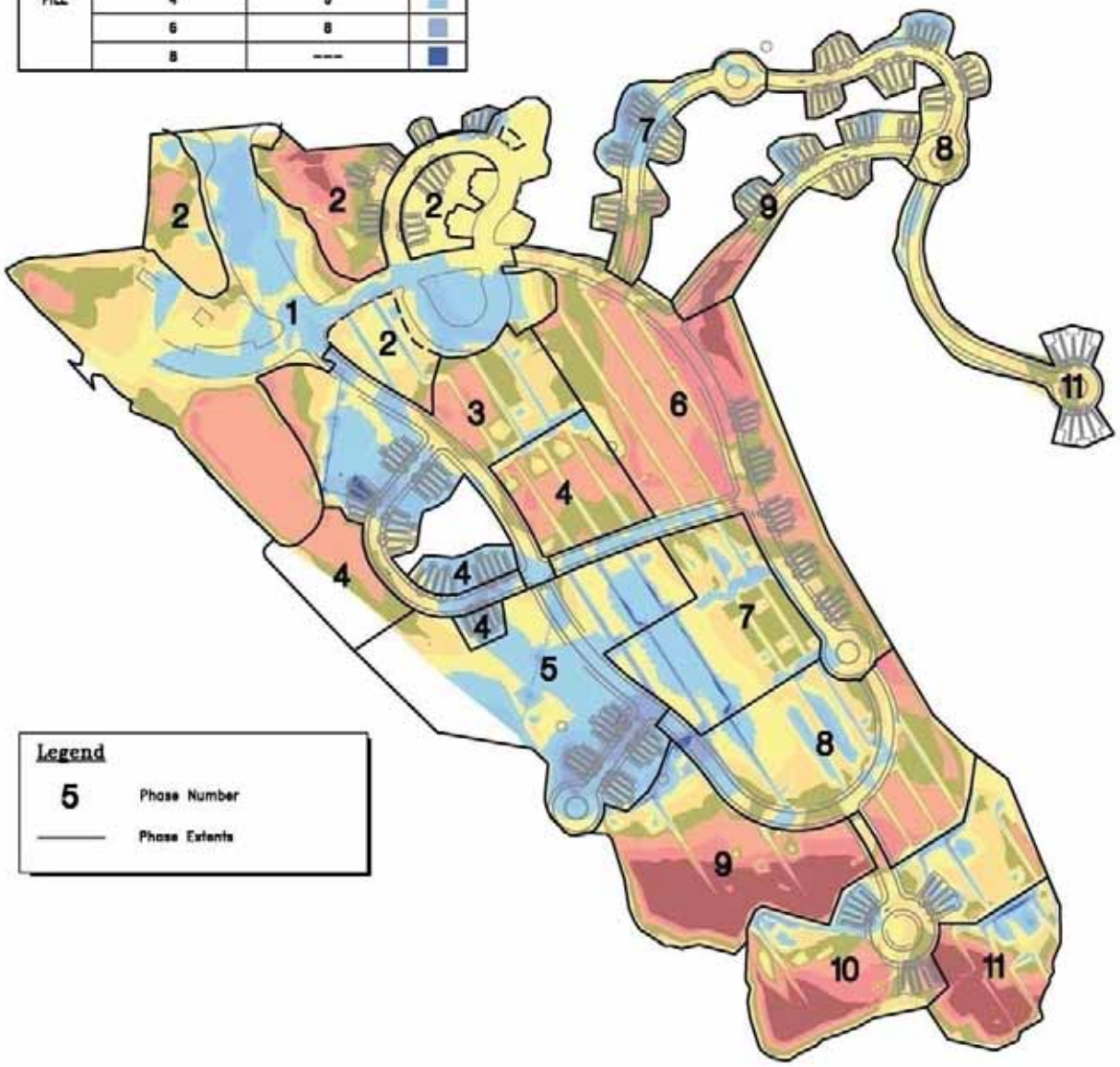
SEASIDE CALIFORNIA

MAY, 2015

Elevations Table			
Cut/Fill	Minimum Elevation	Maximum Elevation	Color
CUT	---	-8	
	-8	-6	
	-6	-4	
	-4	-2	
	-2	0	
FILL	0	2	
	2	4	
	4	6	
	6	8	
	8	---	

240' 120' 0 240'

SCALE: 1" = 240'



Legend

5 Phase Number

Phase Extents

FIGURE 7-1: CCCVC OVERALL CUT/FILL EXHIBIT

WOOD RODGERS

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

3301 C St, Bldg. 100-B Tel 916.341.7760

Sacramento, CA 95816 Fax 916.341.7767

8. Phasing Plan

The layout and design of the burial areas have been arranged and sized for flexibility in phased expansion segments. The Cemetery has a combination of burial facilities - crypts for caskets, oversize plots and columbaria - to meet the needs of all veterans. The phased build out is based on existing site conditions and topography, utilities, construction cost, plot burial size, layout, overall site organization and layout. A total of 11 phases complete the full Cemetery build out. The final burial count exceeds the recommended 100 year count by approximately 36,000 set forth by the VA.

Phase 1 involves the most upfront improvements that establish a foundation and structure for future Cemetery phases. Phase 1 is in concurrence with the limits of the State Cemetery Grant program. Phase 1 construction includes 5,000 columbarium, Cemetery roads including the entry and avenue of the flags, signage, the retention basin, maintenance yard and structures, administration and public information building, committal shelter, assembly plaza and memorial wall. **Table 8-1 and Table 8-2** below enumerate the number of crypts, oversized graves and columbaria to be constructed with each section. Subsequent phases provide for additional burial capacity (both columbaria and crypts), with the final phase, Phase 11, completing the Flag Plaza on top of Artillery Hill. Refer to **Figure 8-1: Master Plan Phasing Plan** for a detailed phasing layout with corresponding burial improvements.

~~**Table 8-1: Summary of Casket Burials**~~

Table 8-1 Amended.
Please refer to "Amended Table 8-1: Summary of Casket Burials" at the beginning of the Master Plan.

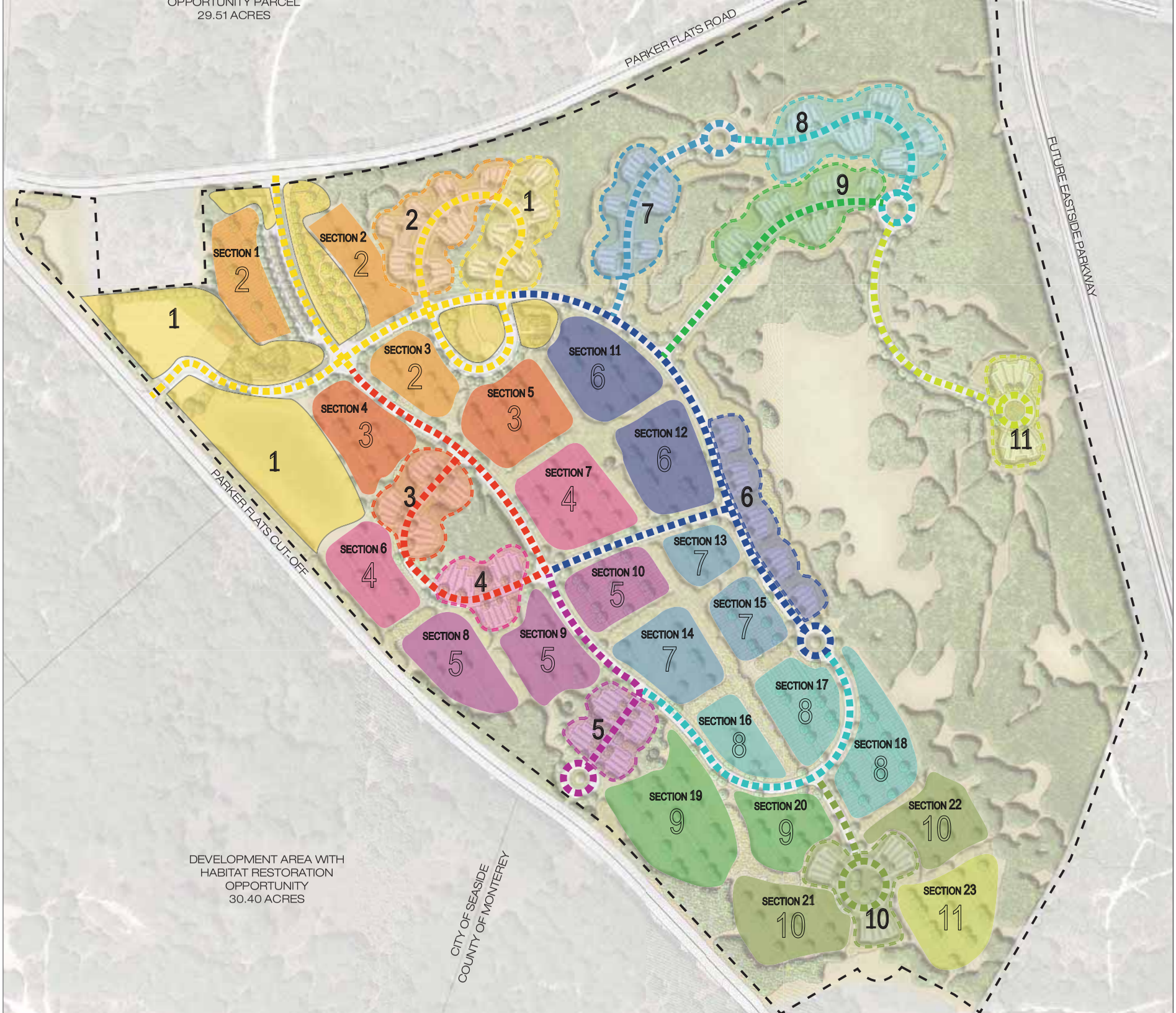
SECTION NUMBER	NUMBER OF CRYPTS	NUMBER OF OVERSIZED GRAVES	TOTAL PER SECTION	PHASE	PHASE TOTAL
1	**885**	**31**	**916**	**2**	
2	**855**	**31**	**886**	**2**	
3	**837**	**43**	**880**	2	2682
4	**1082**	**27**	**1109**	**3**	
5	**1329**	**74**	**1403**	3	2512
6	**1046**	**29**	**1075**	**4**	
7	**1301**	**71**	**1372**	4	2447
8	**1164**	**31**	**1196**	**5**	
9	**1117**	**29**	**1146**	**5**	
10	**862**	**79**	**941**	5	3283
11	**1188**	**70**	**1258**	**6**	
12	**1270**	**50**	**1320**	6	2578
13	**545**	**31**	**576**	**7**	7

Table 8-1 Amended.
Please refer to "Amended Table 8-1: Summary of Casket Burials" at the beginning of the Master Plan.

SECTION NUMBER	NUMBER OF CRYPTS	NUMBER OF OVERSIZED GRAVES	TOTAL PER SECTION	PHASE	PHASE TOTAL
14	**1034**	**49**	**1083**	**7**	
15	**723**	**24**	**747**	7	2406
16	**641**	**50**	**691**	**8**	
17	**1094**	**42**	**1136**	**8**	
18	**1282**	**38**	**1320**	8	3147
19	**1906**	**85**	**1991**	**9**	
20	**827**	**38**	**865**	9	2856
21	**1265**	**57**	**1322**	**10**	
22	**891**	**30**	**921**	10	2243
23	**1230**	**52**	**1282**	11	1282
TOTAL	24457	1061	25436		25436

Table 8-2: Summary of Columbaria

COLUMBARIA NUMBER	NUMBER OF NICHES	PHASE NUMBER
1	**5000**	**1**
2	**9800**	**2**
3	**8000**	**3**
4	**6400**	**4**
5	**7440**	**5**
6	**8800**	**6**
7	**6800**	**7**
8	**9760**	**8**
9	**8240**	**9**
10	**6480**	**10**
11	**4320**	**11**
TOTAL	81040	



BARIA: 9,800
: 2,682 (105 OVERSIZE)
RES

BARIA: 8,000
: 2,512 (101 OVERSIZE)
RES

BARIA: 6,400
: 2,447 (100 OVERSIZE)
RES

BARIA: 7,440
: 3,283 (140 OVERSIZE)
RES

BARIA: 8,800
: 2,578 (120 OVERSIZE)
RES

BARIA: 6,800
: 2,406 (104 OVERSIZE)
RES

BARIA: 9,760
: 3,147 (130 OVERSIZE)
RES

BARIA: 8,240
: 2,856 (123 OVERSIZE)
RES

BARIA: 6,480
: 2,243 (87 OVERSIZE)
RES

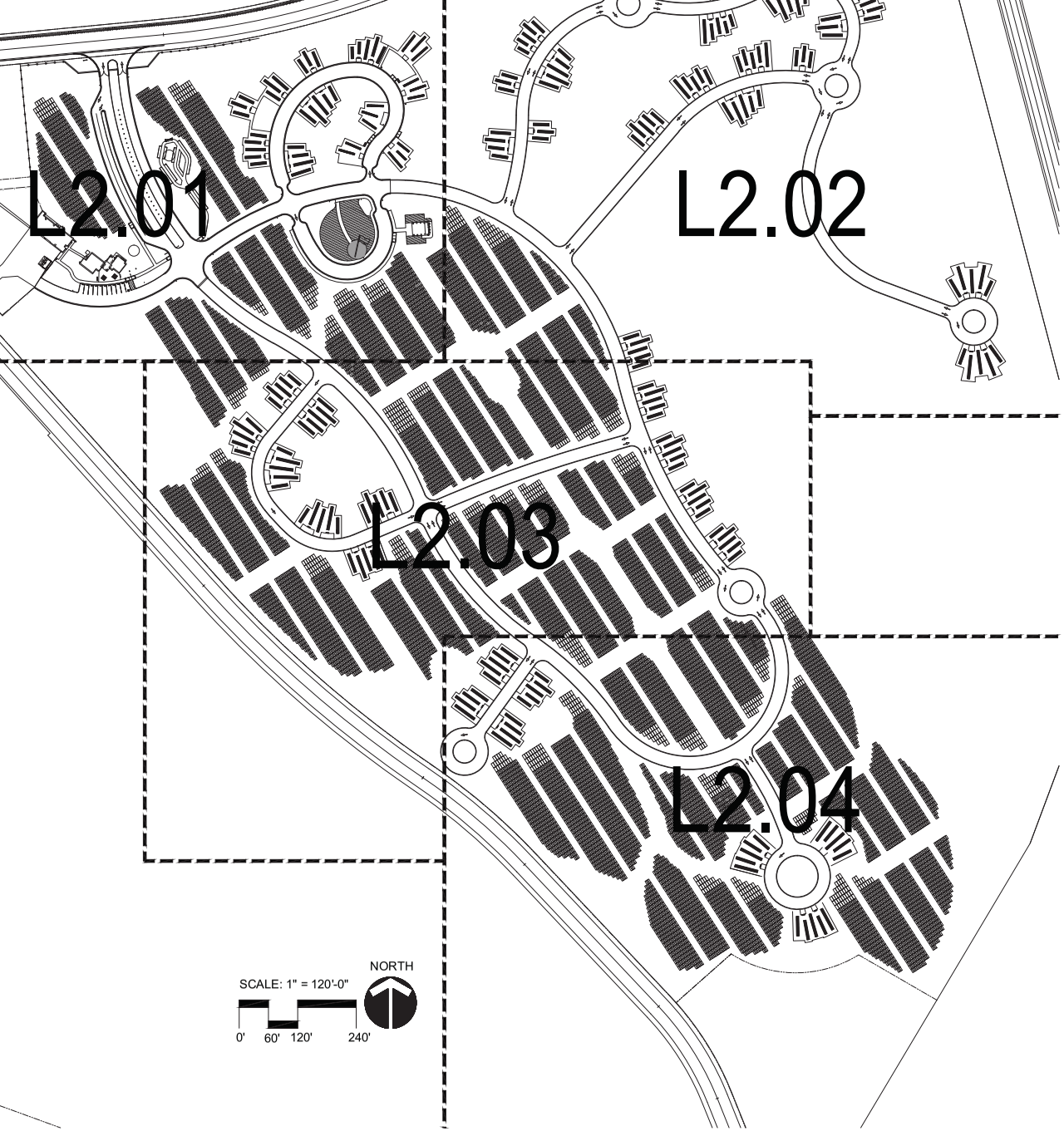
BARIA: 4,320
1,282 (52 OVERSIZE)
RES

MBARIA
ET BURIALS
OARD CRYPTS
SIZE PLOTS
BURIALS

9. Signage System

The signage system provides visitors with information, direction and regulations for the Cemetery. Signs have been located to direct the visitor and where best observable. Directional signs are provided at key intersections. Section markers are provided at each corner of the burial sections that can be approached by a visitor.

The proposed system incorporates the VA standard of precast post with baked enamel signs attached. Signs are of - white lettering with dark brown backgrounds. Phase 1 construction will establish the standards to be followed. Refer to **Figures 9-1 through 9-5** for a complete layout of the proposed signage system.



B2	← COMMITTAL SERVICE SHELTER ← ASSEMBLY AREA ← MEMORIAL WALL ← MEMORIAL WALK			
B3	ALL FUNERALS WAIT HERE →			
B4	← MEMORIAL WALL ← MEMORIAL WALK			
B5	COMMITTAL SERVICE SHELTER →			
B6	ASSEMBLY AREA →			
B7	← COLUMBARIA 1 AND 2			
B8	CEMETERY MAP			INSTALL SIGN PARALLEL TO C
B9	COLUMBARIUM 1 WALLS A B C			INSTALL SIGN PARALLEL TO C
B10	COLUMBARIUM 1 WALLS D E F			INSTALL SIGN PARALLEL TO C
B11	COLUMBARIUM 1 WALLS G H I			INSTALL SIGN PARALLEL TO C
B12	COLUMBARIUM 1 WALLS J K L			INSTALL SIGN PARALLEL TO C
B13	COLUMBARIUM 1 WALLS M N O			INSTALL SIGN PARALLEL TO C
B14	← CEMETERY MAIN ENTRANCE			EXACT LOCATION BY STATE
B15	← COLUMBARIA 9 AND 11			
B16	← COLUMBARIA 7 AND 8			
B17	→ COLUMBARIUM 11			
B18	→ COLUMBARIA 3 AND 4			
B19	→ COLUMBARIUM 5			
B20	→ COLUMBARIUM 10			
B21	← COLUMBARIA 7 AND 8 → COLUMBARIUM 11			
B22	CRYPT FIELD 1			
B23	CRYPT FIELD 2			
B24	CRYPT FIELD 3			
B25	CRYPT FIELD 4			
B26	CRYPT FIELD 5			
B27	CRYPT FIELD 6			
B28	CRYPT FIELD 7			
B29	CRYPT FIELD 8			
B30	CRYPT FIELD 9			
B31	CRYPT FIELD 10			
B32	CRYPT FIELD 11			
B33	CRYPT FIELD 12			
B34	CRYPT FIELD 13			
B35	CRYPT FIELD 14			
B36	CRYPT FIELD 15			
B37	CRYPT FIELD 16			
B38	CRYPT FIELD 17			
B39	CRYPT FIELD 18			
B40	CRYPT FIELD 19			
B41	CRYPT FIELD 20			
B42	CRYPT FIELD 21			
B43	CRYPT FIELD 22			
B44	CRYPT FIELD 23			
B45	→ COLUMBARIUM 9 ↑ COLUMBARIUM 11			
B46	← COLUMBARIUM 9 ↑ COLUMBARIA 7 AND 8			

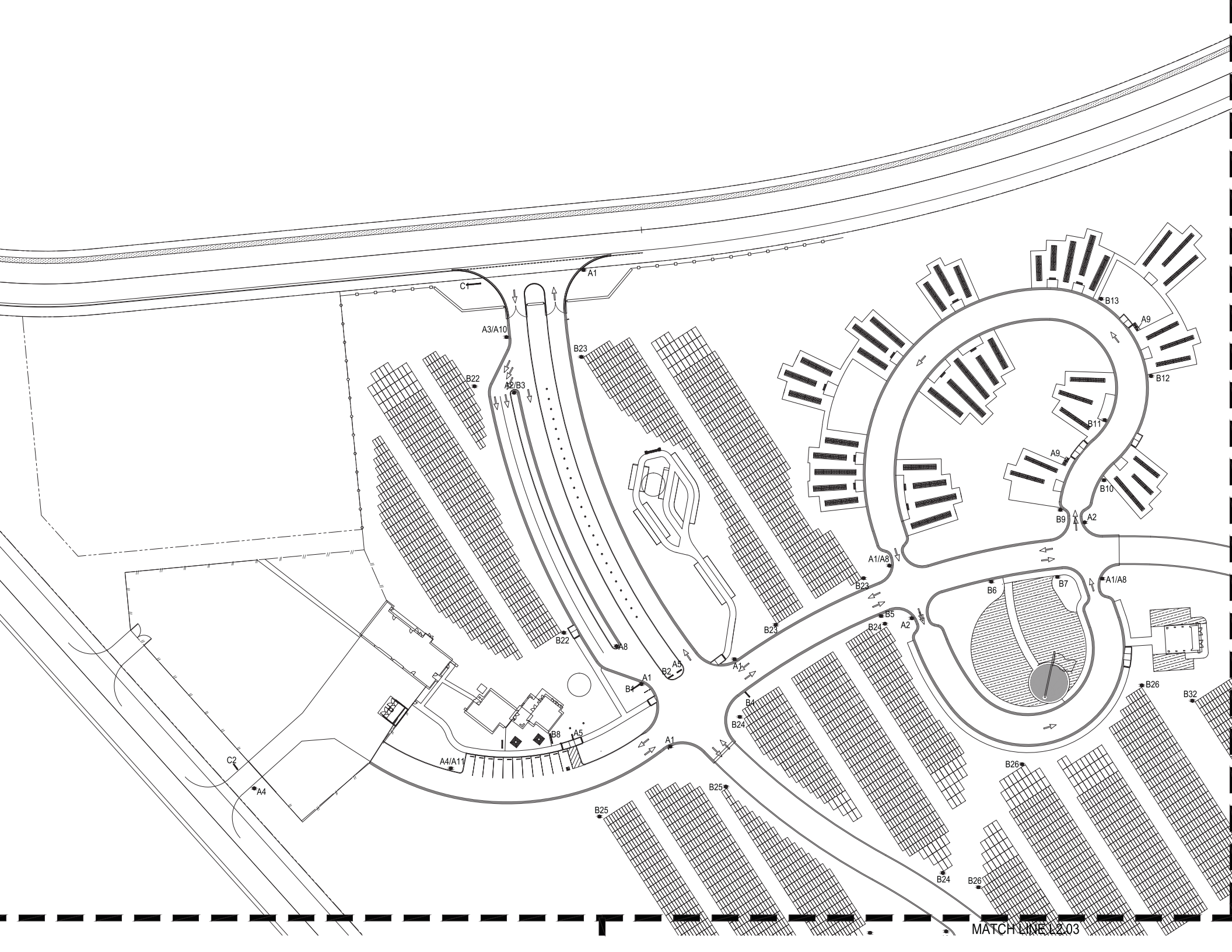
LE ON SIGNAGE TO BE REVIEWED AND APPROVED BY
E) OR CONTRACTING OFFICER (CO).
OP DRAWINGS FOR ALL SIGNS.
LOCATIONS OF ALL SIGNS AND RECEIVE APPROVAL
POST INSTALLATION.
NTIAL UTILITY AND IRRIGATION CONFLICTS PRIOR TO

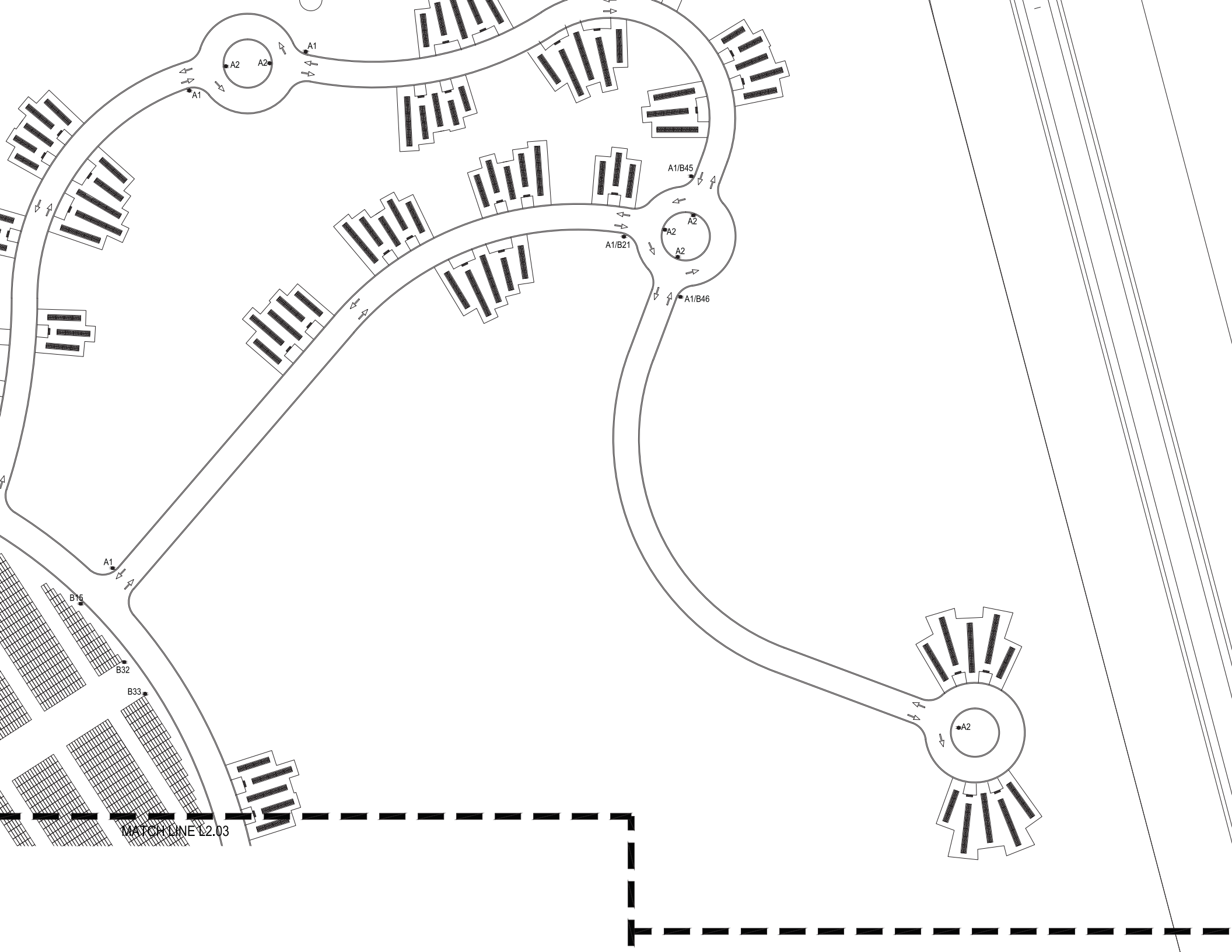
N LINES DAMAGED BY THE INSTALLATION OF SIGN
THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE

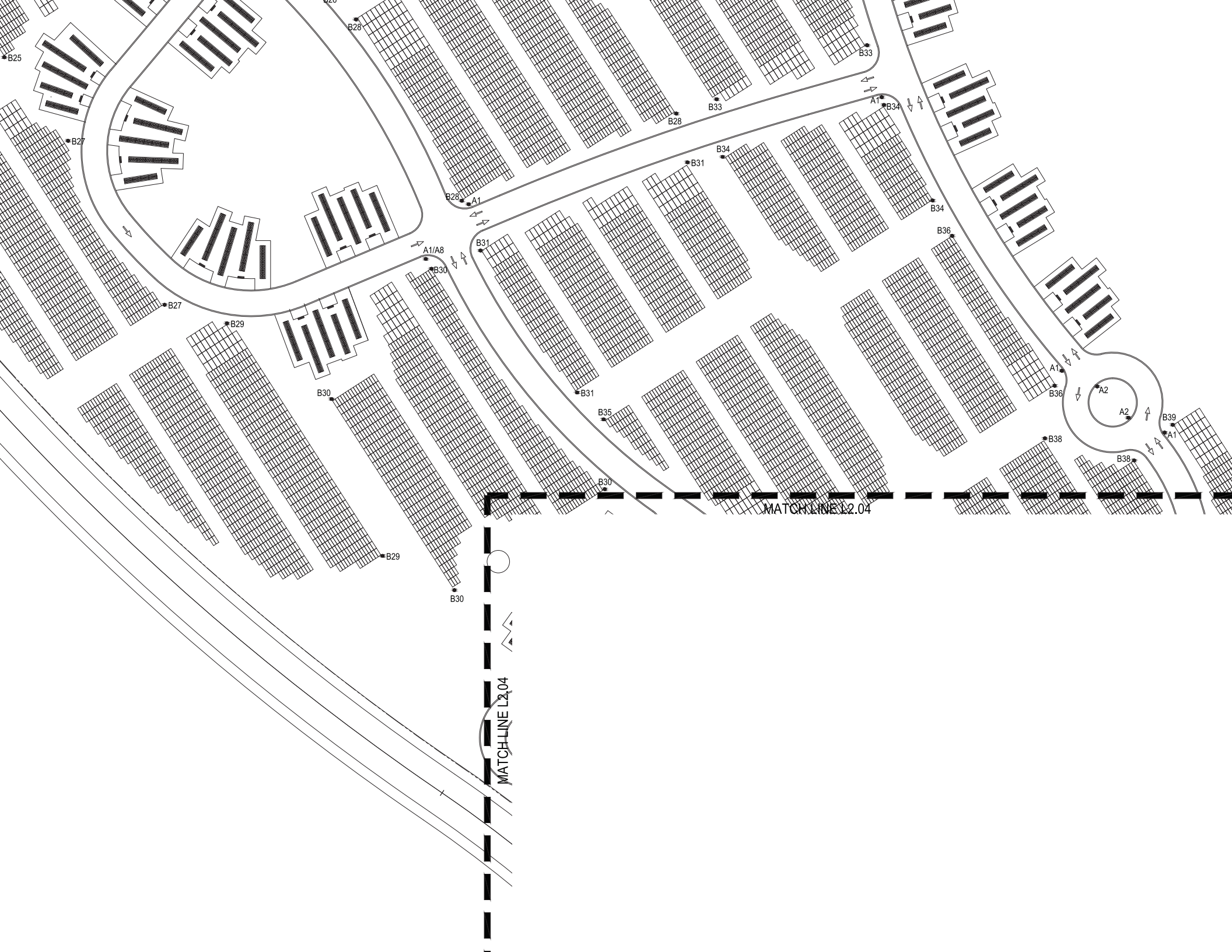
L04 FOR SIGN DETAILS
APPROVED BY THE SRE/CO PRIOR TO INSTALLATION.
CONCRETE POSTS EXCEPT: RESERVED ACCESSIBLE
RE GALVANIZED STEEL POST.
TO ROAD UNLESS OTHERWISE NOTED.

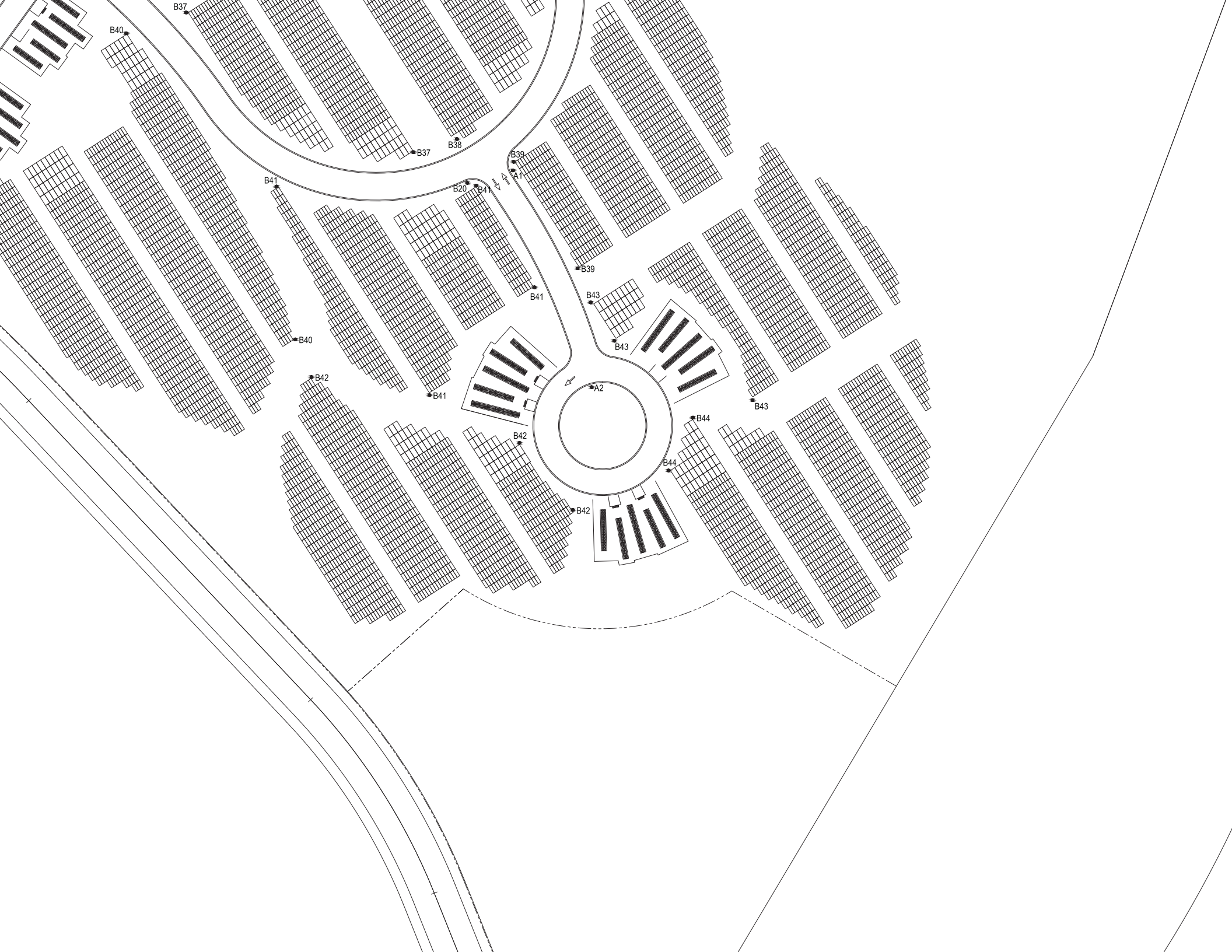
TYPE A (TRAFFIC AND REGULATORY SIGNAGE)

SYMBOL / TYPE	TEXT	SHEET	DETAIL(S)	PLACEMENT REMARKS	GENERAL NOTES
A1	STOP				
A2	ONE WAY				
A3	SPEED LIMIT 15 MPH				
A4	CEMETERY VEHICLES ONLY				
A5	FLORAL REGULATIONS			BY ADMIN, INSTALL SIGN PARALLEL TO CURB	
	ACCESSIBLE VAN PARKING				SEE CIVIL DWGS
	VAN ACCESSIBLE				SEE CIVIL DWGS


C1
A1
A3/A10
B23
B22
A2/B3
B13
A9
B12
B11
A9
B10
B9
A2
A1/A8
B23
B6
B7
A1/A8
B5
B24
A2
B23
B22
A8
A5
A1
B2
B1
A1
B4
B24
B26
B32
B8
A5
A1
A4/A11
C2
A4
B25
B25
B26
B24
B26
MATCH LINE L2.03


A1
A2
A2
A1
A1/B45
A2
A2
A2
A1/B21
A1/B46
A1
B15
B32
B33
A2
MATCH LINE L2.03


B25
B27
B28
B33
B34
B31
B36
B35
B38
B39
B29
B30
A1
A1/A8
A2
MATCH LINE L2.04
MATCH LINE L2.04


B37
B40
B37
B38
B39
A1
B20
B41
B41
B39
B41
B43
B43
B40
B42
B41
A2
B43
B44
B42
B44
B42

10. Architecture

Location / Scope

The project is located at the south east corner of Parker Flats Road and Parker Flats Cutoff. This is a new ground up project consisting of four sited buildings; Administrative, Public, Maintenance and Committal Service Shelter. The Administrative and Public buildings are joined together by a connecting breezeway.

The scope of Phase 1 work consists of designing and programming user spaces based on the guidelines provided by the NCA Facilities Design Guide document and test fit provided. The new Maintenance, Administration, and Public buildings are Type V-B wood construction, sprinklered and shall be concrete slab on grade. The committal shelter is concrete masonry block, non-sprinklered, with concrete slab on grade. The Maintenance and Administration buildings have been sited and organized to allow for future expansion for vehicle storage and offices, respectively. Refer to **Figures 10-1 through 10-9** for each building's architectural plans per the approved Phase 1 Improvement Plans.

Code Analysis

The structures were designed per the 2013 California Building Code (CBC) and conform to the Title 24 ADA guidelines for barrier free access. This includes an accessible path of travel from the building(s) to accessible site features including but not limited to, sidewalks, building to building access, restrooms / locker rooms / shower, accessible parking stall(s), crosswalks and ramps as required.

Functional Analysis of Building Program

Administrative Building

Administrative building services the staff and public. Areas generally consist of offices, work areas, break room, conference room and a public lobby area.

Public Information Building

Public Information Building services the staff and public. Areas generally consist of public and staff restrooms, grave locator kiosk, entry vestibule, janitor closet, mechanical room and electrical room.

Breezeway

The breezeway acts as a sheltered connector to the Administrative and public building and creates a focal point to the buildings.

Maintenance Building

The Maintenance building services staff and honor guard. No public access. Areas generally consist of offices, locker rooms, restrooms, break rooms, parts and tool storage, service bay, vehicle and equipment storage, wash bay and flammable storage.

Committal Service Shelter

The Committal Service Shelter to service the staff and public. Area consists of a covered gathering space opened to the exterior and a storage support space to house support equipment for the shelter.

Materials Analysis and Character Defining Features

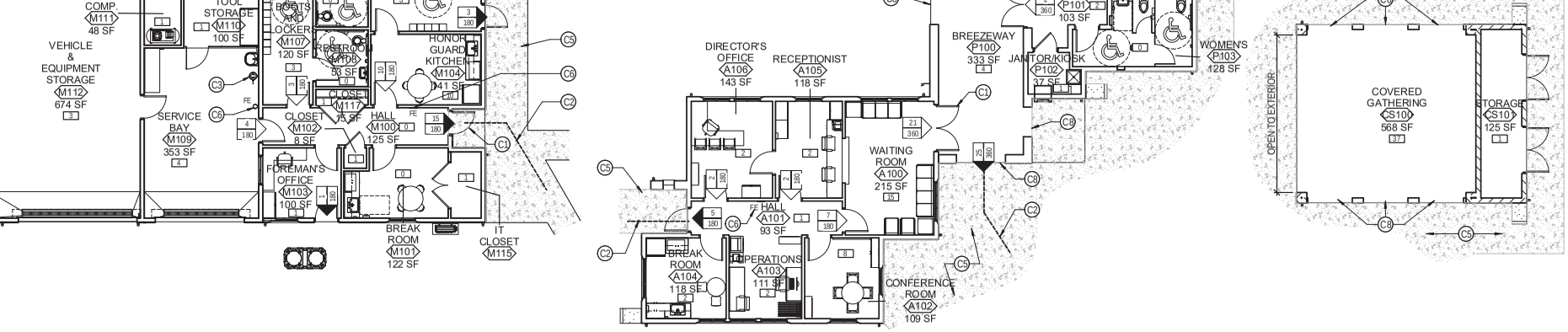
Exterior finishes and architectural design will be in keeping with the local architecture of the region. Based on public hearings, workshops and public response the architectural style was decided on as California Mission. Taking details and materials from historic structures like the Mission San Luis Obispo de Tolosa (City of San Luis Obispo) founded in 1772, Santa Cruz Mission Replica (City of Santa Cruz) founded in 1791 and the San Juan Bautista (City of San Juan Bautista) founded in 1797.The exterior materials will be a combination of cement plaster, wood / wrought iron detailing and clay barrel tile roof system.

Interior Finishes

Interior finishes vary from building to building depending on the user function. The Administration building interior finishes mainly consist of carpet and linoleum flooring, painted gypsum board walls, acoustical ceilings, and operable dual pane windows. The Public building interior finishes mainly consist of ceramic tile and sealed concrete flooring, painted gypsum board walls, full height ceramic tile (restrooms) and painted gypsum board ceilings. The Maintenance building interior finishes mainly consist of carpet and linoleum flooring, painted gypsum board walls, acoustical ceilings, and operable dual pane windows at the office and honor guard locations. The vehicle service areas and workshop have concrete sealed flooring, painted gypsum board walls at interior locations, cement plaster at exterior locations, and ceilings opened to structure above. The Committal Service Shelter has exterior finish materials consisting of cement plaster walls, sealed concrete slab and painted cement plaster ceiling with exposed beams.

Sustainability

Sustainability is an important feature of the design. High efficiency mechanical equipment will be provided as well as low usage high-efficiency plumbing fixtures. Finishes will be selected to contain low VOC's, rapidly renewable materials, and recycled content.



BUILDING - CODE PLAN

Occupancy	Occupant Load
	15
	100
	15
	100
N/A	2
	100
	100
	100
	100
N/A	0
N/A	0
	300
	300
	300
	42

Occupancy	Occupant Load
N/A	0
N/A	0
N/A	1
	100
	15
	50
N/A	0
	50
N/A	0
	100
	100
	300
	300
	300
	300
	300
	33

Occupancy	Occupant Load
	15
	300
	38

FACTORS:

ANICAL	300 GROSS / OCCUPANT
IRS)	15 NET / OCCUPANT
	100 GROSS / OCCUPANT
	100 GROSS / OCCUPANT

ADMINISTRATION BUILDING - CODE PLAN

SCALE: 1/8" = 1'-0"

Area Schedule (Gross Building)		
Name	Occupancy	Area
ADMINISTRATION	B	1025 SF
BREEZEWAY	B	376 SF
COMMITTAL SHELTER	A	723 SF
MAINTENANCE	S-1	2838 SF
PUBLIC	B	596 SF
		5558 SF

PLUMBING FIXTURE COUNT

2013 CALIFORNIA PLUMBING CODE TABLE 422.1

OCCUPANT LOAD:	BASED ON GROUP B - OFFICE OR PUBLIC BUILDINGS (AREA ACCESSIBLE TO THE PUBLIC) BASED ON GROUP S-1			
	FIXTURE	TOTAL REQUIRED	TOTAL PROVIDED	REMARKS
SERVICE SINK OR LNDRY. TRAY	MOP SINK	1	1	FLOOR MOP SINK JANITOR CLOSET (P102)
	DRINKING FOUNTAIN	1	1***	HI-LOW DRINKING FOUNTAIN
ADMINISTRATION BUILDING (B)				
MALE 10 OCCUPANTS				
WC: 1 PER 50	WC	1	1	
URINAL: 1 PER 1-100	URINAL	1	1	
LAVS: 1 PER 75	LAV	1	1	
FEMALE 10 OCCUPANTS				
WC: 1 PER 15	WC	2**	2	
LAVS: 1 PER 50	LAV	1	1	
MAINTENANCE BUILDING (B, S) ****				DRINKING FOUNTAIN NOT REQUIRED. LESS THAN 30 OCCUPANTS*
MALE 11 OCCUPANTS				
WC: 1 PER 50	WC	1	1	
URINAL: 1 PER 1-100**	URINAL	0	0	
LAVS: 1 PER 75	LAV	0	0	
FEMALE 11 OCCUPANTS				
WC: 1 PER 15	WC	1**	1	
LAVS: 1 PER 50	LAV	1	1	

* SECTION 415.2 - WHERE FOOD IS CONSUMED INDOORS, WATER STATIONS SHALL BE PERMITTED TO BE SUBSTITUTED FOR DRINKING FOUNTAINS. DRINKING FOUNTAINS SHALL NOT BE REQUIRED FOR AN OCCUPANT LOAD OF 30 OR LESS.

** THE TOTAL NUMBER OF REQUIRED WATER CLOSETS FOR FEMALES SHALL BE NOT LESS THAN THE TOTAL NUMBER OF REQUIRED WATER CLOSETS AND URINALS FOR MALES. THIS REQUIREMENT SHALL NOT APPLY WHEN SINGLE OCCUPANCY TOILET FACILITIES ARE PROVIDED FOR EACH SEX IN AN A OR E OCCUPANCY WITH AN OCCUPANT LOAD OF LESS THAN 50. EITHER:
a. THE REQUIRED URINAL SHALL BE PERMITTED TO BE OMITTED OR
b. IF INSTALLED, THE URINAL SHALL NOT REQUIRE A SECOND WATER CLOSET TO BE PROVIDED FOR THE FEMALE.

*** DRINKING FOUNTAINS SHALL NOT BE LOCATED IN TOILET ROOMS.

**** 422.2 SEPARATE FACILITIES - SEPARATE TOILET FACILITIES SHALL BE PROVIDED FOR EACH SEX. EXCEPTIONS:
(2) IN OCCUPANCIES WITH A TOTAL OCCUPANT LOAD OF 10 OR LESS, INCLUDING CUSTOMERS AND EMPLOYEES, ONE TOILET FACILITY, DESIGNED FOR USE BY NO MORE THAN ONE PERSON AT A TIME, SHALL BE PERMITTED FOR USE BY BOTH SEXES.

CODE ANALYSIS

CONSTRUCTION TYPE: 5-B SPRINKLERED
FIRE RESISTANCE RATING PER TABLE 602: 0-HR. (ALL BUILDING ELEMENTS)

OCCUPANCY GROUPS: ADMINISTRATION BUILDING - B / A-3 INCIDENTAL ACCESSORY OCCUPANCY
MAINTENANCE BUILDING: S-1
COMMITTAL SHELTER BUILDING: A-3 / S-2 INCIDENTAL ACCESSORY OCCUPANCY

AREA SEPARATIONS REQUIRED:

INCIDENTAL ACCESSORY OCCUPANCIES:
STORAGE ROOMS OVER 100 S.F.1-HR. SEPARATION OR AUTOMATIC FIRE-EXTINGUISHING SYSTEM REQUIRED
REFER TO 2010 CBC SECTION 508.2.4 AND TABLE 508.2.5

ALLOWABLE AREA (PER CBC TABLE 503:

ADMINISTRATION BUILDING - B: OCCUPANCY A-3 INCIDENTAL ACCESSORY OCCUPANCY: MAXIMUM BUILDING AREA: 9,000 S.F. (ACTUAL BUILDING AREA LISTED BELOW)	ZONING: LDR DISTRICT (LOW DENSITY RESIDENTIAL) MAXIMUM BUILDING HEIGHT: 2 STORY ACTUAL BUILDING HEIGHT: 23' - 6" TO ROOF (1 STORY)
MAINTENANCE BUILDING - S-1: OCCUPANCY MAXIMUM BUILDING AREA: 9,000 S.F. (ACTUAL BUILDING AREA LISTED BELOW)	ZONING: LDR DISTRICT (LOW DENSITY RESIDENTIAL) MAXIMUM BUILDING HEIGHT: 1 STORY ACTUAL BUILDING HEIGHT: 21' - 0" TO ROOF 1 STORY
COMMITTAL SHELTER BUILDING - A-3: OCCUPANCY S-2 INCIDENTAL ACCESSORY OCCUPANCY: MAXIMUM BUILDING AREA: 6,000 S.F. (ACTUAL BUILDING AREA LISTED BELOW)	ZONING: LDR DISTRICT (LOW DENSITY RESIDENTIAL) MAXIMUM BUILDING HEIGHT: 1 STORY ACTUAL BUILDING HEIGHT: 13' - 9" TO ROOF (1 STORY)

EXIT LOADS - ADMINISTRATION BUILDING				
Number	Name	Area	Occ. Load Factor	Occupant Load
A100	WAITING ROOM	215 SF	15	15
A101	HALL	93 SF	100	1
A102	CONFERENCE ROOM	109 SF	15	8
A103	OPERATIONS	111 SF	100	2
A104	BREAK ROOM	118 SF	N/A	2
A105	RECEPTIONIST	118 SF	100	2
A106	DIRECTOR'S OFFICE	143 SF	100	2
P100	BREEZEWAY	333 SF	100	4
P101	ENTRY VESTIBULE	103 SF	100	2
P102	JANITOR/KIOSK	37 SF	100	1
P103	WOMEN'S	128 SF	N/A	0
P104	MEN'S	134 SF	N/A	0
P105	MECHANICAL ROOM	43 SF	300	1
P106	ELECTRICAL ROOM	43 SF	300	1
P107	RISER ROOM	12 SF	300	1
				42

EXIT LOADS - MAINTENANCE BUILDING				
Number	Name	Area	Occ. Load Factor	Occupant Load
M100	HALL	125 SF	N/A	0
M101	BREAK ROOM	122 SF	N/A	0
M102	CLOSET	8 SF	N/A	1
M103	FOREMAN'S OFFICE	100 SF	100	1
M104	HONOR GUARD KITCHEN	141 SF	15	10
M105	HONOR GUARD LOCKERS	117 SF	50	3
M106	RESTROOM	51 SF	N/A	0
M107	BOOTS AND LOCKERS	120 SF	50	3
M108	RESTROOM	53 SF	N/A	0
M109	SERVICE BAY	353 SF	100	4
M110	PARTS AND TOOL STORAGE	100 SF	100	1
M111	AIR COMP.	48 SF	300	1
M112	VEHICLE & EQUIPMENT STORAGE	674 SF	300	3
M113	WASH BAY	524 SF	300	2
M114	FLAMMABLE STORAGE	29 SF	300	1
M115	IT CLOSET	36 SF	300	1
M116	MECHANICAL	32 SF	300	1

COMMITTAL SHELTER - CODE PLAN

SCALE: 1/8" = 1'-0"

CODE ANALYSIS CONT.

MEANS OF EGRESS (PER SECTION 1015.1): ONE EXIT IS REQUIRED BASED ON OCCUPANT LOAD CALCULATION OF LESS THAN 50 OCCUPANTS. REFER TO TABLE 1015.1 - SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

TWO EXITS OR EXIT ACCESS DOORWAYS (PER SECTION 1015.2.1): WHERE TWO EXITS OR EXIT ACCESS DOORWAYS ARE REQUIRED FROM ANY PORTION OF THE EXIT ACCESS, THE EXIT DOORS OR EXIT ACCESS DOORWAYS SHALL BE PLACED A DISTANCE APART EQUAL TO NOT LESS THAN ONE-HALF OF THE LENGTH OF THE MAXIMUM OVERALL DIAGONAL DIMENSION OF THE BUILDING OR AREA TO BE SERVED MEASURED IN A STRAIGHT LINE BETWEEN EXIT DOORS OR EXIT ACCESS DOORWAYS.

MINIMUM EXITING WIDTH (PER SECTION 1005.1):
DOORS: 0.2" PER OCCUPANT

GLASS AND GLAZING: CHAPTER 24 PER SECTION 2406
1. PROVIDE SAFETY GLASS IN DOORS AND IN PANELS ADJACENT TO DOORS WITHIN A 24" ARC OF EITHER VERTICAL DOOR EDGE WHEN CLOSED, AND WHERE BOTTOM EDGE IS LESS THAN 5 FT. ABOVE WALKING SURFACE.
2. PROVIDE SAFETY GLASS IN FIXED OR OPERABLE PANELS WHERE INDIVIDUAL EXPOSED PANEL IS GREATER THAN 9 SF, BOTTOM EDGE IS LESS THAN 18" ABOVE FLOOR, TOP EDGE IS GREATER THAN 36" ABOVE FLOOR, AND PANEL IS WITHIN 36" HORIZONTALLY OF A WALKING SURFACE.

ROOF SYSTEM FIRE CLASSIFICATION: ROOF CLASS REQUIRED: CLASS C PER TABLE 1505.1
ROOF CLASS PROVIDED: CLASS A

DOOR HARDWARE (PER SECTION 1133B.2.5.2): HAND-ACTIVATED DOOR OPENING HARDWARE, HANDLES, PULLS, LATCHES, LOCKS AND OTHER OPERATING DEVICES ON ACCESSIBLE DOORS SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOES NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING OR TWISTING OF THE WRIST TO OPERATE. HARDWARE SHALL BE CENTERED BETWEEN 30 INCHES AND 44 INCHES ABOVE THE FLOOR. LATCHING AND LOCKING DOORS THAT ARE HAND-ACTIVATED AND WHICH ARE IN A PATH-OF-TRAVEL SHALL BE OPERABLE BY LEVER-TYPE HARDWARE, PANIC BARS, PUSH-PULL ACTIVATING BARS, U-SHAPED HANDLES OR OTHER HARDWARE DESIGNED TO PROVIDE PASSAGE. LOCKED EXIT DOORS SHALL OPERATE AS ABOVE IN EGRESS DIRECTION.

FIRE PROTECTION NOTES PORTABLE FIRE EXTINGUISHERS:
1. PORTABLE FIRE EXTINGUISHERS:
   A. PORTABLE FIRE EXTINGUISHERS SHALL BE PROVIDED WITH A MINIMUM RATING AND CAPACITY OF:
      1. A-3 OCCUPANCY: 10LB, 2A:20B:C
      2. ELECTRICAL AND EQUIPMENT ROOMS: 10LB, SA:20B:C
      3. VERIFY REQUIREMENTS FOR ANY SPECIAL OCCUPANCY ROOMS WITH LOCAL FIRE DEPARTMENTS.
   B. PORTABLE FIRE EXTINGUISHERS SHALL BE LOCATED TO MAINTAIN A MINIMUM OF ONE EXTINGUISHER PER 3,000 S.F. (OR ANY PORTION THEREOF) AND A MAXIMUM OF 75 FEET TRAVEL DISTANCE TO ANY EXTINGUISHER, VERIFY REQUIRED DISTANCE WITH FIRE DEPARTMENT INSPECTIONS DIVISION PRIOR TO INSTALLATION.
   C. PORTABLE FIRE EXTINGUISHERS SHALL BE MOUNTED IN CABINETS. THE TOP OF THE EXTINGUISHER SHALL BE MOUNTED BETWEEN 36" AND 60" A.F.F.
   D. WHERE EXTINGUISHERS ARE LOCATED ALONG AISLES WITHIN EQUIPMENT OR STORAGE AREAS PROVIDE A VISIBLE MARKING ON THE COLUMN OR WALL TO INDICATE THE EXTINGUISHER LOCATION.
2. FIRE DEPARTMENT GENERAL REQUIREMENTS:
   A. CONTRACTOR SHALL CONFIRM THAT KNOX BOXES ARE LOCATED ADJACENT TO BUILDING

KEYNOTES
- C4 HI-LO DRINKING FOUNTAIN SHALL CO... CBC SECTION 1117B.1.
- C5 ACCESSIBLE CONCRETE WALKWAY. ... CIVIL DRAWINGS FOR CONTINUATIO...
- C6 FIRE EXTINGUISHER LOCATION. TRA... DISTANCE NOT TO EXCEED 75'-0" S... PROTECTION NOTES THIS SHEET.
- C7 FIRE RISER / PIPE STAND, REFER TO ... DRAWINGS
- C8 ARCHWAY OPENING

APPLICABLE CODES:

PUBLIC SAFETY, STATE FIRE MARSHAL RE... TITLE 19 C.C.R.

2013 BUILDING STANDARDS ADMINISTRATI... PART 1, TITLE 24 C.C.R.

2013 CALIFORNIA BUILDING CODE, VOL. 1 & ... PART 2, TITLE 24 C.C.R. (2012 INTERNATIO... CODE, AS AMENDED BY CALIFORNIA)

2013 CALIFORNIA ELECTRICAL CODE (CEC) ... TITLE 24 C.C.R. (2011 NATIONAL ELECTRICA... AMENDED BY CALIFORNIA)

2013 CALFIORNIA MECHANICAL CODE (CMC ... TITLE 24 C.C.R. (2009 UNIFORM MECHANIC... AMENDED BY CALIFORNIA)

2013 CALIFORNIA PLUMBING CODE (CPC), ... 24 C.C.R. (2012 UNIFORM PLUMBING CODE ... BY CALIFORNIA)

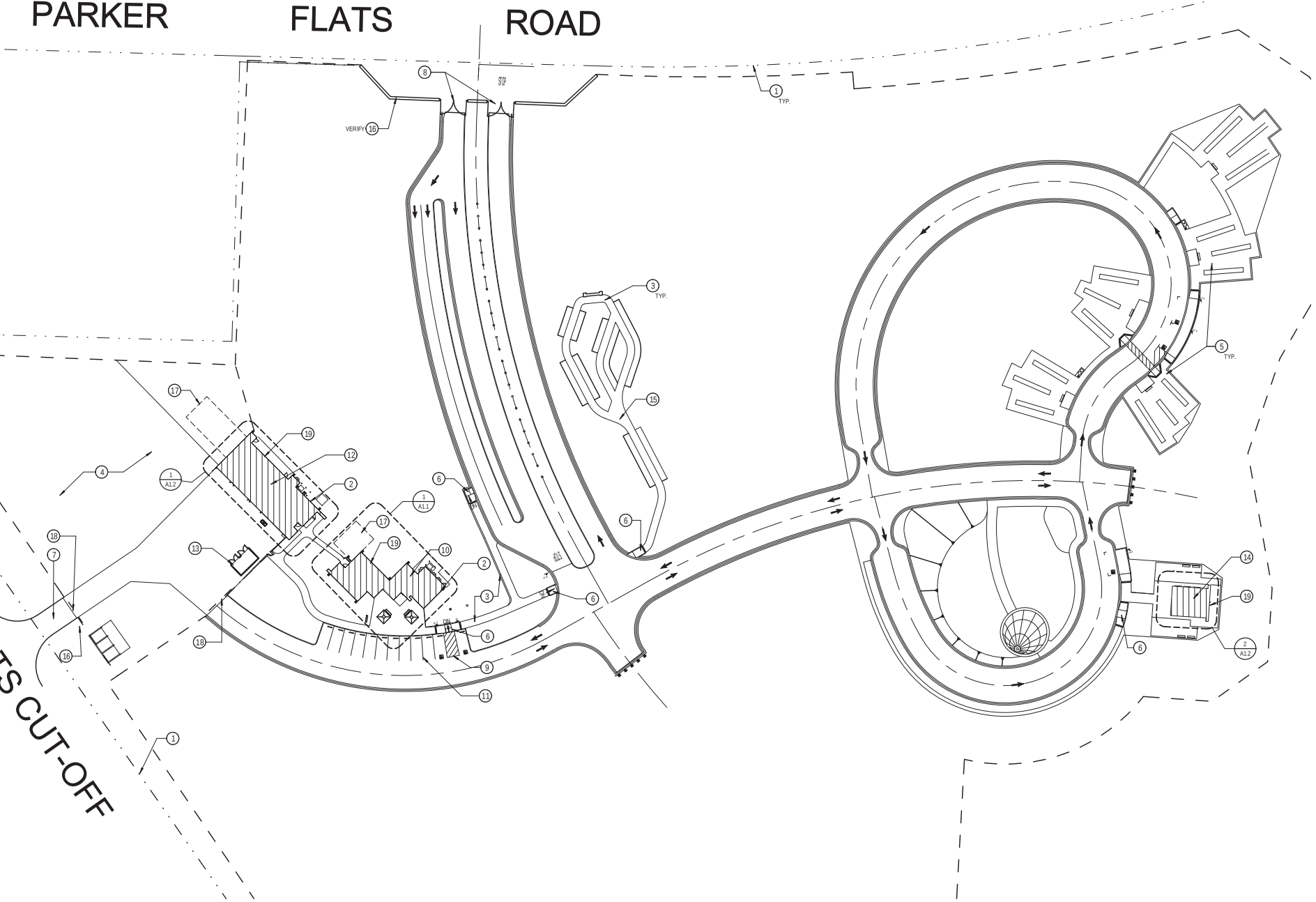
2013 CALIFORNIA ENERGY CODE, PART 6, ...

2013 CALFIRONIA FIRE CODE (CFC), PART ... C.C.R. (2012 IFC, AS AMENDED BY CALIFOR...

2013 CALIFORNIA REFERENCED STANDARD ... TITLE 24 C.C.R. (PARTIAL LIST, SEE CBC CH... CFC CHAPTER 45)

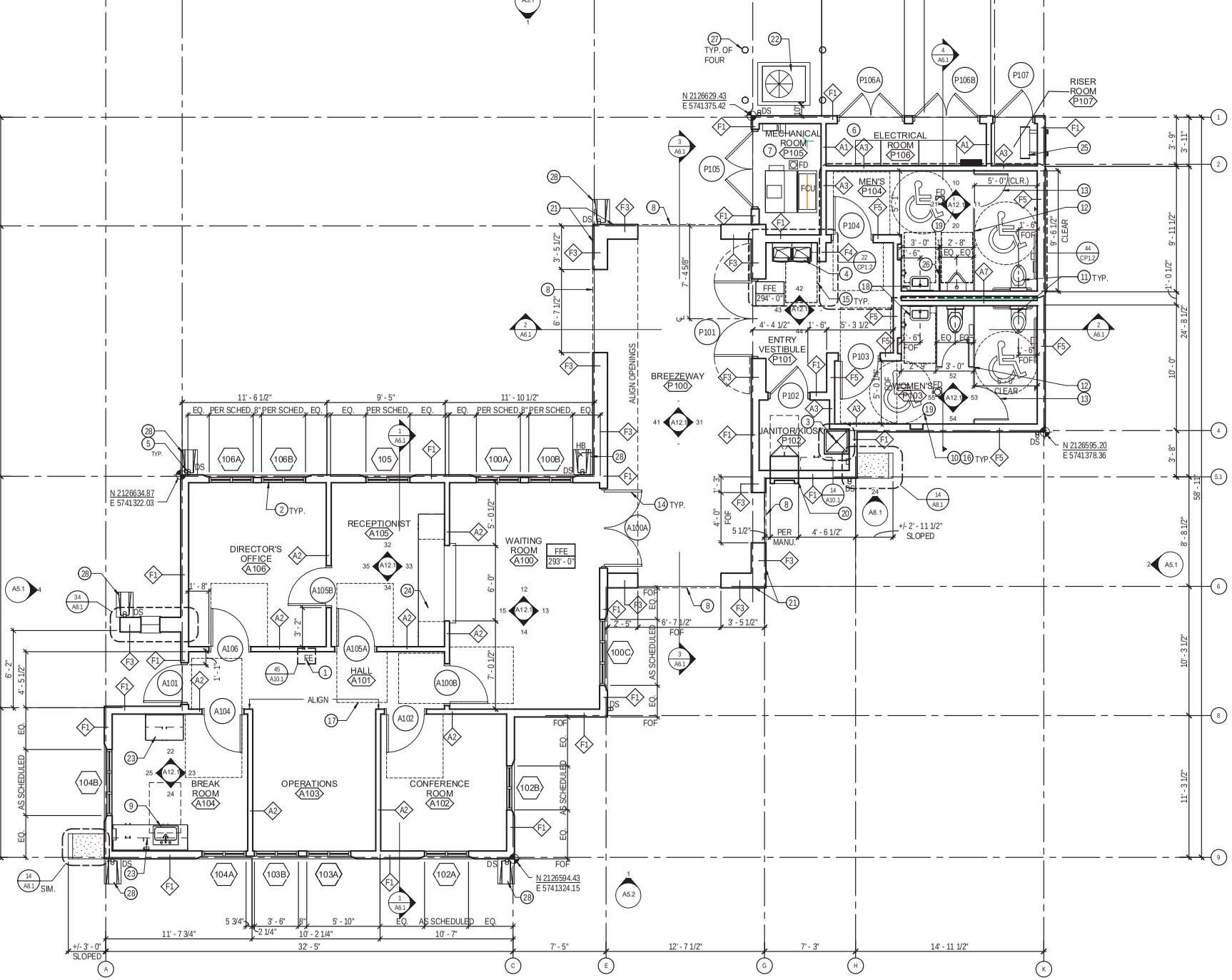
SYMBOL LEGEND

- - OCCUPANCY LOAD
- - ACCESSORY USE AREA (OCCUPA... NOT INCLUDED IN LOADS BEYOND...
- COMBINED OCCUPANT LOAD AT ... DOOR OR STAIR
- TOTAL EXIT CAPACITY OF DOOR ...
- (THE CAPACITY OF DOORS ARE D... AS FOLLOWS: CLEAR OPENING W... INCHES DIVIDED BY 0.2. THE CAP... STAIRS ARE DETERMINED AS FO... WIDTH IN INCHES DIVIDED BY 0.3...
- TOTAL EXIT CAPACITY OF DOOR ...
- COMBINED OCCUPANT LOAD AT ...



6 CONCRETE CURB RAMP. REFER TO
DRAWINGS.
7 SERVICE ACCESS DRIVEWAY.
8 MAIN ENTRY / GATEWAY FROM PUBL
RIGHT-OF-WAY
9 VAN ACCESSIBLE PARKING STALL. F
CIVIL DRAWINGS.
10 ADMINISTRATION AND PUBLIC BUILD
11 EMPLOYEE AND VISITOR PARKING S
12 MAINTENANCE BUILDING / HONOR G
13 TRASH ENCLOSURE. REFER TO CIVI
DRAWINGS C6.2.
14 COMMITTAL SERVICE SHELTER.
15 MEMORIAL WALK.
16 PROVIDE KNOX BOX PER CFC 506. C
REQUIREMENTS AND LOCATION WIT
FIRE AUTHORITY.
17 FUTURE BUILDING ADDITION SHOWN
NOT IN SCOPE OF WORK.
18 SECURED GATE, EMPLOYEE ACCESS
19 LIMIT OF WORK

AL SITE PLAN: REFER TO CIVIL AND LANDSCAPING DRAWINGS FOR ON-SITE IMPROVEMENTS



ADMINISTRATION and PUBLIC BUILDINGS - FLOOR PLANS

SCALE: 1/4" = 1'-0"

6 ELECTRICAL EQUIPMENT ROOM. RE ELECTRICAL DRAWINGS FOR EQUIPI LAYOUT.

7 MECHANICAL ROOM. REFER TO MEC DRAWINGS FOR EQUIPMENT LAYOU

8 LINE OF BREEZEWAY STRUCTURE A

9 ACCESSIBLE SINK AND COUNTER.

10 ADA ACCESSIBLE CLEARANCE. REF 44 AND 45 SHEET CP1.2.

11 PLUMBING FIXTURE. REFER TO PLU DWGS.

12 TOILET PARTITION.

13 TOILET PARTITION DOOR TO BE ACC SEE SHEET CP1.2.

14 DOORS AS SCHEDULED.

15 30"X48" CLEAR FLOOR SPACE FOR W PER CBC SECTION 11B-305.3.

16 ADA 60" MINIMUM TURNING RADIUS I SECTION 11B-304.3.1.

17 PROVIDE DOOR MANEUVERING CLEA PER CBC FIGURE 11B-404.2.4.1. SEE NOTES THIS SHEET

18 ADA COMPLIANT WALL MOUNTED SI TO DETAIL AS NOTED.

19 ALL DIMENSIONS AT RESTROOM PLU FIXTURES AND ADA MANEUVERING ARE TO WALL FACE OF FINISH, TYP.

20 GRAVESITE LOCATOR KIOSK SUPPLI OWNER, INSTALLED BY CONTRACTO

21 WALLS TO BE EQUAL LENGTH TO OP CORNER.

22 MECHANICAL EQUIPMENT. REFER T MECHANICAL EQUIPMENT SCHEDUL

23 CASEWORK WITH UPPER CABINETS

24 BUILT-IN RECEPTION COUNTER.

25 FIRE SPRINKLER RISER. REFER TO I PROTECTION DRAWINGS.

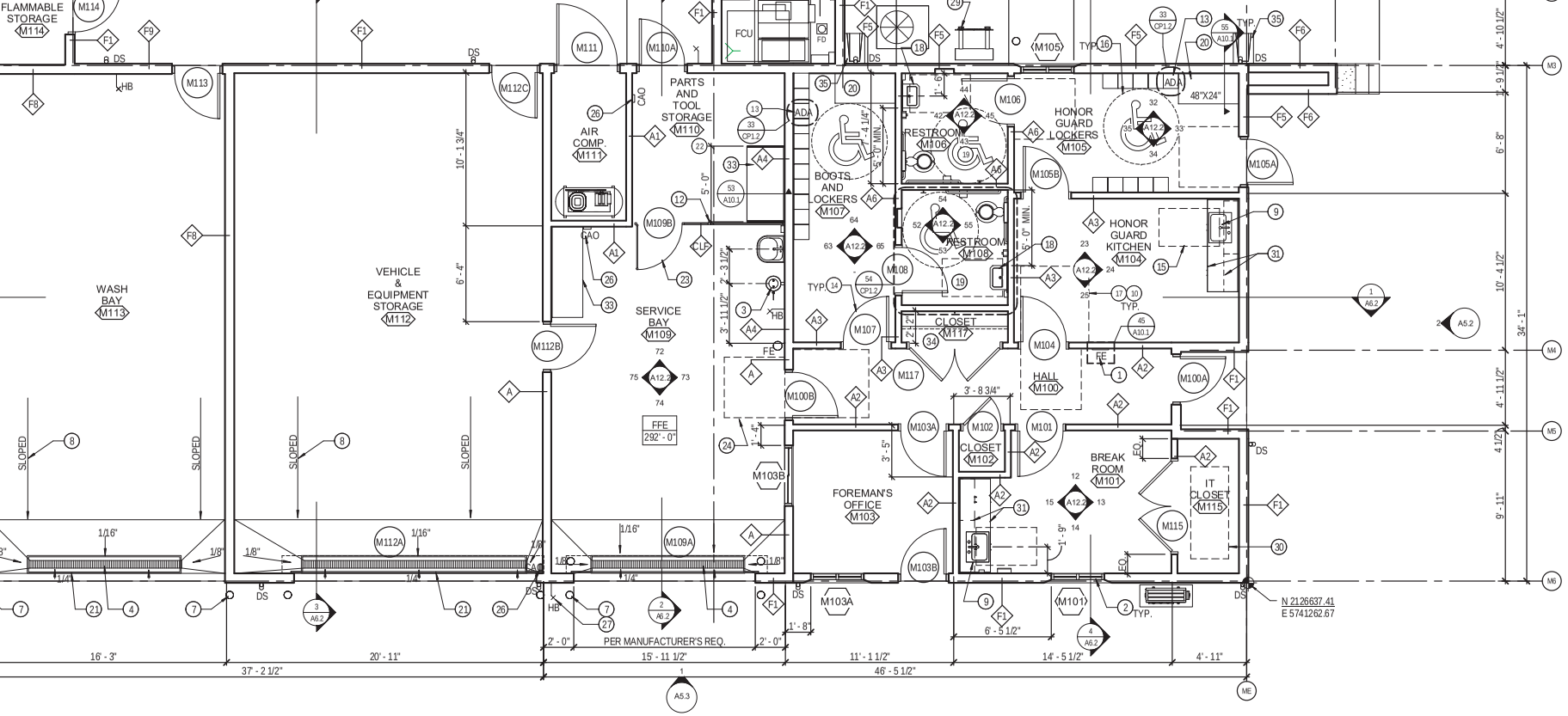
26 URINAL SCREEN. 24" DEEP

27 6" CONCRETE FILLED STEEL BOLLAR

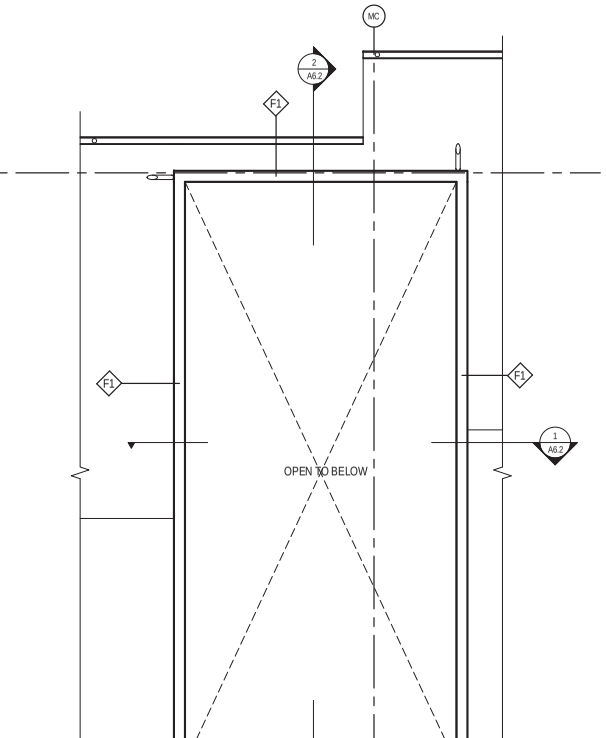
28 CONCRETE SPLASH BLOCK AT DOWI

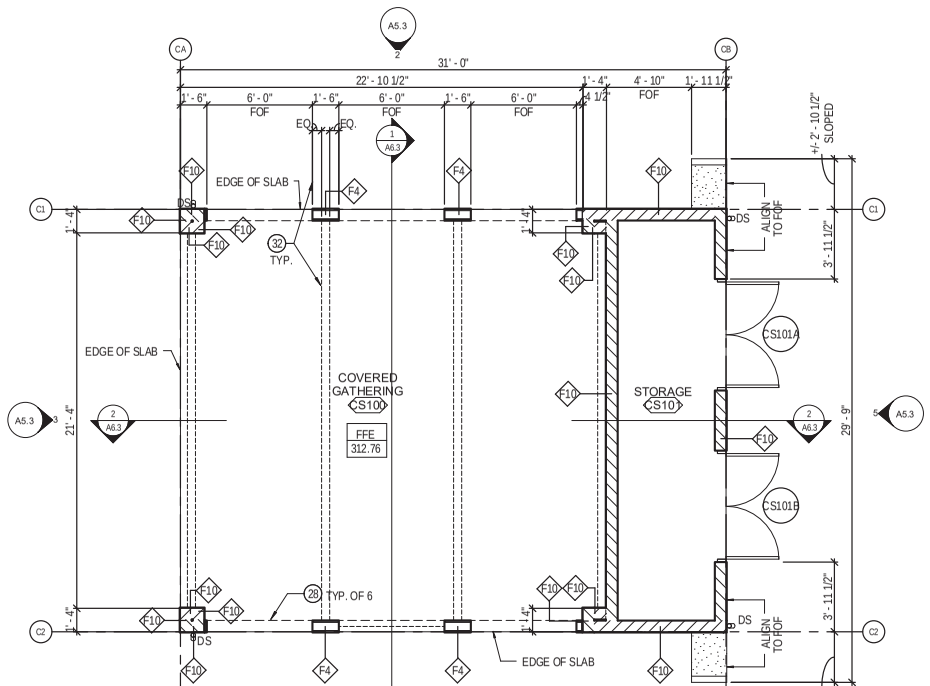
GENERAL NOTES

1. REFER TO SHEET CP1.2 FOR ADDITION ACCESSIBILITY CLEARANCES AT TOILE
2. REFER TO SHEET CP1.2 FOR ADA ACC AROUND DOOR CLEARANCES. SEE DE 25 AND 45
3. REFER TO SHEET CP1.2 FOR ADA ACC REQUIREMENTS AT SHOWER STALL. S
4. SEE CIVIL SHEET C2.0 FOR BUILDING L ORIENTATIONS



E BUILDING - FLOOR PLAN

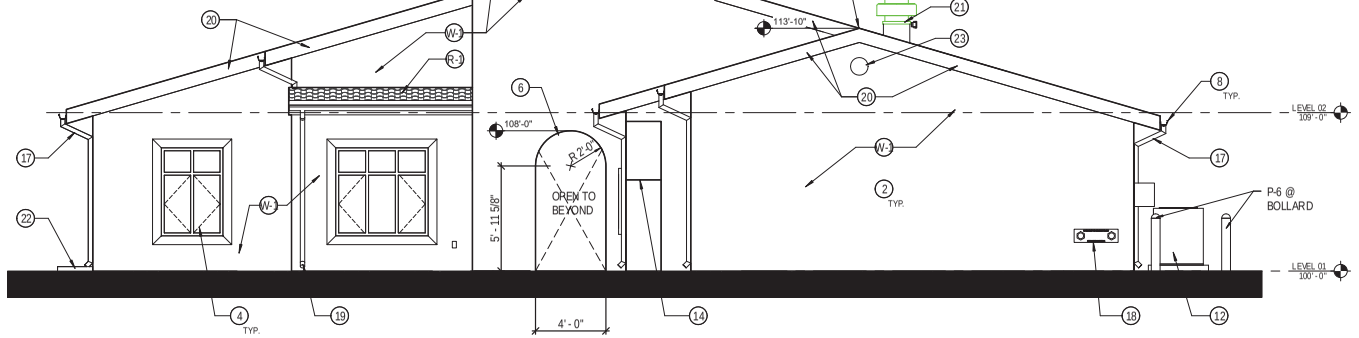




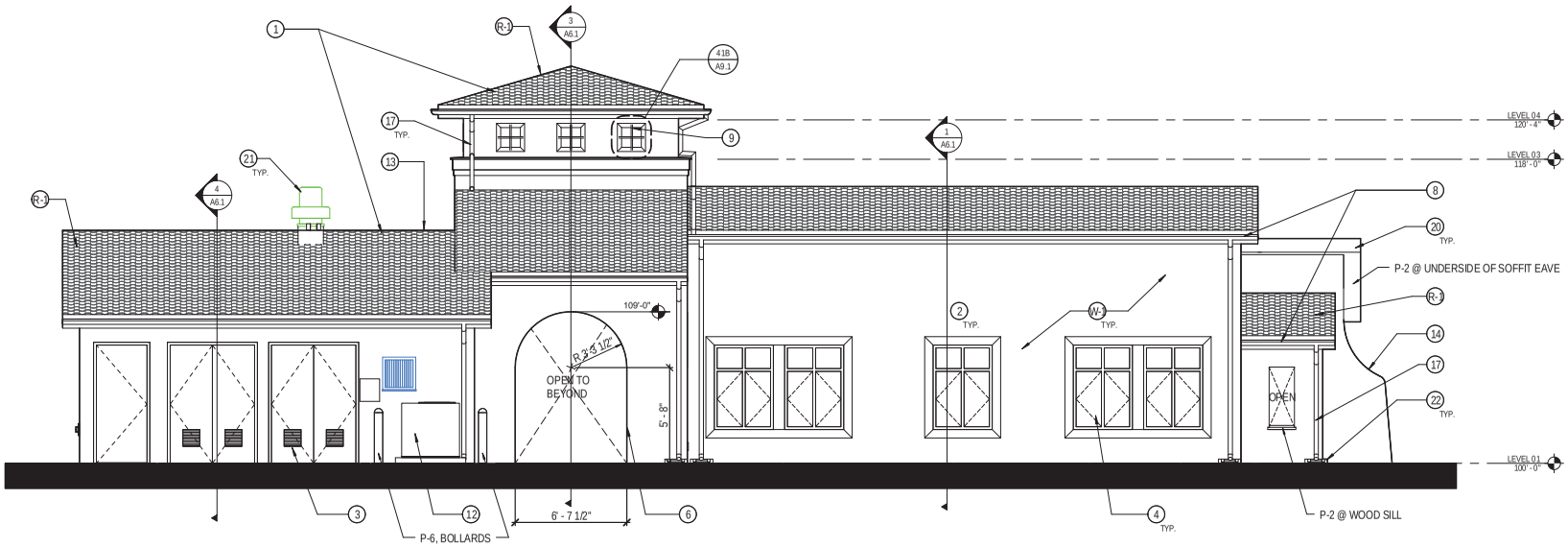
1. DOWNSPOUT LOCATIONS. REFER TO DWGS. FOR ROOF DRAIN WATER CALCULATIONS.
6. ROLL-UP DOOR AS SCHEDULED.
7. 6" CONCRETE FILLED STEEL BOLLA
8. SLOPE CONCRETE SLAB TO DRAIN CIVIL DRAWINGS.
9. ACCESSIBLE SINK AND COUNTER.
10. ADA ACCESSIBLE CLEARANCE. RE SHEET CP1.2.
11. PLUMBING FIXTURE. REFER TO PL DWGS.
12. CHAINLINK FENCING. FULL HEIGHT STRUCTURE ABOVE
13. METAL LOCKERS. ONE MINIMUM T COMPLIANT.
14. DOORS AS SCHEDULED.
15. 30"X48" CLEAR FLOOR SPACE FOR WHEELCHAIRS PER CBC SECTION
16. ADA 60" MINIMUM TURNING RADIUS SECTION 11B-304.3.1.
17. PROVIDE DOOR MANEUVERING CL PER CBC FIGURE 11B-404.2.4.1
18. ADA COMPLIANT WALL MOUNTED S TO DETAIL AS NOTED.
19. ALL DIMENSIONS AT RESTROOM P FIXTURES AND ADA CLEARANCES FACE OF FINISH, TYP.
20. ADA ACCESSIBLE BENCH.
21. LOCATE HIGHPOINT OF SLOPE AT DOOR AND SLOPE DOWN AWAY FR POINT TO EXTERIOR AT 1/4" PER FO
22. DO NOT SLOPE FLOOR AT PARTS A STORAGE.
23. 3'-0" X 7'-0" CHAINLINK GATE WITH
24. LEVEL LANDING AT DOOR.
25. ACCESSIBLE SHOWER AND SEAT. DETAIL 32/CP1.2
26. WALL MOUNTED COMPRESSED AIR 38" A.F.F.
27. HOSE BIB, TYP. REFER TO PLUMBI DRAWINGS.
28. ARCHED OPENING ABOVE.
29. FIRE SPRINKLER RISER / PIPE STA
30. IT EQUIPMENT PER LOW VOLTAGE
31. CASEWORK WITH UPPER CABINET
32. BEAM ABOVE TO BE CENTERED ON TYP.
33. WORK BENCH
34. SHELF AND POLE AT CLOSET
35. CONCRETE SPLASH BLOCK

GENERAL NOTES

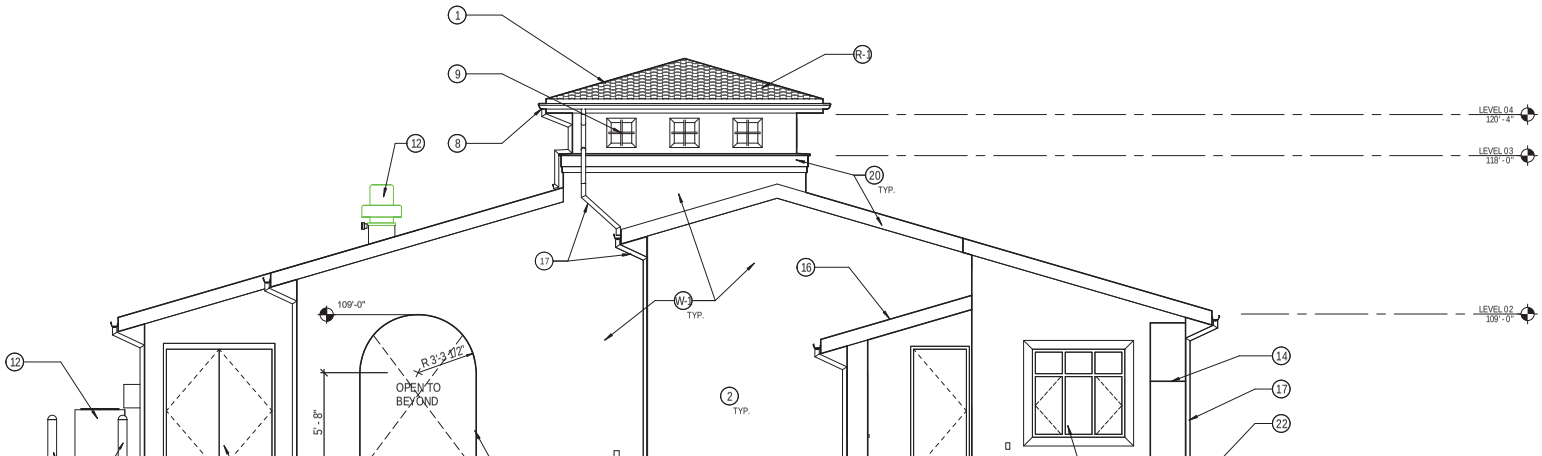
1. REFER TO SHEET CP1.2 FOR ADDITION ACCESSIBILITY CLEARANCES AT TOILE
2. REFER TO SHEET CP1.2 FOR ADA ACCE AROUND DOOR CLEARANCES. SEE DE 25 AND 45
3. REFER TO SHEET CP1.2 FOR ADA ACCE REQUIREMENTS AT SHOWER STALL. S
4. SEE CIVIL SHEET C2.0 FOR BUILDING L ORIENTATIONS



2 A5.1 ADMINISTRATION BUILDING - EAST
SCALE: 1/4" = 1'-0"



1 A5.1 ADMINISTRATION BUILDING - NORTH
SCALE: 1/4" = 1'-0"



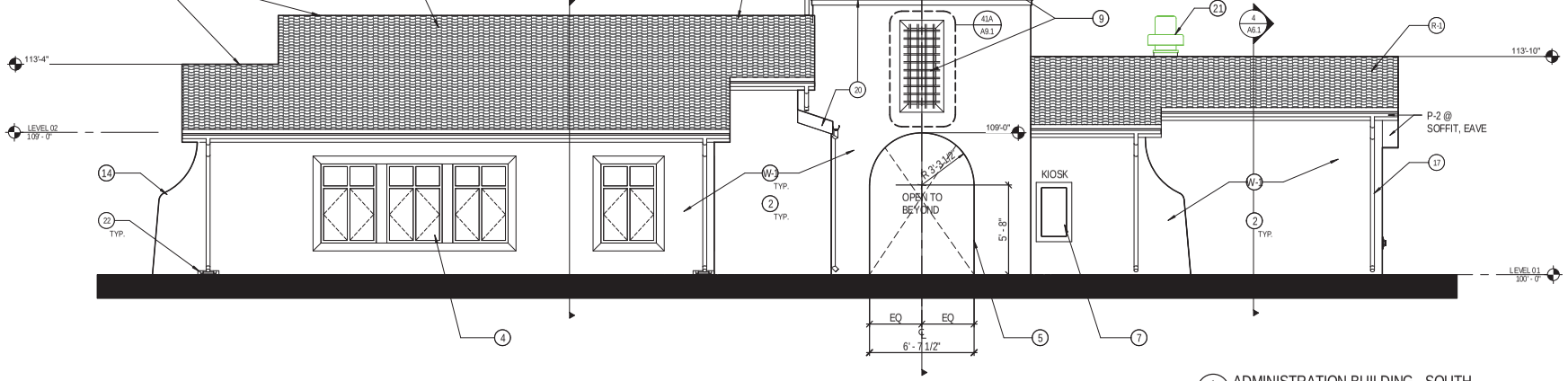
8 ROOF GUTTER HALF ROUND. P-2
9 DECORATIVE WROUGHT IRON GRID
11 CONCRETE FILLED STEEL BOLLARD
12 HVAC EQUIPMENT. REFER TO MECH DRAWINGS. P-2
13 ROOF RIDGE.
14 ANGLED WING WALL.
15 SHED ROOF OVER RECESSED EXTE ALCOVE.
16 LOWER SHED ROOF.
17 DOWNSPOUT LEADER, TYP. P-2
18 FIRE DEPARTMENT CONNECTION.
19 CONCRETE SPLASH BLOCK AT ALL LEADER LOCATIONS, TYP.
20 FASCIA BOARD, PAINTED, P-2
21 ROOF MOUNTED EQUIPMENT AND PENETRATIONS WHERE OCCURS. P
22 PRE-CAST CONCRETE SPLASH BLO GRADE. COORDINATE WITH LANDS TYP.
23 EXTERIOR WALL MOUNTED FIRE AL LOCATION.
R-1 CLASSIC MISSION CLAY TILE ROOFI REFER TO SPECIFICATIONS.
W-1 SMOOTH PLASTER FINISH EXTERIO REFER TO SPECIFICATIONS.

EXTERIOR PAINT FINISHE (SEE FINISH SCHEDULE)

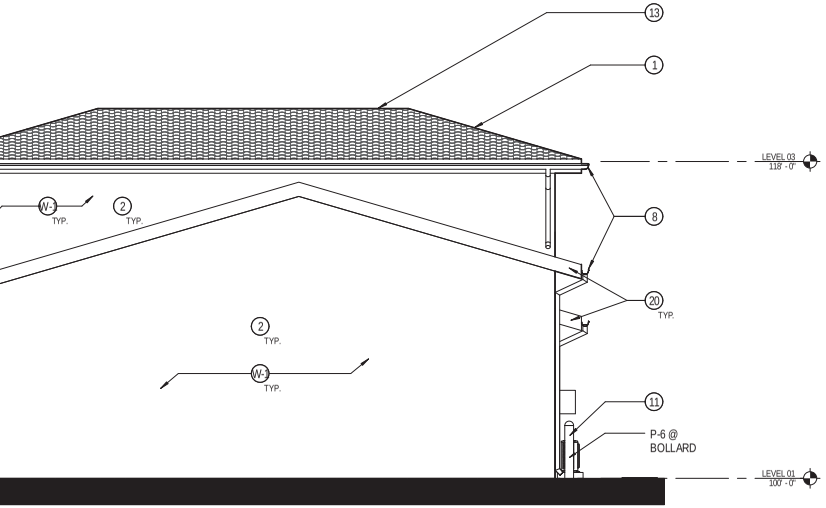
P-1 EXTERIOR WALLS, TYP.

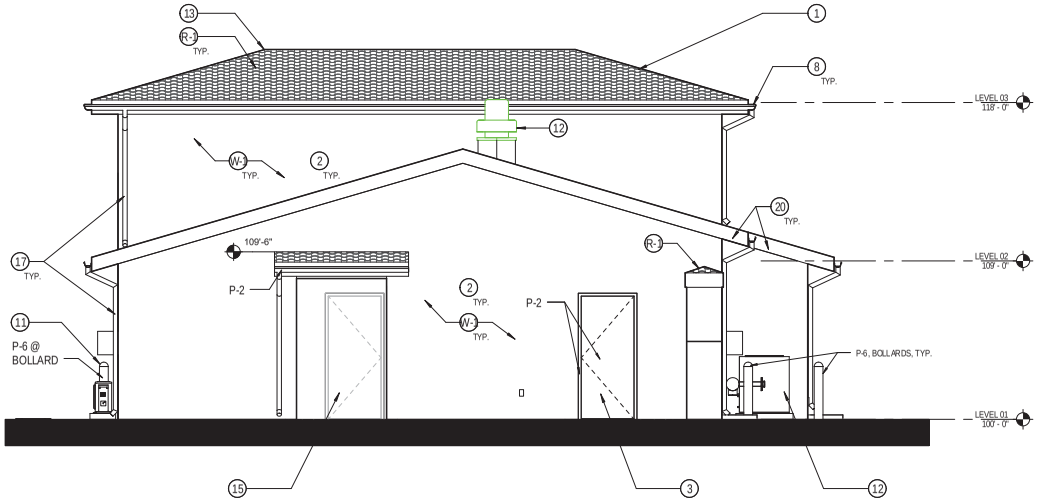
P-2 DOORS + FRAMES, FASCIA, EA SOFFIT, EXTERIOR WOOD TRI GUTTERS, MECH EQUIP., TYP.

P-6 BOLLARDS, TYP.



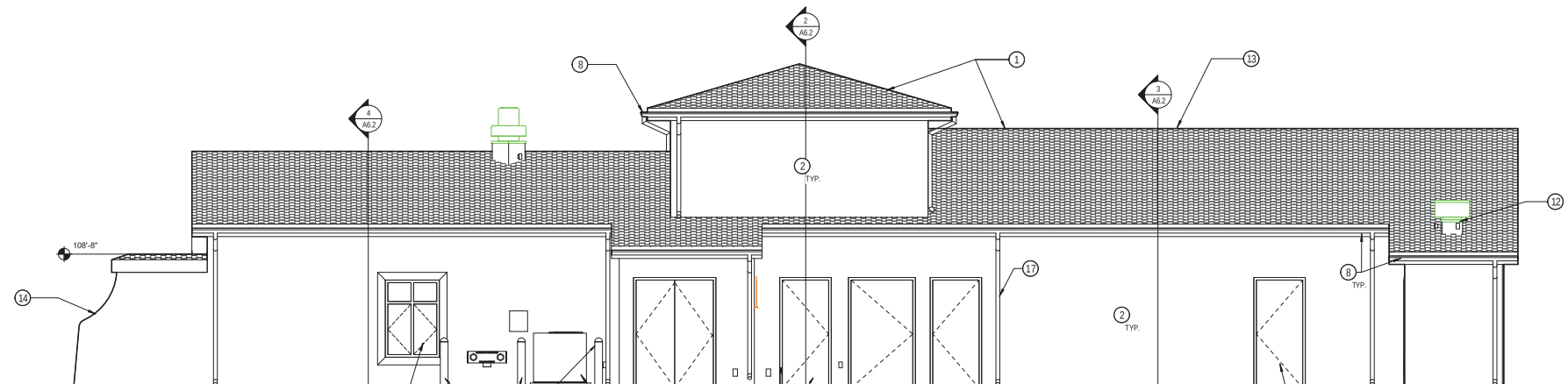
1 A5.2 ADMINISTRATION BUILDING - SOUTH
SCALE: 1/4" = 1'-0"





4 A5.2 MAINTENANCE BUILDING - WEST
SCALE: 1/4" = 1'-0"

2 A5.2 MAINTENANCE BUILDING - EAST
SCALE: 1/4" = 1'-0"



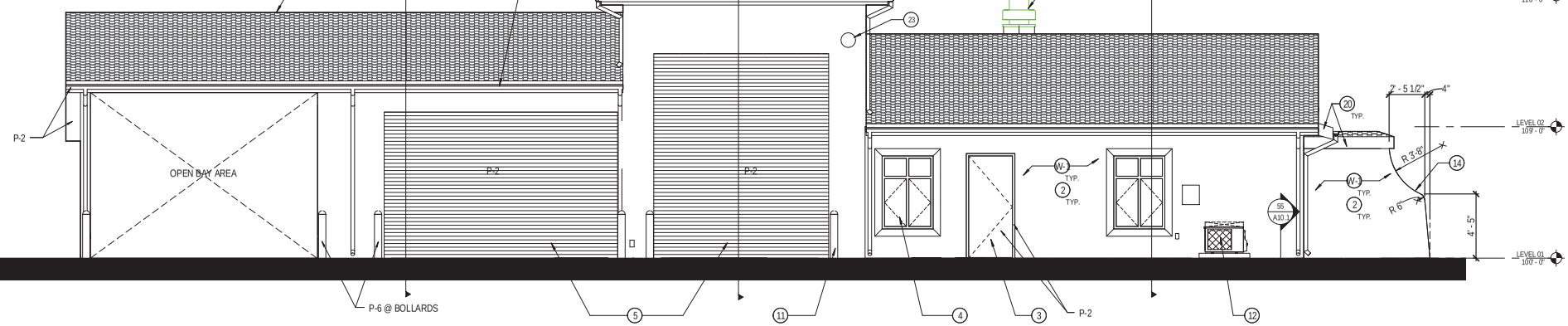
8 ROOF GUTTER HALF ROUND. P-2
9 DECORATIVE WROUGHT IRON GRI
11 CONCRETE FILLED STEEL BOLLAR
12 HVAC EQUIPMENT. REFER TO MEC DRAWINGS. P-2
13 ROOF RIDGE.
14 ANGLED WING WALL.
15 SHED ROOF OVER RECESSED EXT ALCOVE.
16 LOWER SHED ROOF.
17 DOWNSPOUT LEADER, TYP. P-2
18 FIRE DEPARTMENT CONNECTION.
19 CONCRETE SPLASH BLOCK AT ALL LEADER LOCATIONS, TYP.
20 FASCIA BOARD, PAINTED, P-2
21 ROOF MOUNTED EQUIPMENT AND PENETRATIONS WHERE OCCURS.
22 PRE-CAST CONCRETE SPLASH BLO GRADE. COORDINATE WITH LANDS TYP.
23 EXTERIOR WALL MOUNTED FIRE AL LOCATION.
R-1 CLASSIC MISSION CLAY TILE ROOF REFER TO SPECIFICATIONS.
W-1 SMOOTH PLASTER FINISH EXTERIO REFER TO SPECIFICATIONS.

EXTERIOR PAINT FINISH (SEE FINISH SCHEDULE

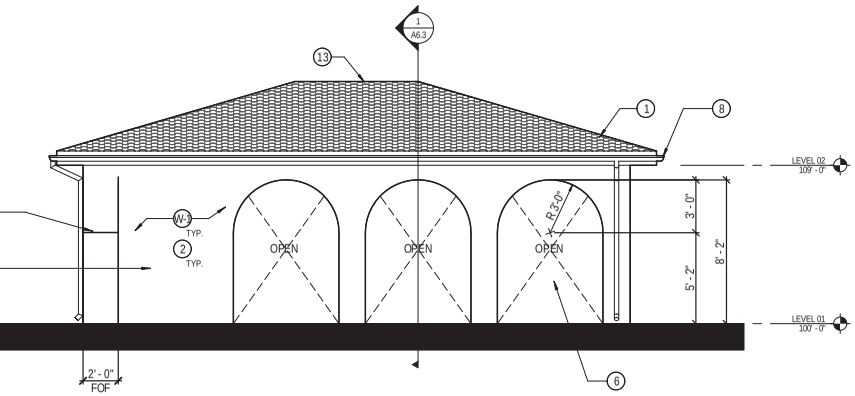
P-1 EXTERIOR WALLS, TYP.

P-2 DOORS + FRAMES, FASCIA, SOFFIT, EXTERIOR WOOD T GUTTERS, MECH EQUIP., TY

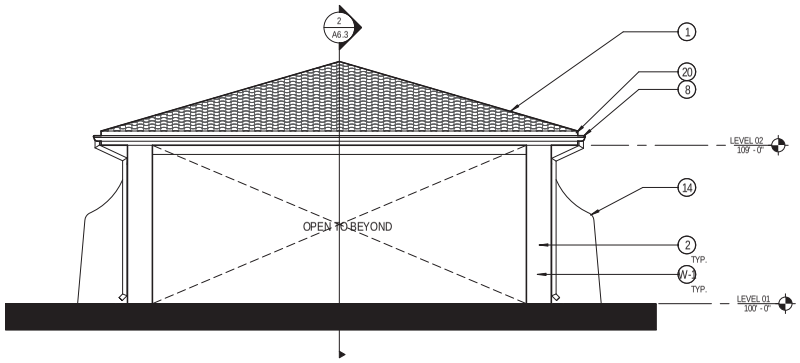
P-6 BOLLARDS, TYP.



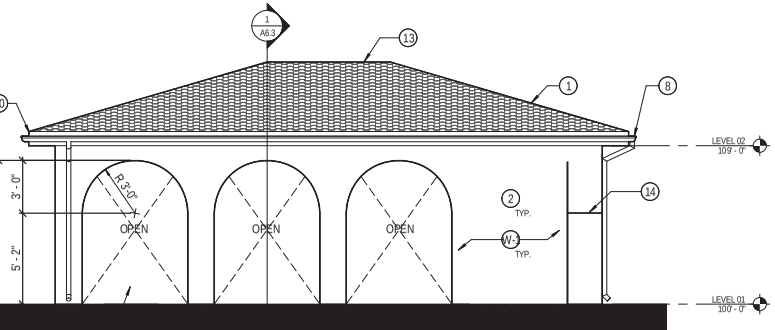
1 A5.3 MAINTENANCE BUILDING - SOUTH
SCALE: 1/4" = 1'-0"

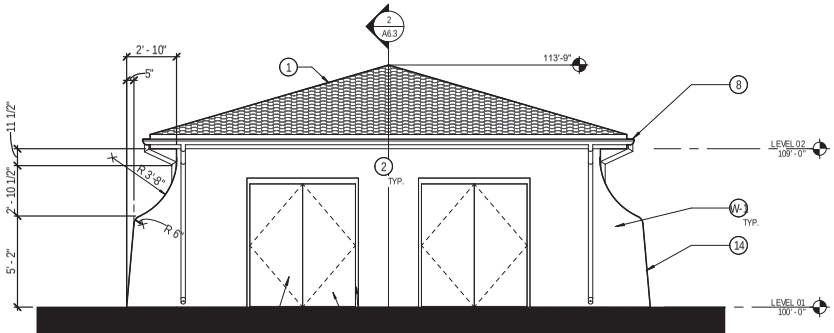


2 A5.3 COMMITTAL SHELTER - WEST
SCALE: 1/4" = 1'-0"



3 A5.3 COMMITTAL SHELTER - SOUTH
SCALE: 1/4" = 1'-0"





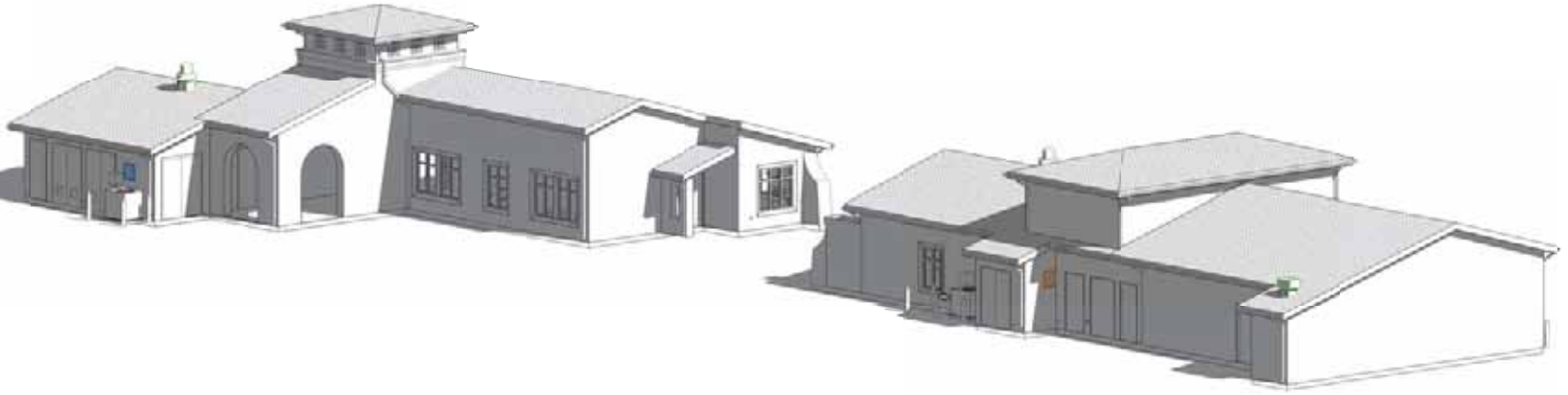
	NOT PAINT
8	ROOF GUTTER HALF ROUND. P-2
9	DECORATIVE WROUGHT IRON GRID.
11	CONCRETE FILLED STEEL BOLLARD
12	HVAC EQUIPMENT. REFER TO MECH DRAWINGS. P-2
13	ROOF RIDGE.
14	ANGLED WING WALL.
15	SHED ROOF OVER RECESSED EXTE ALCOVE.
16	LOWER SHED ROOF.
17	DOWNSPOUT LEADER, TYP. P-2
18	FIRE DEPARTMENT CONNECTION.
19	CONCRETE SPLASH BLOCK AT ALL F LEADER LOCATIONS, TYP.
20	FASCIA BOARD, PAINTED, P-2
21	ROOF MOUNTED EQUIPMENT AND PENETRATIONS WHERE OCCURS. F
22	PRE-CAST CONCRETE SPLASH BLOC GRADE. COORDINATE WITH LANDS TYP.
23	EXTERIOR WALL MOUNTED FIRE ALA LOCATION.
R-1	CLASSIC MISSION CLAY TILE ROOFIN REFER TO SPECIFICATIONS.
W-1	SMOOTH PLASTER FINISH EXTERIOR REFER TO SPECIFICATIONS.

EXTERIOR PAINT FINISHE (SEE FINISH SCHEDULE)

P-1	EXTERIOR WALLS, TYP.
P-2	DOORS + FRAMES, FASCIA, EA SOFFIT, EXTERIOR WOOD TRIM GUTTERS, MECH EQUIP., TYP.
P-6	BOLLARDS, TYP.



SING MODEL - SOUTH



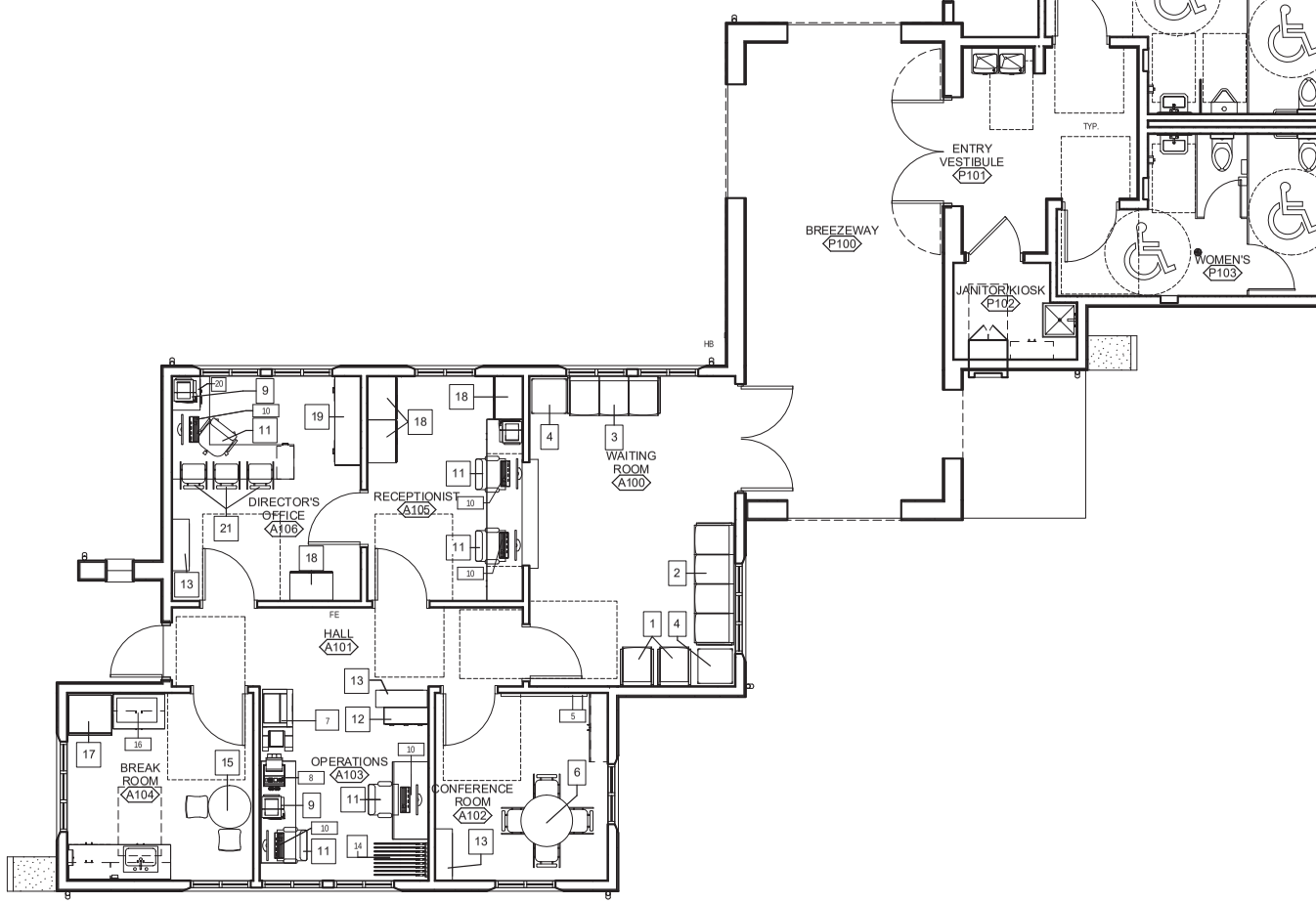
SING MODEL - NORTH



SING MODEL - WEST - PERSPECTIVE VIEW



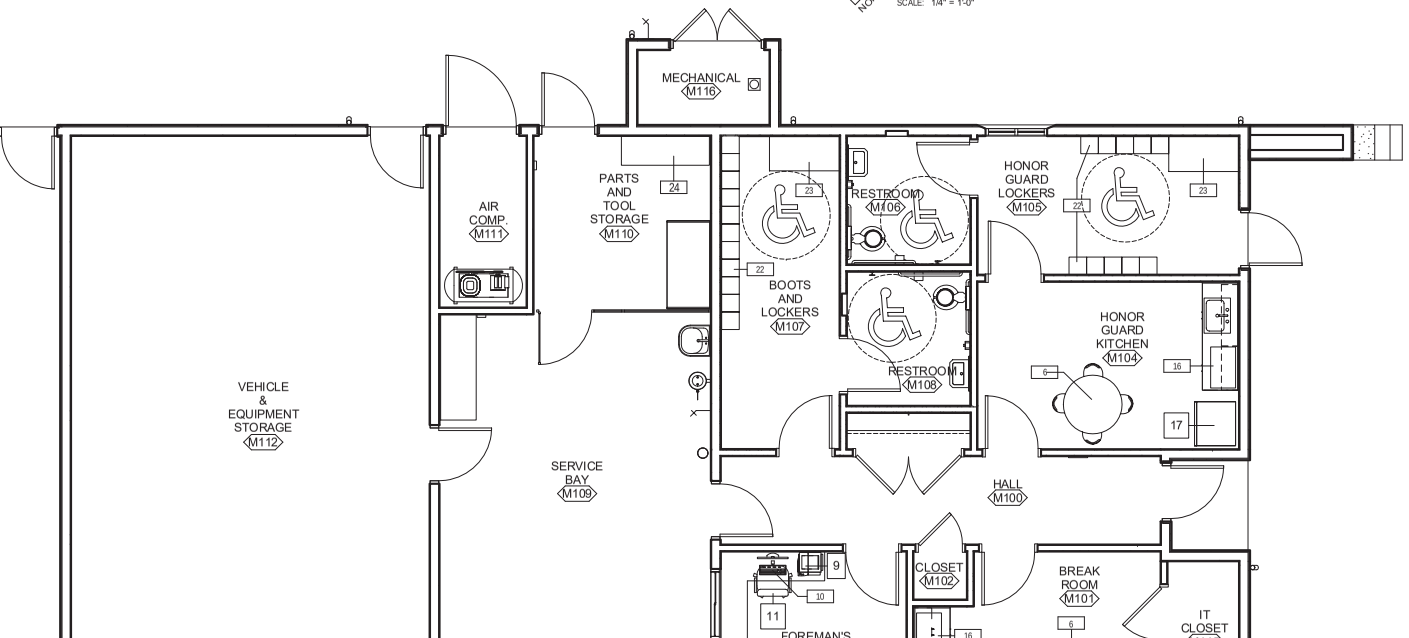
	1	4 SEAT BENCH
	1	3 SEAT BENCH
	2	END TABLE
	1	TACKBOARD
	1	CONFERENCE TABLE WITH SEATING
3	1	STORAGE SHELFING SYSTEM
	1	COPY MACHINE
	1	FAX MACHINE
	1	PRINTER
0	2	WORKSTATION COMPUTER
1	2	WORK STATION CHAIR
2	1	BASE FILE CABINET
3	1	STORAGE SHELFING SYSTEM
4	1	WALL MOUNTED DRAWING STORAGE
5	1	TABLE WITH CHAIRS
6	1	MICROWAVE
7	1	REFRIGERATOR
8	3	LATERAL 4 DRAWER FILE CABINET
0	2	WORKSTATION COMPUTER
1	2	WORKSTATION CHAIR
	1	PRINTER
0	1	WORKSTATION COMPUTER
1	1	WORKSTATION CHAIR
3	1	STORAGE SHELFING SYSTEM
8	1	LATERAL 4 DRAWER FILE CABINET
9	1	CREDENZA WORKSTATION/STORAGE
0	1	FIRE-PROOF SAFE
1	3	MEETING CHAIRS
	1	TABLE WITH SEATING
6	1	MICROWAVE
	1	PRINTER
0	1	WORKSTATION COMPUTER
1	1	WORKSTATION CHAIR
8	1	LATERAL 4 DRAWER FILE CABINET
	1	TABLE WITH SEATING
6	1	MICROWAVE
7	1	REFRIGERATOR
2	10	METAL LOCKERS
3	1	LOCKER ROOM BENCH SEATING
2	11	METAL LOCKERS
3	1	LOCKER ROOM BENCH SEATING
3	1	STORAGE SHELFING SYSTEM



NORTH

ADMINISTRATION and PUBLIC BUILDINGS - FURNITURE FLOOR PLAN

SCALE: 1/4" = 1'-0"



11. Mechanical Systems

General

The CCCVC construction project comprises four buildings:

1. Administration
2. Public Information Building
3. Maintenance Building.
4. Committal Service Shelter

These are described in more detail in Section 10: Architecture.

The four buildings are constructed with Phase 1.

Expansion of the Administration and Maintenance Building are planned to occur in a later phase. The expansion of the Maintenance building is not to be conditioned space.

The committal service shelter has a small enclosed storage area and is not be conditioned.

Design Criteria

External Design Conditions

Location	Seaside, Monterey County, California
Latitude	36.59º
Elevation	17 Feet above sea level
Climate Zone:	4
Summer Design:	79º F dry bulb; 64º F wet bulb
Winter Design:	35º F
Mean Daily Range:	20º F

Geographic Location: Approximately 1.5 miles inland from the Pacific Ocean.

Indoor Air Temperature

Offices and support areas:	
Winter	70º F
Summer	75º F
Electrical Rooms	maintain maximum 10º F above ambient.
Mechanical Rooms	maintain maximum 10º F above ambient.

Data obtained from Title 24 Appendix C California Design Location Data, outdoor design conditions at frequency level of 0.5 percent for summer Dry Bulb and Wet Bulb temperatures.

Ventilation Requirements		
Offices	-	15 cfm per person
Toilets	-	10 air changes per hour

Internal Noise Criteria – The following internal noise criteria from mechanical services will be achieved.

Offices:	NC35
Toilets and Corridors:	NC40

Insulation Requirements

Insulation thickness and R-value shall exceed the requirements of Title 24 by at least 20 percent.

12. Cost Estimate Summary

Phase 1

A detailed cost estimate for Phase 1 has been completed by Leland Saylor Associates as part of the Phase 1 Improvement Plans and can be found in **Appendix F**. The estimate provided by Saylor includes a thorough break-down of the three main components of the Phase 1 cost: Administration Building, Maintenance Building and Cemetery & Roadways. (The Saylor estimate places the committal service shelter within the Cemetery & Roadways portion of the estimate.) Approximately 27 percent of the Phase 1 costs come from the construction of the administration and maintenance buildings, with the remaining 73 percent coming from Cemetery and roadway construction. It is important to note that this estimate specifically excludes costs for UXO support and offsite improvements/utilities, which were estimated separately. The total engineer's estimate for the Phase 1 work was $6.7 million. The Phase 1 cost (as-bid) was $6.2 million, with four bids received ranging from $6.2 million to $7.2 million.

Phases 2-11

Phase 1 constructs all the necessary elements for Cemetery operation, while Phases 2-11 allow for expanded burial capacity via the construction of additional columbaria, standard burial plots and oversized burial plots. Along with development of interment spaces, the phasing includes a logical extension of grading, drainage, roads and utilities for each phase. In addition, improvements to the administration/maintenance complex and perimeter fencing are identified. These elements are not tied to a particular phase and have been arbitrarily assigned. **Table 12-1** below provides a cost summary by Phase. **Table 12-2** provides additional detail and major assumptions. The identified construction cost to build out the cemetery is approximately $70 million.

Table 12-1: Construction Cost Summary

Phase	Construction Cost
2	$ 7,632,800
3	$ 7,093,100
4	$ 5,985,950
5	$ 8,576,740
6	$ 7,865,800
7	$ 6,092,040
8	$ 8,452,840
9	$ 7,445,040
10	$ 5,769,800
11	$ 4,809,270
2-11	**$ 69,723,380**

Engineer's Preliminary Estimate of Construction Costs
FAI CA-09-05

	Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8		Phase 9		Phase 10		
UNIT PRICE	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**QUANTITY**	**COST**	**Q**
$3,000.00	3.5	$10,500	4.3	$12,900	2.8	$8,400	4.8	$14,400	6.0	$18,000	3.9	$11,700	5.3	$15,900	4.5	$13,500	3.9	$11,700	
$1,500.00	3.5	$5,250	4.3	$6,450	2.8	$4,200	4.8	$7,200	6.0	$9,000	3.9	$5,850	5.3	$7,950	4.5	$6,750	3.9	$5,850	
$8.00	12,000	$96,000	12,000	$96,000	10,000	$80,000	20,000	$160,000	15,000	$120,000	10,000	$80,000	8,000	$64,000	30,000	$240,000	18,000	$144,000	
$100,000.00	1	$100,000	1	$100,000	1	$100,000	1	$100,000	1	$100,000	1	$100,000	1	$100,000	1	$100,000	1	$100,000	
$7.00	16,000	$112,000	41,700	$291,900	16,700	$116,900	48,100	$336,700	60,000	$420,000	30,700	$214,900	32,100	$224,700	32,500	$227,500	29,400	$205,800	
$150.00	0	$0	1,350	$202,500	0	$0	700	$105,000	1,650	$247,500	600	$90,000	1,500	$225,000	650	$97,500	400	$60,000	
$7.00	16,300	$114,100	13,300	$93,100	10,100	$70,700	11,470	$80,290	14,400	$100,800	11,470	$80,290	17,120	$119,840	13,720	$96,040	11,650	$81,550	
$150.00	0	$0	0	$0	1,960	$294,000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	
$80.00	0	$0	500	$40,000	210	$16,800	370	$29,600	1,240	$99,200	0	$0	800	$64,000	0	$0	0	$0	
$100.00	0	$0	1,000	$100,000	0	$0	480	$48,000	1,440	$144,000	490	$49,000	600	$60,000	1,000	$100,000	0	$0	
$300,000.00	0	$0		$0	0	$0	1	$300,000		$0		$0		$0	0	$0	0	$0	
$500.00	9,800	$4,900,000	8,000	$4,000,000	6,400	$3,200,000	7,440	$3,720,000	8,800	$4,400,000	6,800	$3,400,000	9,760	$4,880,000	8,240	$4,120,000	6,480	$3,240,000	
$850.00	2,577	$2,190,450	2,411	$2,049,350	2,347	$1,994,950	3,143	$2,671,550	2,458	$2,089,300	2,302	$1,956,700	3,017	$2,564,450	2,733	$2,323,050	2,156	$1,832,600	
$900.00	105	$94,500	101	$90,900	100	$90,000	140	$126,000	120	$108,000	104	$93,600	130	$117,000	123	$110,700	87	$78,300	
$300.00		$0		$0		$0	1,100	$330,000		$0		$0		$0		$0		$0	
$400.00		$0		$0		$0	520	$208,000		$0		$0		$0		$0		$0	
$10,000.00	1	$10,000	1	$10,000	1	$10,000	1	$10,000	1	$10,000	1	$10,000	1	$10,000	1	$10,000	1	$10,000	
Phase Cost	**$7,632,800**		**$7,093,100**		**$5,985,950**		**$8,576,740**		**$7,865,800**		**$6,092,040**		**$8,452,840**		**$7,445,040**		**$5,769,800**		

Total Phase 2-11
$69,723,380

has been applied.
CD Estimate, May 2014 and NCA - MSN Cost Guide, Oct 2013.
arbitrarily shown to occur in Phase 5
paving, fuel dispensing, and vehicle wash area.
and match entry fencing.
the estimate.

13. Conclusions and Recommendations

The CCCVC Master Plan examines the existing conditions at the Cemetery project site (including the construction of Phase 1) and outlines a strategy that can be used to guide the construction of future phases. The existing conditions identified in this report affect many aspects of the project as a whole ranging from phasing to architecture and design concepts.

This Master Plan is intended to be used as a starting point when considering expansion of the Cemetery through future phases.

Appendix C

Air Quality and Greenhouse Gas Analyses

AIR QUALITY & GREENHOUSE GAS IMPACT ASSESSMENT

FOR

CENTRAL COAST VETERANS CEMETERY PROJECT
SEASIDE, CA

MARCH 2019

PREPARED FOR:
DENISE DUFFY & ASSOCIATES, INC.
947 CASS STREET, SUITE 5
MONTEREY, CA 93940

PREPARED BY:
AMBIENT
AIR QUALITY & NOISE CONSULTING
612 12TH STREET, SUITE 201
PASO ROBLES, CA 93446

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APPENDICES

Appendix A: Emissions Modeling

LIST OF COMMON TERMS & ACRONYMS

AAM	Annual Arithmetic Mean
AHERA	Asbestos Hazard Emergency Response Act
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
BSC	Building Standards Code
CAAQS	California Ambient Air Quality Standards
CBSC	California Building Standards Code
CCAA	California Clean Air Act
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel-Exhaust Particulate Matter or Diesel-Exhaust PM
DRRP	Diesel Risk Reduction Plan
FCAA	Federal Clean Air Act
GHG	Greenhouse Gases
HAP	Hazardous Air Pollutant
LOS	Level of Service
MBARD	Monterey Bay Air Resources District
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NCCAB	North Central Coast Air Basin
NO_x	Oxides of Nitrogen
O_3	Ozone
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter (less than 10 µm)
$PM_{2.5}$	Particulate Matter (less than 2.5 µm)
ppb	Parts per Billion
ppm	Parts per Million
ROG	Reactive Organic Gases
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
sq.ft.	Square Feet
TAC	Toxic Air Contaminant
TOG	Total Organic Gases
µg/m^3	Micrograms per cubic meter
UNFCCC	United Nations Framework Convention on Climate Change
U.S. EPA	United State Environmental Protection Agency
VOC	Volatile Organic Gases

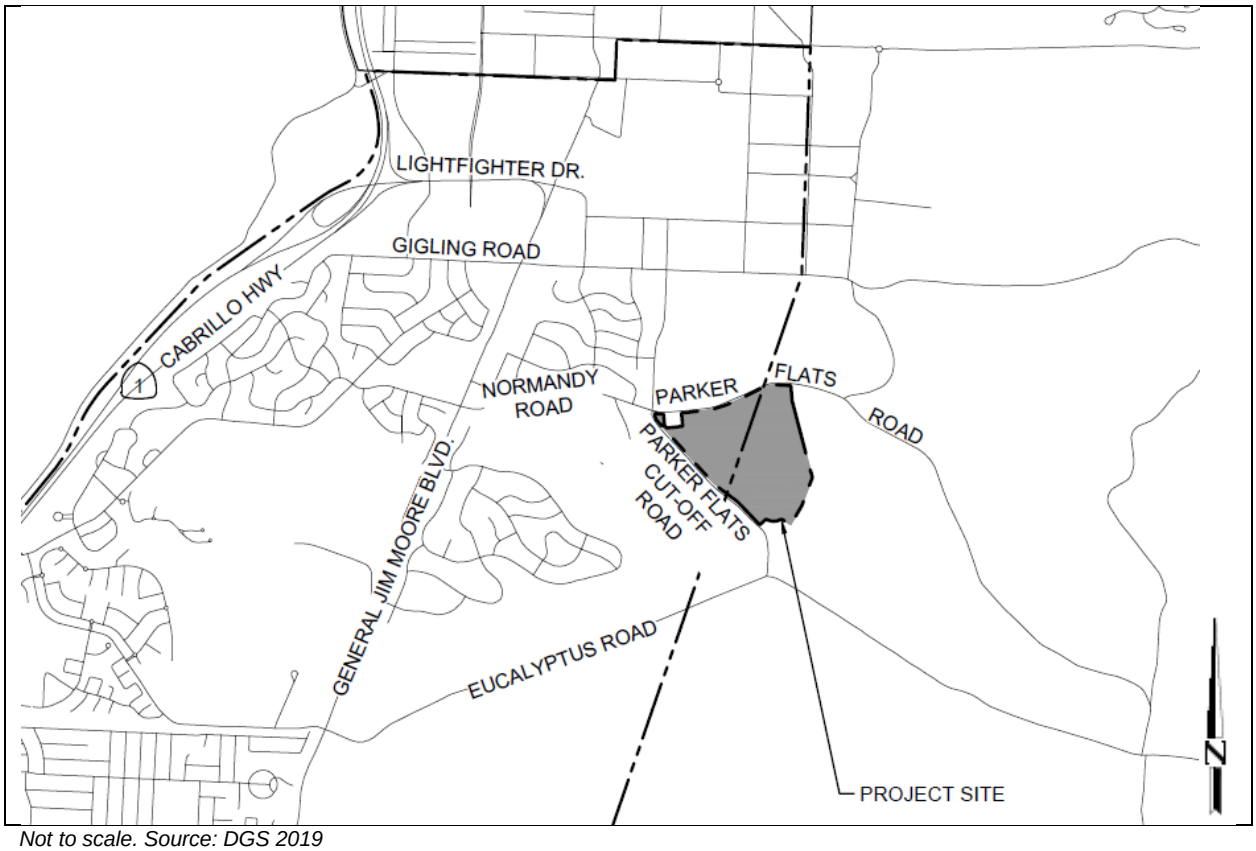
INTRODUCTION

This report provides an evaluation of potential air quality and greenhouse gas (GHG) impacts associated with the proposed California Central Coast Veterans Cemetery (CCCVC) 2015 Master Plan (2015 Master Plan), including Phase 2. Phase 1 of the CCCVC was previously evaluated in 2014 and is not included in this analysis. An overview of the existing environmental setting related to air quality and GHGs, including a summary of the existing regulatory framework has also been included. The analysis was prepared in accordance with Monterey Bay Air Resources District (MBARD)-recommended guidance.

PROPOSED PROJECT OVERVIEW

The purpose of the 2015 Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues remaining following the construction and completion of Phase 1 for the development of the cemetery. The 2015 Master Plan lays out the process and strategy for the implementation of the entire CCCVC over the next 100 years, including Phase 2. The location of the CCCVC is depicted in Figure 1. Phase 2 of the 2015 Master Plan would accommodate burials over the next 10 years and includes burial facilities of both in-ground cremains and crypts, as well as supporting roads and infrastructure. Phase 2 of the CCCVC is depicted in Figure 2.

Figure 1
CCCVC Location



Not to scale. Source: DGS 2019

Figure 2
CCCVC Phase 2



Source: DGS 2019

AIR QUALITY

EXISTING SETTING

The proposed project is located within the North Central Coast Air Basin (NCCAB) and within the jurisdiction of the Monterey Bay Air Resources District (MBARD). Air quality in a region is affected by its topography, meteorology, and climate. These factors are discussed in more detail in the following sections:

TOPOGRAPHY

The NCCAB encompasses Santa Cruz, San Benito, and Monterey counties. The NCCAB is generally bounded by the Diablo Range to the northeast, which together with the southern portion of the Santa Cruz Mountains forms the Santa Clara Valley which extends into the northeastern tip of the NCCAB. Farther south, the Santa Clara Valley transitions into the San Benito Valley, which runs northwest-southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley that extends from Salinas at the northwest end to King City at the southeast end. The northwest portion of the NCCAB is dominated by the Santa Cruz Mountains.

METEOROLOGY AND CLIMATE

The climate of the NCCAB is dominated by a semi-permanent high pressure cell over the Pacific Ocean. In the summer, the dominant high pressure cell results in persistent west and northwest winds across the majority of coastal California. As air descends in the Pacific high pressure cell, a stable temperature inversion is formed. As temperatures increase, the warmer air aloft expands, forcing the coastal layer of air to move onshore producing a moderate sea breeze over the coastal plains and valleys. Temperature inversions inhibit vertical air movement and often result in increased transport of air pollutants to inland receptor areas.

In the winter, when the high pressure cell is weakest and farthest south, the inversion associated with the Pacific high pressure cell is typically absent in the NCCAB. Air frequently flows in a southeasterly direction out of the Salinas and San Benito valleys in the NCCAB. The predominant offshore flow during this time of year tends to aid in pollutant dispersal producing relatively healthful to moderate air quality throughout the majority of the region. Conditions during this time are often characterized by afternoon and evening land breezes and occasional rain storms. However, local inversions caused by the cooling of air close to the ground can form in some areas during the evening and early morning hours.

Winter daytime temperatures in the NCCAB typically average in the mid 50s during the day, with nighttime temperatures averaging in the low 40s. Summer daytime temperatures typically average in the 60s during the day, with nighttime temperatures averaging in the 50s. Precipitation varies within the region, but in general, annual rainfall is lowest in the coastal plain and inland valley, higher in the foothills, and highest in the mountains.

CRITERIA AIR POLLUTANTS

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the United States Environmental Protection Agency (U.S. EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air. An ambient air quality standard is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. Standards established for the protection of human health are referred to as primary standards; whereas, standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this report.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere.

Ozone (O_3) is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO_X and volatile organic compounds (VOC), also referred to as reactive organic gases (ROG) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

Reactive Organic Gas (ROG) is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like

the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

Volatile Organic Compounds (VOC) are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Oxides of Nitrogen (NO_X) are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO_X, nitrogen dioxide (NO_2), is a reddish-brown gas that is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Particulate Matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- Inhalable coarse particles ($PM_{2.5}$- PM_{10}), such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- Fine particles ($PM_{2.5}$), such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- Ultrafine particles (UFP), are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

Carbon Monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, ARB and U.S. EPA designate urban areas as

CO nonattainment areas instead of the entire basin as with ozone and PM_{10}. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover (Caltrans 1996).

Sulfur Dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 ppm can cause death). OSHA regulates workplace exposure to H_2S.

Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The California Air Resources Board (ARB) has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

Visibility Reducing Particles: Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Vinyl Chloride (C_2H_3Cl or **VCM)** is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

ODORS

Typically odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The MBARD does not have an individual rule or regulation that specifically addresses odors; however, odors would be subject to MBARD *Rule 402, Nuisance*. Any actions related to odors would be based on citizen complaints to local governments and the MBARD.

TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are not expected to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered "criteria pollutants" under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to National or California ambient air quality standards (NAAQS and CAAQS, respectively). Instead, the U.S. EPA and the ARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with MBARD rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the U.S. EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The following provides a summary of the primary TACs of concern within the State of California and related health effects:

Diesel Particulate Matter (DPM) was identified as a TAC by the ARB in August 1998. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40percent of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary

sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (ARB 2013).

In October 2000, the ARB issued a report entitled: "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles", which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRPP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (ARB 2013, ARB 2000).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

Acetaldehyde is a federal hazardous air pollutant. The ARB identified acetaldehyde as a TAC in April 1993. Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Sources of acetaldehyde include emissions from combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. A majority of the statewide acetaldehyde emissions can be attributed to mobile sources, including on-road motor vehicles, construction and mining equipment, aircraft, recreational boats, and agricultural equipment. Area sources of emissions include the burning of wood in residential fireplaces and wood stoves. The primary stationary sources of acetaldehyde are from fuel combustion from the petroleum industry (ARB 2013).

Acute exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic intoxication of acetaldehyde resemble those of alcoholism. The U.S. EPA has classified acetaldehyde as a probable human carcinogen. In California, acetaldehyde was classified on April 1, 1988, as a chemical known to the state to cause cancer (U.S. EPA 2018a; ARB 2013).

Benzene is highly carcinogenic and occurs throughout California. The ARB identified benzene as a TAC in January 1985. A majority of benzene emitted in California (roughly 88 percent) comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. These sources include on-road motor vehicles, recreational boats, off-road recreational vehicles, and lawn and garden equipment. Benzene is also formed as a partial combustion product of larger aromatic fuel components. To a lesser extent, industry-related stationary sources are also sources of benzene emissions. The primary stationary sources of reported benzene emissions are crude petroleum and natural gas mining, petroleum refining, and electric generation that involves the use of petroleum products. The primary area sources include residential combustion of various types such as cooking and water heating (ARB 2013).

Acute inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by

inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidences of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. The U.S. EPA has classified benzene as known human carcinogen for all routes of exposure (U.S. EPA 2018a).

1,3-butadiene was identified by the ARB as a TAC in 1992. Most of the emissions of 1,3-butadiene are from incomplete combustion of gasoline and diesel fuels. Mobile sources account for a majority of the total statewide emissions. Additional sources include agricultural waste burning, open burning associated with forest management, petroleum refining, manufacturing of synthetics and man-made materials, and oil and gas extraction. The primary natural sources of 1,3-butadiene emissions are wildfires (ARB 2013).

Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Epidemiological studies have reported a possible association between 1,3-butadiene exposure and cardiovascular diseases. Epidemiological studies of workers in rubber plants have shown an association between 1,3-butadiene exposure and increased incidence of leukemia. Animal studies have reported tumors at various sites from 1,3-butadiene exposure. In California, 1,3-butadiene has been identified as a carcinogen.

Carbon Tetrachloride was identified by the ARB as a TAC in 1987 under California's TAC program (ARB 2013). The primary stationary sources reporting emissions of carbon tetrachloride include chemical and allied product manufacturers and petroleum refineries. In the past, carbon tetrachloride was used for dry cleaning and as a grain-fumigant. Usage for these purposes is no longer allowed in the United States. Carbon tetrachloride has not been registered for pesticidal use in California since 1987. Also, the use of carbon tetrachloride in products to be used indoors has been discontinued in the United States. The statewide emissions of carbon tetrachloride are small (about 1.96 tons per year), and background concentrations account for most of the health risk (ARB 2013).

The primary effects of carbon tetrachloride in humans are on the liver, kidneys, and central nervous system. Human symptoms of acute inhalation and oral exposures to carbon tetrachloride include headache, weakness, lethargy, nausea, and vomiting. Acute exposures to higher levels and chronic (long-term) inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans. Human data on the carcinogenic effects of carbon tetrachloride are limited. Studies in animals have shown that ingestion of carbon tetrachloride increases the risk of liver cancer. In California, carbon tetrachloride has been identified as a carcinogen.

Hexavalent chromium was identified as a TAC in 1986. Sources of Hexavalent chromium include industrial metal finishing processes, such as chrome plating and chromic acid anodizing, and firebrick lining of glass furnaces. Other sources include mobile sources, including gasoline motor vehicles, trains, and ships (ARB 2013).

The respiratory tract is the major target organ for hexavalent chromium toxicity, for acute and chronic inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to hexavalent chromium, while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled hexavalent chromium is a human carcinogen, resulting in an increased risk of lung cancer. In California, hexavalent chromium has been identified as a carcinogen.

Para-Dichlorobenzene was identified by the ARB as a TAC in April 1993. The primary area-wide sources that have reported emissions of para-dichlorobenzene include consumer products such as non-aerosol insect repellants and solid/gel air fresheners. These sources contribute nearly all of the statewide para-dichlorobenzene emissions (ARB 2013).

Acute exposure to paradichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans. The U.S. EPA has classified para-dichlorobenzene as a possible human carcinogen.

Formaldehyde was identified by the ARB as a TAC in 1992. Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Photochemical oxidation is the largest source of formaldehyde concentrations in California ambient air. Directly emitted formaldehyde is a product of incomplete combustion. One of the primary sources of directly-emitted formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is also used in fumigants and soil disinfectants. The primary area sources of formaldehyde emissions include wood burning in residential fireplaces and wood stoves (ARB 2013).

Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute and chronic inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. Formaldehyde is classified as a probable human carcinogen.

Methylene Chloride was identified by the ARB as a TAC in 1987. Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California, where methylene chloride is the main ingredient in many paint stripping formulations. Plastic product manufacturers, manufacturers of synthetics, and aircraft and parts manufacturers are stationary sources reporting emissions of methylene chloride (ARB 2013).

The acute effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic exposure to methylene chloride suggest that the central nervous system is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride. In California, methylene chloride has been identified as a carcinogen.

Perchloroethylene was identified by the ARB as a TAC in 1991. Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents. In California, the stationary sources that have reported emissions of perchloroethylene are dry cleaning plants, aircraft part and equipment manufacturers, and fabricated metal product manufacturers. The primary area sources include consumer products such as automotive brake cleaners and tire sealants and inflators (ARB 2013).

Acute inhalation exposure to perchloroethylene vapors can result in irritation of the upper respiratory tract and eyes, kidney dysfunction, and at lower concentrations, neurological effects, such as reversible mood and behavioral changes, impairment of coordination, dizziness, headaches sleepiness, and unconsciousness. Chronic inhalation exposure can result in neurological effects, including sensory symptoms such as headaches, impairments in cognitive and motor neurobehavioral functioning, and color vision decrements. Cardiac arrhythmia, liver damage, and possible kidney damage may also occur. In California, perchloroethylene has been identified as a carcinogen.

ASBESTOS

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than 1 percent up to about 25 percent, and

sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by ARB as a TAC in 1986. The ARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

REGULATORY FRAMEWORK

Air quality within the NCCAB is regulated by several jurisdictions including the U.S. EPA, ARB, and the MBARD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL

U.S. Environmental Protection Agency

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

Federal Clean Air Act

The FCAA required the U.S. EPA to establish NAAQS, and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in Table 1.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

Table 1
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards*	National Standards* (Primary)
Ozone (O_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 µg/m^3	–
	24-hour	50 µg/m^3	150 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	12 µg/m^3
	24-hour	No Standard	35 µg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm
	8-hour	9 ppm	9 ppm
	8-hour (Lake Tahoe)	6 ppm	–
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppb
Sulfur Dioxide (SO_2)	AAM	–	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	3-hour	–	0.5 ppm (1300 µg/m^3)**
	1-hour	0.25 ppm	75 ppb
Lead	30-day Average	1.5 µg/m^3	–
	Calendar Quarter	–	1.5 µg/m^3
	Rolling 3-Month Average	–	0.15 µg/m^3
Sulfates	24-hour	25 µg/m^3	No Federal Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent.	

ppm=parts per million; ppb=parts per billion; AAM=Annual Arithmetic Mean; µg/m^3=micrograms per cubic meter
** For more information on standards visit: http//ww.arb.ca.gov.research/aaqs/aaqs2.pdf*
***Secondary Standard*
Source: ARB 2018c

National Emission Standards for Hazardous Air Pollutants

Pursuant to the FCAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

STATE

California Air Resources Board

The ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA of 1988. Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in Table 1. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

California Clean Air Act

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO_2, and NO_2 by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

California Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

Assembly Bills 1807 & 2588 - Toxic Air Contaminants

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

California Building Standards Code

The California Building Standards Code (CBSC), commonly referred to as Title 24, contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. Included in the CBSC are energy efficiency standards, which are commonly referred to as green building standards or CalGreen standards. The CBSC is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBSC was most recently updated in 2016.

MONTEREY BAY AIR RESOURCES DISTRICT

The MBARD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the NCCAB, within which the project is located. Responsibilities of the MBARD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA. In an attempt to achieve NAAQS and CAAQS and maintain air quality, the MBARD has most recently completed the *2008 Air Quality Management Plan (AQMP)* for achieving the state ozone standards and the *2007 Federal Maintenance Plan* for maintaining federal ozone standards (MBARD 2018b).

To achieve and maintain ambient air quality standards, the MBARD has adopted various rules and regulations for the control of airborne pollutants. The MBARD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

- **Rule 402 (Nuisances).** The purpose of this rule is to prohibit emissions that may create a public nuisance. Applies to any source operation that emits or may emit air contaminants or other materials.
- **Rule 425 (Use of Cutback Asphalt).** The purpose~~d~~ of this rule is to limit emissions of vapors of organic compounds from the use of cutback and emulsified asphalt. This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.

REGULATORY ATTAINMENT DESIGNATIONS

The attainment status of the NCCAB is summarized in Table 2. An attainment designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A nonattainment designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation(s) was caused by an exceptional event, as defined in the criteria. Unclassified designations indicate insufficient data is available to determine attainment status.

Table 2
NCCAB Attainment Status Designations

Pollutant	State Designation	National Designation
Ozone (O_3)	Nonattainment [1]	Attainment/Unclassified[2]
Inhalable Particulates (PM_{10})	Nonattainment	Attainment
Fine Attainment ($PM_{2.5}$)	Attainment	Unclassified/Attainment [3]
Carbon Monoxide (CO)	Monterey County-Attainment San Benito County-Unclassified Santa Cruz County-Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO_2)	Attainment	Attainment/Unclassified[4]
Sulfur Dioxide (SO_2)	Attainment	Attainment[5]
Lead	Attainment	Attainment/Unclassified[6]

Notes:
1) *Effective July 26, 2007, the ARB designated the NCCAB a nonattainment area for the State ozone standard, which was revised in 2006 to include an 8-hour standard of 0.070 ppm.*
2) *On March 12, 2008, EPA adopted a new 8-hour ozone standard of 0.075 ppm. In April 2012, EPA designated the NCCAB attainment/unclassified based on 2009-2011 data.*
3) *This includes the 2006 24-hour standard of 35 µg/m3 and the 2012 annual standard of 12 µg/m3.*
4) *In 2012, EPA designated the entire state as attainment/unclassified for the 2010 NO_2 standard.*
5) *In June 2011, the ARB recommended to EPA that the entire state be designated as attainment for the 2010 primary SO_2 standard. Final designations to be addressed in future EPA actions.*
6) *On October 15, 2008 EPA lowered the NAAQS for lead to 0.15 µg/m^3. Final designations were made by EPA in November 2011.*

Source: ARB 2018b, MBARD 2018a.

Under the CCAA, the basin is designated as a nonattainment transitional area for the state ozone AAQS. The NCCAB is also designated a nonattainment area for the state PM_{10} AAQS. Under the FCAA, the NCCAB is currently designated attainment for the recently established eight-hour ozone federal AAQS. The NCCAB is designated either attainment or unclassified for the remaining state and federal AAQS.

SENSITIVE RECEPTORS

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Nearby sensitive receptors consist predominantly of residential dwellings. The nearest residential dwellings are located northwest of the project site, across Normandy Way. Chartwell School is located west of the project site, along Numa Watson Road.

PROJECT IMPACTS

THRESHOLDS OF SIGNIFICANCE

Criteria for determining the significance of air quality impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

1. Conflict with or obstruct implementation of any applicable air quality plan.
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial pollutant concentrations.
5. Create objectionable odors affecting a substantial number of people.

To assist local jurisdictions in the evaluation of air quality impacts, the MBARD has published the *CEQA Air Quality Guidelines* (MBARD 2008). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. The following MBARD-recommended thresholds of significance were relied upon for determination of impact significance:

- **Short-term Emissions of Criteria Air Pollutants**. Construction impacts would be significant if the proposed project would emit greater than 82 pounds per day (lbs/day) of PM_{10}, or will cause a violation of PM_{10} National or State AAQS at nearby receptors. Construction-generated emissions of ozone precursors (i.e., ROG or NO_X) are accommodated in the emission inventories of State and federally-required air plans. For this reason, the MBARD has not identified recommended thresholds of significance for construction-generated ozone precursors.
- **Long-Term Emissions of Criteria Air Pollutants**. Operational impacts would be considered potentially significant if direct and indirect emissions would exceed 137 lbs/day of either ROG or NO_X, 82 lbs/day

of PM_{10}, or if the project would contribute to local PM_{10} concentrations that exceed Ambient Air Quality Standards. Emissions of SO_X would be significant if the project generates direct emissions of greater than 150 lbs/day;

- **Local Mobile-Source CO Concentrations**. Local mobile-source impacts would be significant if the project generates direct emissions of greater than 550 lbs/day of CO or if the project would contribute to local CO concentrations that exceed the CAAQS of 9.0 ppm for 8 hours or 20 ppm for 1 hour. (Indirect emissions are typically considered to include mobile sources that access the project site but generally emit off-site; direct emissions typically include sources that emitted on-site (e.g., stationary sources, on-site mobile equipment).
- **Toxic Air Contaminants**. TAC impacts would be significant if the project would expose the public to substantial levels of TACs so that the probability of contracting cancer for the Maximally Exposed Individual would exceed 10 in 1 million and/or so that ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the Maximally Exposed Individual.
- **Odorous Emissions**. Odor impacts would be significant if the project has the potential to frequently expose members of the public to objectionable odors.

METHODOLOGY

Short-term Construction

Short-term construction emissions associated with construction of Phase 2 of the CCCVC were quantified using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Emissions were quantified based on project-specific data provided and default modeling parameters contained in the model for Monterey County. Emissions modeling assumptions are summarized in Table 3. Construction emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed. Refer to Appendix B for emissions modeling assumptions and results.

Long-term Operation

Long-term operational emissions for Phase 2 of the CCCVC were quantified using CalEEMod, version 2016.3.2, based on vehicle trip-generation rates provided. To be conservative, a maximum of 80 vehicles (160 vehicle trips) was assumed for weekdays and a maximum of 200 vehicles (400 vehicle trips) was assumed for weekend days. Actual trip-generation rates for most days of the year, excluding special events, would typically be less. Vehicle trip lengths were based on the maximum daily average trip length identified in the model of 9.7 miles per trip. The fleet mix was assumed to be predominantly light-duty vehicles. Other modeling assumptions, including energy usage rates, water usage rates, and waste-generation rates were based on CalEEMod model defaults. Operational emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed. Refer to Appendix B for emissions modeling assumptions and results.

Table 3
Construction Information – CCCVC Phase 2

Construction Phase	Duration (Days) [1]	Off-Road Equipment [2]	Construction Vehicle Trips [3]
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20 Worker Trips/Day 525 Haul Truck Trips [4]
Site Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20 Worker Trips/Day
Onsite Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15 Worker Trips/Day 50 Haul Truck Trips [5]

1. *Based on a conservative project-specific estimation of construction activity durations.*
2. *Based on default equipment assumptions contained in the CalEEMod computer model and, where available, project-specific construction information. All equipment assumed to operate 8 hours per day.*
3. *Worker trips are based on CalEEMod default assumptions and estimated equipment usage.*
4. *Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.*
5. *Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5 inch application material thickness) and an average haul truck capacity of 8 cubic yards.*

PROJECT IMPACTS

Impact AQ-1: Conflict with or obstruct implementation of any applicable air quality plan.

Consistency with the AQMP is assessed by comparing the proposed growth associated with a proposed project with the population and dwelling unit forecasts adopted by the Association of Monterey Bay Area Governments (AMBAG). These projections are used to generate emission forecasts upon which the AQMP is based. Project's which are consistent with AMBAG's regional forecasts would be considered consistent with the AQMP (MBARD 2008). In addition, projects that would result in a significant increase in emissions, in excess of MBARD significance thresholds, would also be considered to potentially conflict with or obstruct implementation of the AQMP.

The proposed project would not result in a substantial increase in employment, nor would the proposed project result in increased population growth. In addition, as noted in Impact 3, the proposed project would not result in a significant increase in emissions. For these reasons, implementation of the proposed project is not anticipated to result in a substantial increase in either direct or indirect emissions that would conflict with or obstruct implementation of the AQMP. This impact is considered less than significant. No mitigation is required. (Refer to Impacts AQ-3 and AQ-4 for additional discussion of air quality impacts.)

Impact AQ-2: ***Violate any air quality standard or contribute substantially to an existing or projected air quality violation.***

As discussed in Impacts AQ-3 and AQ-4, implementation of the proposed project would not result in short-term or long-term increases in emissions that would violate any air quality standard or contribute to an existing or projected air quality violation. As a result, this impact is considered less than significant. No mitigation is required. (Refer to Impacts AQ-3 and AQ-4 for additional discussion of air quality impacts.)

Impact AQ-3: ***Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).***

Construction Emissions

Construction-generated emissions are short-term and of temporary duration, lasting only as long as construction activities occur, but possess the potential to represent a significant air quality impact. The construction of the proposed uses would result in the temporary generation of emissions resulting from site grading and excavation, asphalt paving, the application of architectural coatings, motor vehicle exhaust associated with construction equipment and on-road vehicle trips. Emissions of PM are largely associated with ground disturbance and the movement of construction vehicles and equipment on unpaved surfaces.

Construction-generated emissions associated with CCCVC Phase 2 are summarized in Table 4. As depicted, Phase 2 would generate maximum daily PM_{10} emissions of approximately 32.2 lbs/day and would not exceed MBARD's significance threshold of 82 lbs/day. Furthermore, compliance with existing MBARD rules and regulations, such as Rule 402 (Nuisances) and Rule 425 (Use of Cutback Asphalt) would further minimize potential short-term air quality impacts. For instance, with application of water for the control of nuisance-related dust emissions, construction-generated PM_{10} would total approximately 15 lbs/day, or less.

Construction activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, construction emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed MBARD's significance threshold of 82 lbs/day. As a result, short-term construction activities would be considered to have a less-than-significant air quality impact. No mitigation is required.

Operational Emissions

Daily operational emissions associated with CCCVC Phase 2 are summarized in Table 5. As depicted, Phase 2 would generate maximum daily emissions of approximately 0.9 lbs/day of ROG, 1.8 lbs/day of NO_X, 12.1 lbs/day of CO, less than 0.1 lbs/day of SO_X, 2.9 lbs/day of PM_{10}, and 0.8 lbs/day of $PM_{2.5}$. It is important to note that operational emissions were conservatively quantified based on maximum daily operational vehicle trip-generation rates. Operational emissions are projected to decline in future years due primarily to improvements in vehicle fuel efficiency. Daily operational emissions would not exceed applicable MBARD significance thresholds.

Operational activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, operational emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed MBARD's significance thresholds. As a result, long-term operational activities would be considered to have a less-than-significant air quality impact. No mitigation is required.

Table 4
Construction Emissions of Criteria Air Pollutants – CCCVC Phase 2

Construction Activity	Emissions (lbs/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Demolition				
On-Site:	3.8	39.6	1.8	1.6
Off-Site:	0.1	0.1	0.2	0.1
Total:	3.9	39.7	2.0	1.7
Site Preparation				
On-Site:	5.1	52.8	20.7	12.4
Off-Site:	0.1	0.1	0.2	0.1
Total:	5.2	52.9	20.9	12.5
Grading				
On-Site:	3.3	35.5	7.7	4.8
Off-Site:	0.2	1.8	0.3	0.1
Total:	3.5	37.3	8.0	4.9
Paving				
On-Site:	1.9	18.4	1.1	1.0
Off-Site:	0.1	0.5	0.2	0.1
Total:	2.0	18.9	1.3	1.1
Maximum Daily Emissions: [1]	14.6	148.8	32.2	20.2
MBARD Significance Threshold[2]:	-	-	82	-
Exceeds Threshold/Significant Impact?	NA	NA	No	NA

1. Based on highest daily emissions during summer or winter conditions without implementation of fugitive dust control measures. Assumes demolition, site preparation, grading, and paving could potentially occur simultaneously.

2. The MBARD has not identified significance thresholds for ROG, NO_X, or $PM_{2.5}$. Emissions of ROG and NO_X are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant impact on the attainment and maintenance of ozone AAQS.Emissions of $PM_{2.5}$ are a component of PM_{10}.

Refer to Appendix A for emissions modeling assumptions and results.

Table 5
Operational Emissions of Criteria Air Pollutants – CCCVC Phase 2

Source	Emissions (lbs/day) [1]					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Landscaping, Consumer Products, Architectural Coatings	0.02	0.00	0.00	0.00	0.00	0.00
Mobile Sources	0.90	1.81	12.13	0.03	2.92	0.80
Maximum Daily Emissions [5]:	0.9	1.8	12.1	<0.1	2.9	0.8
MBARD Significance Threshold:	137	137	550	150	82	-
Exceeds Threshold/Significant Impact?	No	No	No	No	No	NA

1. To be conservative, maximum daily emissions are based on the highest daily emissions for summer or winter conditions.

Refer to Appendix A for emissions modeling assumptions and results.

Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations.

Short-term Exposure

Naturally-Occurring Asbestos

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered less than significant. No mitigation is required.

DPM Emissions

Implementation of the proposed project would result in the generation of DPM emissions during construction associated with the use of off-road diesel equipment for site grading and excavation, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure ~~of~~ to TACs are typically calculated based on a 25 to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would to occur over an approximate 12-month period, project-related construction activities would constitute less than four percent of the typical exposure period. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 10 in one million). This impact would be considered less than significant. No mitigation is required.

Fugitive Dust Emissions

Implementation of the proposed project would result in short-term emissions of fugitive PM associated with ground disturbance. However, compliance with applicable MBARD rules and regulations, including but not limited to, Rule 402 for the control of nuisance–related emissions would minimize potential impacts to occupants of nearby land uses. Furthermore, as noted in Impact AQ-3, construction-generated PM_{10} would not exceed MBARD's daily significance threshold of 82 lbs/day. For these reasons, construction activities would be considered to have a less-than-significant short-term impact to nearby sensitive receptors. No mitigation is required.

Long-term Exposure

Implementation of the proposed project would not result in the installation of any major stationary sources of emissions. As a result, CO generated by mobile sources would be considered the primary pollutant of local concern. Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. If inhaled, CO can be adsorbed easily by the blood stream and can inhibit oxygen delivery to the body, which can cause significant health effects ranging from slight headaches to death. The most serious effects are felt by individuals susceptible to oxygen deficiencies, including people with anemia and those suffering from chronic lung or heart disease. For this reason, localized mobile-source CO concentrations are of potential concern near signalized intersections that experience high traffic volumes/vehicle congestion and are projected to operate at unacceptable levels of service (i.e., LOS E, or worse) (Caltrans 1996).

Implementation of the proposed project would not result in or contribute to unacceptable levels of service (i.e., LOS E, or worse) at primarily affected signalized intersections. For this reason and given the regions low background CO concentrations, implementation of the proposed project would not result in or contribute to localized mobile-source CO concentrations that would be projected to exceed applicable ambient air quality standards. This impact would be considered less than significant. No mitigation is required.

Impact AQ-5: Create objectionable odors affecting a substantial number of people.

Implementation of the proposed project would not result in the installation of any major sources of odors. In addition, no major sources of odors have been identified in the vicinity of the project site. As a result, implementation of the proposed project would not result in the long-term exposure of individuals to increased concentrations of odors. However, construction of the proposed facilities would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. For these reasons, this impact would be considered less than significant. No mitigation is required.

GREENHOUSE GASES AND CLIMATE CHANGE

EXISTING SETTING

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

- **Carbon Dioxide**. Carbon dioxide (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2018c).

- **Methane**. Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (U.S. EPA 2018c).

- **Nitrous Oxide**. Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years (U.S. EPA 2018c).

- **Hydrofluorocarbons.** Hydrofluorocarbons (HFCs) are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 270 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA 2018c).

- **Perfluorocarbons.** Perfluorocarbons (PFCs) are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F_{14}). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which

releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for PFCs ranges from 2,600 to 50,000 years (U.S. EPA 2018c).

- **Nitrogen Trifluoride**. Nitrogen trifluoride (NF_3) is an inorganic, colorless, odorless, toxic, nonflammable gas used as an etchant in microelectronics. Nitrogen trifluoride is predominantly employed in the cleaning of the plasma-enhanced chemical vapor deposition chambers in the production of liquid crystal displays and silicon-based thin film solar cells. It has a global warming potential of 16,100 carbon dioxide equivalents (CO_2e). While NF_3 may have a lower global warming potential than other chemical etchants, it is still a potent GHG. In 2009, NF_3 was listed by California as a high global warming potential GHG to be listed and regulated under Assembly Bill (AB) 32 (Section 38505 Health and Safety Code).

- **Sulfur Hexafluoride**. Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Leaks of SF_6 occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years (U.S. EPA 2018c).

- **Black Carbon**. Black carbon is the strongest light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Black carbon contributes to climate change both directly by absorbing sunlight and indirectly by depositing on snow and by interacting with clouds and affecting cloud formation. Black carbon is considered a short-lived species, which can vary spatially and, consequently, it is very difficult to quantify associated global-warming potentials. The main sources of black carbon in California are wildfires, off-road vehicles (locomotives, marine vessels, tractors, excavators, dozers, etc.), on-road vehicles (cars, trucks, and buses), fireplaces, agricultural waste burning, and prescribed burning (planned burns of forest or wildlands) (CCAC 2018, U.S. EPA 2018c).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in CO_2e, which weight each gas by its global warming potential (GWP). Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. Table 6 provides a summary of the GWP for GHG emissions of typical concern with regard to community development projects, based on a 100-year time horizon. As indicated, Methane traps over 25 times more heat per molecule than CO_2, and N_2O absorbs roughly 298 times more heat per molecule than CO_2. Additional GHG with high GWP include Nitrogen trifluoride, Sulfur hexafluoride, Perfluorocarbons, and black carbon.

Table 6
Global Warming Potential for GHGs

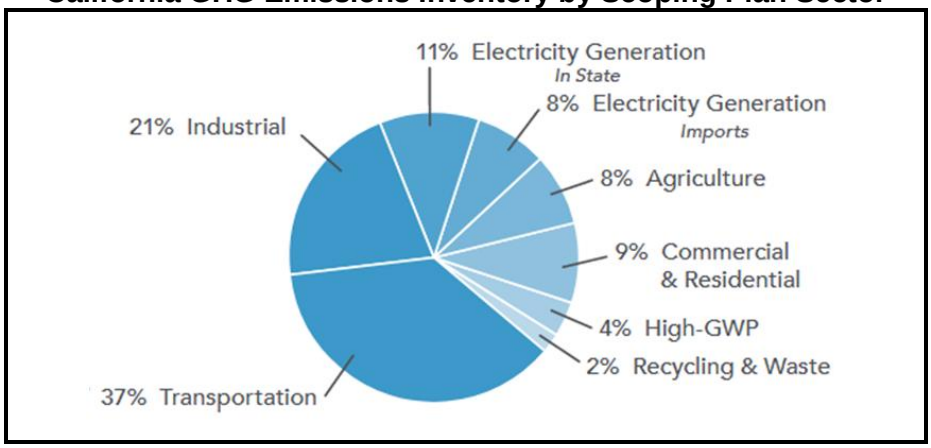
Greenhouse Gas	Global Warming Potential (100-year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Dioxide (N_2O)	298
**Based on IPCC GWP values for 100-year time horizon* *Source: IPCC 2007*	

SOURCES OF GHG EMISSIONS

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions (U.S. EPA 2018c).

In 2015, GHG emissions within California totaled 440.4 million metric tons (MMT) of CO_2e. GHG emissions, by sector, are summarized in Figure 3. Within California, the transportation sector is the largest contributor, accounting for approximately 37 percent of the total state-wide GHG emissions. Emissions associated with industrial uses are the second largest contributor, totaling roughly 21 percent. Electricity generation totaled roughly 19 percent (ARB 2018d).

Figure 3
California GHG Emissions Inventory by Scoping Plan Sector



Source: ARB 2018d

Short-Lived Climate Pollutants

Short-lived climate pollutants (SLCPs), such as black carbon, fluorinated gases, and methane also have a dramatic effect on climate change. Though short lived, these pollutants create a warming influence on the climate that is many times more potent than that of carbon dioxide.

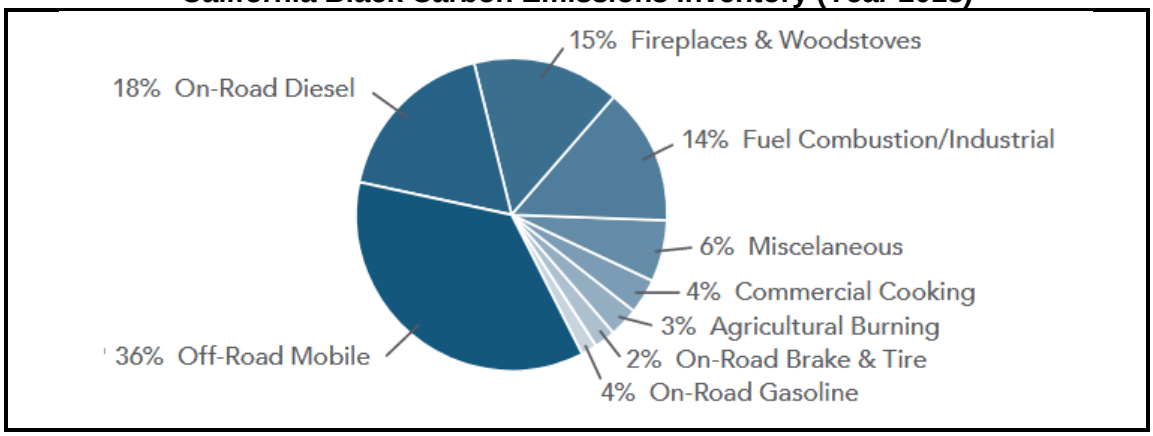
As part of the ARB's efforts to address SLCPs, the ARB has developed a statewide emission inventory for black carbon. The black carbon inventory will help support implementation of the SLCP Strategy, but it is not part of the State's GHG Inventory that tracks progress towards the State's climate targets. The most recent inventory for year 2013 conditions is depicted in Figure 4. As depicted, off-road mobile sources account for a majority of black carbon emissions totaling roughly 36 percent of the inventory. Other major anthropogenic sources of black carbon include on-road transportation, residential wood burning, fuel combustion, and industrial processes (ARB 2018e).

Effects of Global Climate Change

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snow pack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the

Figure 4
California Black Carbon Emissions Inventory (Year 2013)



Source: ARB 2018d

snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry (CCCC 2012; PCL 2018).

REGULATORY FRAMEWORK

FEDERAL

Executive Order 13514

Executive Order 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in Massachusetts v. U.S. EPA, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the FCAA and that the U.S. EPA has the authority to regulate GHG. The Court held that the U.S. EPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's "Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles", which was published on September 15, 2009. On May 7, 2010 the final "Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards" was published in the Federal Register.

U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

STATE

Assembly Bill 1493

AB 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the ARB to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply; an increase in air pollution caused by higher temperatures; harm to agriculture; an increase in wildfires; damage to the coastline; and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the FCAA, to allow the State to require reduced tailpipe emissions of CO_2. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

In 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order No. S-3-05

Executive Order S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the

Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32 - California Global Warming Solutions Act of 2006

AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, NF_3, and SF_6. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that were phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions (ARB 2018c).

Climate Change Scoping Plan

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by ARB on December 11, 2008 and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals., The most recent update released by ARB is the *2017 Climate Change Scoping Plan*, which was released In November 2017. The *2017 Climate*

Change Scoping Plan incorporates strategies for achieving the 2030 GHG-reduction target established in SB 32 and EO B-30-15.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superseded this Executive Order in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

ARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The California Energy Commissions and California Public Utilities Commission serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

Mandatory Reporting of GHG Emissions

The California Global Warming Solutions Act (AB 32, 2006) requires the reporting of GHGs by major sources to the ARB. Major sources required to report GHG emissions include industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013, and apply to large electric power plants and large industrial plants. In 2015, fuel distributors, including distributors of heating and transportation fuels, also became subject to the cap-and-trade rules. At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total GHG emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions to 1990 levels by the year 2020 and would achieve an approximate 80 percent reduction from 1990 levels by 2050.

Senate Bill 32

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan. ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

California Building Code

The CBC contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the BSC. In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both standards are contained in the CBC and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

AB 32, which mandates the reduction of GHG emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In its scoping plan for the implementation of AB 32, ARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, ARB estimated that green building standards would reduce GHG emissions by approximately 26 MMT of CO_2e by 2020. Most recently, the California Energy Commission adopted new building energy efficiency standards that amends the building code to require improvements in building insulation, use of energy-efficient lighting, and the incorporation of renewable energy technology (e.g., solar photovoltaic systems) for newly constructed residential dwellings. These standards are anticipated to reduce energy usage by approximately 50 percent for residential buildings and 30 percent for nonresidential buildings (CEC 2018).

Senate Bill 97

Senate Bill 97 (SB 97) was enacted in 2007. SB 97 required OPR to develop, and the Natural Resources Agency to adopt, amendments to the CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those CEQA Guidelines amendments clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects and must reach a conclusion regarding the significance of those emissions.
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions.
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change.
- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria.
- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply and ways to reduce energy demand, including through the use of efficient transportation alternatives.

As part of the administrative rulemaking process, the California Natural Resources Agency developed a Final Statement of Reasons explaining the legal and factual bases, intent, and purpose of the CEQA Guidelines amendments. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Short-Lived Climate Pollutant Reduction Strategy

In March 2017, the ARB adopted the "Short-Lived Climate Pollutant Reduction Strategy" (*SLCP Strategy*) establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities, and manure methane at dairies, and using the methane as a renewable source of natural gas to fuel vehicles or generate electricity. The *SLCP Strategy* also identifies steps to reduce natural gas leaks from oil and gas wells, pipelines, valves, and pumps to improve safety, avoid energy losses, and reduce methane emissions associated with natural gas use. Lastly, the *SLCP Strategy* also identifies measures that can reduce hydrofluorocarbon (HFC) emissions at national and international levels, in addition to State-level action that includes an incentive program to encourage the use of low-Global Warming Potential (GWP) refrigerants, and limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment (ARB 2017).

PROJECT IMPACTS

THRESHOLDS OF SIGNIFICANCE

In accordance with CEQA Guidelines, a project would be considered to have a significant impact to climate change if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or,

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

As of June 2018, the MBARD Board of Directors has not adopted recommended GHG significance thresholds applicable to development projects (MBARD 2014). However, it is important to note that other air districts within the State of California have recently adopted recommended CEQA significance thresholds for GHG emissions. For instance, on March 28, 2012 the San Luis Obispo Air Pollution Control District (SLOAPCD) Board approved thresholds of significance for the evaluation of project-related increases of GHG emissions. The SLOAPCD's significance thresholds include both qualitative and quantitative threshold options, which include a bright-line threshold of 1,150 $MTCO_2e$/year. The Sacramento Metropolitan Air Quality Management District (SMAQMD) the Mendocino County Air Quality Management District (MCAQMD) have adopted similar significance thresholds of 1,100 $MTCO_2e$/year and the Placer County Air Pollution Control District is currently considering adoption of a proposed mass-emissions threshold of 1,100 $MTCO_2e$/year. The GHG significance thresholds are based on AB 32 GHG emission reduction goals, which take into consideration the emission reduction strategies outlined in ARB's Scoping Plan. Development projects located within these jurisdictions that would exceed these thresholds would be considered to have a potentially significant impact on the environment which could conflict with applicable GHG-reduction plans, policies and regulations. Projects with GHG emissions that do not exceed the applicable threshold would be considered to have a less-than-significant impact on the environment and would not be anticipated to conflict with AB 32 GHG emission-reduction goals (PCAPCD 2016; SLOAPCD 2016; SMAQMD 2014, MCAQMD 2010).

As noted above, MBARD has not yet adopted recommended GHG significance thresholds applicable to development projects. In the interim, the MBARD recommends use of other thresholds, such as those adopted by the SLOAPCD. For purposes of this analysis, project-generated emissions in excess of 1,100 $MTCO_2e$/year would be considered to have a potentially significant impact. This mass-emission threshold is based on thresholds adopted by SMAQMD and MCAQMD, which is slightly more conservative than the threshold recommended by SLOAPCD.

METHODOLOGY

Short-term Construction

Short-term construction emissions associated with construction of Phase 2 of the CCCVC were quantified using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Emissions were quantified based on project-specific data provided and default modeling parameters contained in the model for Monterey County. Emissions modeling assumptions are summarized in Table 4. Construction emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed. Refer to Appendix B for emissions modeling assumptions and results.

Long-term Operation

Long-term operational emissions for Phase 2 of the CCCVC were quantified using CalEEMod, version 2016.3.2, based on vehicle trip-generation rates provided. To be conservative, a maximum of 80 vehicles (160 vehicle trips) was assumed for weekdays and a maximum of 200 vehicles (400 vehicle trips) was assumed for weekend days. Vehicle trip lengths were based on the maximum daily trip length identified in the model of 9.7 miles per trip. The fleet mix was assumed to be predominantly light-duty vehicles. Other modeling assumptions, including energy usage rates, water usage rates, and waste-generation rates were based on CalEEMod model defaults. Operational emissions for future phases are anticipated to be similar to Phase 2 construction-generated emissions and were qualitatively discussed. Refer to Appendix B for emissions modeling assumptions and results.

PROJECT IMPACTS

Impact GHG-1:	***Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? and***
	Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

Short-term Construction

Construction-generated GHG emissions are summarized in Table 7. As depicted, construction of Phase 2 would generate a total of approximately 612 $MTCO_2e$. Amortized GHG emissions, when averaged over an assumed 100-year life of the project, would total approximately 6.1 $MTCO_2e$/year. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. Construction-generated emissions would vary, depending on the final construction schedules, equipment required, and activities conducted.

Construction activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, construction emissions for future phases would be similar to Phase 2 emissions. Construction-generated emissions were included with operational emissions for determination of impact significance.

Long-term Operation

Operational GHG emissions for Phase 2 operational years 2020 and 2030 are summarized in Table 8. With the inclusion of amortized construction-generated emissions, Phase 2 of the proposed project would generate a total of approximately 374 $MTCO_2e$/year under year 2020 conditions and approximately 289 $MTCO_2e$/year under year 2030 conditions. Mobile sources are projected to account for roughly 99% of the total operational GHG emissions. Remaining GHG operational emissions would be predominantly associated with energy use, water use, and waste generation. Project-generated GHG emissions are projected to decrease in future years due largely to improvements in vehicle fleet emissions.

Table 7
Construction GHG Emissions – CCCVC Phase 2

Construction Activity	Annual Emissions ($MTCO_2e$/Year)
Demolition	245.1
Site Preparation	95.9
Grading	222.6
Paving	48.8
Total Construction Emissions:	612.4
Amortized Net Change in Construction Emissions[1]:	6.1

1. Amortized emissions are quantified based on an estimated 100-year project life.
Refer to Appendix A for emissions modeling assumptions and results.

Table 8
Operational GHG Emissions – CCCVC Phase 2

Source	Annual Emissions ($MTCO_2e$/year)[1]	Percent Contribution
Year 2020		
Energy Use	1.0	0.3%
Mobile	362.4	98.6%
Waste	0.2	0.1%
Water	4.1	1.1%
Total:	367.7	
Total with Amortized Construction Emissions:[2]	373.8	
Significance Threshold:	1,100	
Exceeds Significance Threshold?:	No	
Year 2030		
Energy Use	0.8	0.3%
Mobile	278.4	98.6%
Waste	0.2	0.1%
Water	3.1	1.1%
Total:	282.4	
Total with Amortized Construction Emissions:[2]	288.5	
Significance Threshold:	1,100	
Exceeds Significance Threshold?:	No	

1. GHG emissions quantified for buildout conditions.
2. Refer to Table 7 for amortized construction emissions.
Refer to Appendix A for emissions modeling assumptions and results.

As noted in Table 8, annual GHG emissions for Phase 2 would not exceed the significance threshold of 1,100 $MTCO_2e$/year. Operational activities for future phases of the CCCVC 2015 Master Plan would be similar to those identified for Phase 2. As a result, operational GHG emissions for future phases would be similar to Phase 2 emissions and, likewise, would not be anticipated to exceed the significance threshold of 1,100 $MTCO_2e$/year. As a result, the proposed project would not result in GHG emissions that would have a significant impact on the environment, nor would the proposed project conflict with applicable GHG-reduction plans, policies or regulations. This impact would be considered less than significant. No mitigation is required.

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APPENDIX A

Emissions Modeling

Table 1
Construction Information – Phase II

Construction Phase	Duration (Days)	Off-Road Equipment	Construction Vehicle Trips
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20 Worker Trips/Day 525 Haul Truck Trips
Site Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20 Worker Trips/Day
Onsite Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15 Worker Trips/Day 50 Haul Truck Trips

Based on default equipment assumptions contained in the CalEEMod computer model and, where available, project-specific construction information. All equipment assumed to operate 8 hours per day. Worker trips are based on CalEEMod default assumptions and estimated equipment usage.
Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.
Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5 inch application material thickness) and an average haul truck capacity of 8 cubic yards.

CA Central Coast Veterans Cemetery

Monterey County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.30	Acre	0.30	13,068.00	0
City Park	4.40	Acre	4.40	191,664.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Summer

Project Characteristics - Includes RPS adjustment for utility intensity factors.

Land Use - Based on default data for park construction. Project-specific information included where available. 4.4 acres to be developed. 0.3 acres to be paved.

Construction Phase - Assumes 80 days for basin excavation and demolition. 40 days for site preparation. 100 days for grading and excavation. 40 days for paving.

Off-road Equipment - Assumes 3 excavators, 2 loaders, 1 30-hp chipper/grinder, 1 tractor/loader/backhoe, 1 water truck; 8 hours/day. Hp & load factors based on model defaults.

Off-road Equipment - Assumes 1 excavator, 1 grader, 1 dozer, 3 tractor/loader/backhoe, 1 water truck, 1 roller/compactor; 8 hours per day based on model defaults.

Off-road Equipment - 1 paver, 2 paving equipment, 2 rollers, 1 tractor/loader/backhoe, 1 trencher; 8 hours per day.

Off-road Equipment - Assumes 3 dozers, 4 tractor/loader/backhoes, 1 water truck; 8 hours per day based on model defaults.

Trips and VMT - Worker trips and trip distances based on model defaults. Truck trips for import of soil based on project-specific info: 4200 cy imported. Assumes 50 concrete/asphalt haul trips based on 0.3 acres to be paved.

Demolition - No structures to be demolished.

Grading - Based on model defaults. Assumes 4,200 cy material imported. No material exported.

Vehicle Trips - Assumes a maximum of 80 vehicles (160 vehicle trips) on weekdays (36.36 trips/acre); 200 vehicles (400 vehicle trips) on weekend days (90.91 trips/acre). Trip lengths are based on maximum model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - 50% CE for watering onsite roads, 61% CE for watering disturbed areas, 15 mph speed limit. T3 off-road equipment included for informational purposes.

Operational Off-Road Equipment - Assumes 1 landscape mower (20 hp) for turf maintenance. Average of 8 hours per day, 2 days per week (104 days/year).

Fleet Mix - Fleet mix excludes MDT, bus, and HDT.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Summer

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	8.00	100.00
tblConstructionPhase	NumDays	18.00	40.00
tblConstructionPhase	NumDays	5.00	40.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.54	0.60
tblFleetMix	MH	8.0500e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	4.1550e-003	0.00
tblFleetMix	SBUS	1.2360e-003	0.00
tblFleetMix	UBUS	2.7380e-003	0.00
tblGrading	AcresOfGrading	50.00	4.00

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Summer

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	104.00
tblOperationalOffRoadEquipment	OperHorsePower	124.00	20.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblTripsAndVMT	HaulingTripNumber	0.00	525.00
tblTripsAndVMT	HaulingTripNumber	0.00	50.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	20.00	15.00
tblVehicleTrips	CC_TL	7.30	9.50
tblVehicleTrips	CNW_TL	7.30	9.50
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	ST_TR	22.75	90.91

tblVehicleTrips	SU_TR	16.74	90.91
tblVehicleTrips	WD_TR	1.89	36.36

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	14.3821	148.6067	100.3172	0.1969	24.8603	7.1965	32.0567	13.4400	6.6212	20.0611						19,681.3674
Maximum	**14.3821**	**148.6067**	**100.3172**	**0.1969**	**24.8603**	**7.1965**	**32.0567**	**13.4400**	**6.6212**	**20.0611**						**19,681.3674**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.9790	93.1135	122.4875	0.1969	10.1405	4.3861	14.5266	5.3602	4.3852	9.7455						19,681.3673
Maximum	**4.9790**	**93.1135**	**122.4875**	**0.1969**	**10.1405**	**4.3861**	**14.5266**	**5.3602**	**4.3852**	**9.7455**						**19,681.3673**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**65.38**	**37.34**	**-22.10**	**0.00**	**59.21**	**39.05**	**54.68**	**60.12**	**33.77**	**51.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Mobile	0.9579	1.5049	12.0485	0.0313	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						3,125.7968
Total	**0.9740**	**1.5049**	**12.0490**	**0.0313**	**2.8953**	**0.0257**	**2.9210**	**0.7688**	**0.0239**	**0.7927**						**3,125.7979**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Mobile	0.9579	1.5049	12.0485	0.0313	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						3,125.7968
Total	**0.9740**	**1.5049**	**12.0490**	**0.0313**	**2.8953**	**0.0257**	**2.9210**	**0.7688**	**0.0239**	**0.7927**						**3,125.7979**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/9/2019	6/28/2019	5	80	Basin Excavation & Demo
2	Site Preparation	Site Preparation	4/6/2019	5/31/2019	5	40	Site Prep & Grubbing
3	Grading	Grading	4/13/2019	8/30/2019	5	100	Grading & Excavation
4	Paving	Paving	4/25/2019	6/19/2019	5	40	Onsite Road Const. & Paving

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Off-Highway Trucks	1	8.00	402	0.38
Demolition	Other Material Handling Equipment	1	30.00	168	0.40
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	2	8.00	203	0.36
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Trenchers	1	8.00	78	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	7	20.00	0.00	525.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	15.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7652	39.5530	33.6033	0.0660		1.7460	1.7460		1.6063	1.6063						6,583.3527
Total	**3.7652**	**39.5530**	**33.6033**	**0.0660**		**1.7460**	**1.7460**		**1.6063**	**1.6063**						**6,583.3527**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.0975**	**0.0805**	**0.8640**	**1.8400e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**182.6415**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6232	31.6469	44.2482	0.0660		1.4391	1.4391		1.4391	1.4391						6,583.3527
Total	**1.6232**	**31.6469**	**44.2482**	**0.0660**		**1.4391**	**1.4391**		**1.4391**	**1.4391**						**6,583.3527**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.0975**	**0.0805**	**0.8640**	**1.8400e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**182.6415**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307						0.0000
Off-Road	5.0449	52.7623	26.0598	0.0512		2.6518	2.6518		2.4397	2.4397						5,114.3199
Total	**5.0449**	**52.7623**	**26.0598**	**0.0512**	**18.0663**	**2.6518**	**20.7181**	**9.9307**	**2.4397**	**12.3703**						**5,114.3199**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.0975**	**0.0805**	**0.8640**	**1.8400e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**182.6415**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730						0.0000
Off-Road	1.2545	25.3162	29.9650	0.0512		1.1833	1.1833		1.1833	1.1833						5,114.3199
Total	**1.2545**	**25.3162**	**29.9650**	**0.0512**	**7.0458**	**1.1833**	**8.2291**	**3.8730**	**1.1833**	**5.0562**						**5,114.3199**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.0975**	**0.0805**	**0.8640**	**1.8400e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**182.6415**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0645	0.0000	6.0645	3.3148	0.0000	3.3148						0.0000
Off-Road	3.2904	35.5376	20.2902	0.0429		1.6588	1.6588		1.5261	1.5261						4,278.1115
Total	**3.2904**	**35.5376**	**20.2902**	**0.0429**	**6.0645**	**1.6588**	**7.7233**	**3.3148**	**1.5261**	**4.8409**						**4,278.1115**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0506	1.6783	0.3385	4.3300e-003	0.0916	8.5200e-003	0.1001	0.0251	8.1600e-003	0.0332						459.2009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.1481**	**1.7588**	**1.2025**	**6.1700e-003**	**0.2559**	**0.0100**	**0.2659**	**0.0687**	**9.5200e-003**	**0.0782**						**641.8424**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3652	0.0000	2.3652	1.2928	0.0000	1.2928						0.0000
Off-Road	1.0496	21.0903	25.9956	0.0429		0.9926	0.9926		0.9926	0.9926						4,278.1115
Total	**1.0496**	**21.0903**	**25.9956**	**0.0429**	**2.3652**	**0.9926**	**3.3578**	**1.2928**	**0.9926**	**2.2854**						**4,278.1115**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0506	1.6783	0.3385	4.3300e-003	0.0916	8.5200e-003	0.1001	0.0251	8.1600e-003	0.0332						459.2009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0975	0.0805	0.8640	1.8400e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						182.6415
Total	**0.1481**	**1.7588**	**1.2025**	**6.1700e-003**	**0.2559**	**0.0100**	**0.2659**	**0.0687**	**9.5200e-003**	**0.0782**						**641.8424**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8338	18.3741	16.7049	0.0246		1.1238	1.1238		1.0339	1.0339						2,452.1433
Paving	0.0197					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**1.8535**	**18.3741**	**16.7049**	**0.0246**		**1.1238**	**1.1238**		**1.0339**	**1.0339**						**2,452.1433**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0121	0.3996	0.0806	1.0300e-003	0.0218	2.0300e-003	0.0238	5.9700e-003	1.9400e-003	7.9100e-003						109.3335
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0731	0.0604	0.6480	1.3800e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337						136.9811
Total	**0.0852**	**0.4600**	**0.7286**	**2.4100e-003**	**0.1450**	**3.1400e-003**	**0.1482**	**0.0387**	**2.9600e-003**	**0.0416**						**246.3147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6039	12.6802	18.6197	0.0246		0.7551	0.7551		0.7551	0.7551						2,452.1433
Paving	0.0197					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.6235**	**12.6802**	**18.6197**	**0.0246**		**0.7551**	**0.7551**		**0.7551**	**0.7551**						**2,452.1433**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0121	0.3996	0.0806	1.0300e-003	0.0218	2.0300e-003	0.0238	5.9700e-003	1.9400e-003	7.9100e-003						109.3335
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0731	0.0604	0.6480	1.3800e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337						136.9811
Total	**0.0852**	**0.4600**	**0.7286**	**2.4100e-003**	**0.1450**	**3.1400e-003**	**0.1482**	**0.0387**	**2.9600e-003**	**0.0416**						**246.3147**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9579	1.5049	12.0485	0.0313	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						3,125.7968
Unmitigated	0.9579	1.5049	12.0485	0.0313	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						3,125.7968

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.98	400.00	400.00	790,364	790,364
Parking Lot	0.00	0.00	0.00		
Total	159.98	400.00	400.00	790,364	790,364

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	9.50	9.50	33.00	48.00	19.00	100	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.599234	0.028716	0.205211	0.131753	0.021859	0.005504	0.000000	0.000000	0.000000	0.000000	0.007724	0.000000	0.000000
Parking Lot	0.543895	0.028716	0.205211	0.131753	0.021859	0.005504	0.019097	0.027308	0.004155	0.002738	0.007724	0.001236	0.000805

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Unmitigated	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4900e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.0145					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.0000e-005	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Total	**0.0160**	**0.0000**	**4.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.1000e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4900e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.0145					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.0000e-005	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Total	**0.0160**	**0.0000**	**4.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.1000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Tractors	1	8.00	104	20	0.44	Diesel

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CA Central Coast Veterans Cemetery

Monterey County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.30	Acre	0.30	13,068.00	0
City Park	4.40	Acre	4.40	191,664.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Winter

Project Characteristics - Includes RPS adjustment for utility intensity factors.

Land Use - Based on default data for park construction. Project-specific information included where available. 4.4 acres to be developed. 0.3 acres to be paved.

Construction Phase - Assumes 80 days for basin excavation and demolition. 40 days for site preparation. 100 days for grading and excavation. 40 days for paving.

Off-road Equipment - Assumes 3 excavators, 2 loaders, 1 30-hp chipper/grinder, 1 tractor/loader/backhoe, 1 water truck; 8 hours/day. Hp & load factors based on model defaults.

Off-road Equipment - Assumes 1 excavator, 1 grader, 1 dozer, 3 tractor/loader/backhoe, 1 water truck, 1 roller/compactor; 8 hours per day based on model defaults.

Off-road Equipment - 1 paver, 2 paving equipment, 2 rollers, 1 tractor/loader/backhoe, 1 trencher; 8 hours per day.

Off-road Equipment - Assumes 3 dozers, 4 tractor/loader/backhoes, 1 water truck; 8 hours per day based on model defaults.

Trips and VMT - Worker trips and trip distances based on model defaults. Truck trips for import of soil based on project-specific info: 4200 cy imported. Assumes 50 concrete/asphalt haul trips based on 0.3 acres to be paved.

Demolition - No structures to be demolished.

Grading - Based on model defaults. Assumes 4,200 cy material imported. No material exported.

Vehicle Trips - Assumes a maximum of 80 vehicles (160 vehicle trips) on weekdays (36.36 trips/acre); 200 vehicles (400 vehicle trips) on weekend days (90.91 trips/acre). Trip lengths are based on maximum model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - 50% CE for watering onsite roads, 61% CE for watering disturbed areas, 15 mph speed limit. T3 off-road equipment included for informational purposes.

Operational Off-Road Equipment - Assumes 1 landscape mower (20 hp) for turf maintenance. Average of 8 hours per day, 2 days per week (104 days/year).

Fleet Mix - Fleet mix excludes MDT, bus, and HDT.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Winter

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	8.00	100.00
tblConstructionPhase	NumDays	18.00	40.00
tblConstructionPhase	NumDays	5.00	40.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	LDA	0.54	0.60
tblFleetMix	MH	8.0500e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	4.1550e-003	0.00
tblFleetMix	SBUS	1.2360e-003	0.00
tblFleetMix	UBUS	2.7380e-003	0.00
tblGrading	AcresOfGrading	50.00	4.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	104.00
tblOperationalOffRoadEquipment	OperHorsePower	124.00	20.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblTripsAndVMT	HaulingTripNumber	0.00	525.00
tblTripsAndVMT	HaulingTripNumber	0.00	50.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	20.00	15.00
tblVehicleTrips	CC_TL	7.30	9.50
tblVehicleTrips	CNW_TL	7.30	9.50
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	ST_TR	22.75	90.91

tblVehicleTrips	SU_TR	16.74	90.91
tblVehicleTrips	WD_TR	1.89	36.36

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	14.4171	148.7373	100.3176	0.1963	24.8603	7.1967	32.0570	13.4400	6.6214	20.0614						19,627.0613
Maximum	**14.4171**	**148.7373**	**100.3176**	**0.1963**	**24.8603**	**7.1967**	**32.0570**	**13.4400**	**6.6214**	**20.0614**						**19,627.0613**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	5.0139	93.2441	122.4879	0.1963	10.1405	4.3864	14.5268	5.3602	4.3855	9.7457						19,627.0612
Maximum	**5.0139**	**93.2441**	**122.4879**	**0.1963**	**10.1405**	**4.3864**	**14.5268**	**5.3602**	**4.3855**	**9.7457**						**19,627.0612**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**65.22**	**37.31**	**-22.10**	**0.00**	**59.21**	**39.05**	**54.68**	**60.12**	**33.77**	**51.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Mobile	0.8855	1.8045	12.1323	0.0295	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						2,938.7778
Total	**0.9015**	**1.8045**	**12.1328**	**0.0295**	**2.8953**	**0.0257**	**2.9210**	**0.7688**	**0.0239**	**0.7927**						**2,938.7789**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Mobile	0.8855	1.8045	12.1323	0.0295	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						2,938.7778
Total	**0.9015**	**1.8045**	**12.1328**	**0.0295**	**2.8953**	**0.0257**	**2.9210**	**0.7688**	**0.0239**	**0.7927**						**2,938.7789**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/9/2019	6/28/2019	5	80	Basin Excavation & Demo
2	Site Preparation	Site Preparation	4/6/2019	5/31/2019	5	40	Site Prep & Grubbing
3	Grading	Grading	4/13/2019	8/30/2019	5	100	Grading & Excavation
4	Paving	Paving	4/25/2019	6/19/2019	5	40	Onsite Road Const. & Paving

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Off-Highway Trucks	1	8.00	402	0.38
Demolition	Other Material Handling Equipment	1	30.00	168	0.40
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	2	8.00	203	0.36
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Trenchers	1	8.00	78	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	7	20.00	0.00	525.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	15.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7652	39.5530	33.6033	0.0660		1.7460	1.7460		1.6063	1.6063						6,583.3527
Total	**3.7652**	**39.5530**	**33.6033**	**0.0660**		**1.7460**	**1.7460**		**1.6063**	**1.6063**						**6,583.3527**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1063**	**0.1014**	**0.8549**	**1.7200e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**171.0277**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6232	31.6469	44.2482	0.0660		1.4391	1.4391		1.4391	1.4391						6,583.3527
Total	**1.6232**	**31.6469**	**44.2482**	**0.0660**		**1.4391**	**1.4391**		**1.4391**	**1.4391**						**6,583.3527**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1063**	**0.1014**	**0.8549**	**1.7200e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**171.0277**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307						0.0000
Off-Road	5.0449	52.7623	26.0598	0.0512		2.6518	2.6518		2.4397	2.4397						5,114.3199
Total	**5.0449**	**52.7623**	**26.0598**	**0.0512**	**18.0663**	**2.6518**	**20.7181**	**9.9307**	**2.4397**	**12.3703**						**5,114.3199**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1063**	**0.1014**	**0.8549**	**1.7200e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**171.0277**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730						0.0000
Off-Road	1.2545	25.3162	29.9650	0.0512		1.1833	1.1833		1.1833	1.1833						5,114.3199
Total	**1.2545**	**25.3162**	**29.9650**	**0.0512**	**7.0458**	**1.1833**	**8.2291**	**3.8730**	**1.1833**	**5.0562**						**5,114.3199**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1063**	**0.1014**	**0.8549**	**1.7200e-003**	**0.1643**	**1.4800e-003**	**0.1658**	**0.0436**	**1.3600e-003**	**0.0449**						**171.0277**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0645	0.0000	6.0645	3.3148	0.0000	3.3148						0.0000
Off-Road	3.2904	35.5376	20.2902	0.0429		1.6588	1.6588		1.5261	1.5261						4,278.1115
Total	**3.2904**	**35.5376**	**20.2902**	**0.0429**	**6.0645**	**1.6588**	**7.7233**	**3.3148**	**1.5261**	**4.8409**						**4,278.1115**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0522	1.7206	0.3663	4.2500e-003	0.0916	8.7200e-003	0.1003	0.0251	8.3500e-003	0.0334						450.5147
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1585**	**1.8219**	**1.2212**	**5.9700e-003**	**0.2559**	**0.0102**	**0.2661**	**0.0687**	**9.7100e-003**	**0.0784**						**621.5424**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3652	0.0000	2.3652	1.2928	0.0000	1.2928						0.0000
Off-Road	1.0496	21.0903	25.9956	0.0429		0.9926	0.9926		0.9926	0.9926						4,278.1115
Total	**1.0496**	**21.0903**	**25.9956**	**0.0429**	**2.3652**	**0.9926**	**3.3578**	**1.2928**	**0.9926**	**2.2854**						**4,278.1115**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0522	1.7206	0.3663	4.2500e-003	0.0916	8.7200e-003	0.1003	0.0251	8.3500e-003	0.0334						450.5147
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.1063	0.1014	0.8549	1.7200e-003	0.1643	1.4800e-003	0.1658	0.0436	1.3600e-003	0.0449						171.0277
Total	**0.1585**	**1.8219**	**1.2212**	**5.9700e-003**	**0.2559**	**0.0102**	**0.2661**	**0.0687**	**9.7100e-003**	**0.0784**						**621.5424**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8338	18.3741	16.7049	0.0246		1.1238	1.1238		1.0339	1.0339						2,452.1433
Paving	0.0197					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**1.8535**	**18.3741**	**16.7049**	**0.0246**		**1.1238**	**1.1238**		**1.0339**	**1.0339**						**2,452.1433**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0124	0.4097	0.0872	1.0100e-003	0.0218	2.0800e-003	0.0239	5.9700e-003	1.9900e-003	7.9600e-003						107.2654
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0797	0.0760	0.6412	1.2900e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337						128.2708
Total	**0.0921**	**0.4857**	**0.7284**	**2.3000e-003**	**0.1450**	**3.1900e-003**	**0.1482**	**0.0387**	**3.0100e-003**	**0.0417**						**235.5362**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6039	12.6802	18.6197	0.0246		0.7551	0.7551		0.7551	0.7551						2,452.1433
Paving	0.0197					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.6235**	**12.6802**	**18.6197**	**0.0246**		**0.7551**	**0.7551**		**0.7551**	**0.7551**						**2,452.1433**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0124	0.4097	0.0872	1.0100e-003	0.0218	2.0800e-003	0.0239	5.9700e-003	1.9900e-003	7.9600e-003						107.2654
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0797	0.0760	0.6412	1.2900e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337						128.2708
Total	**0.0921**	**0.4857**	**0.7284**	**2.3000e-003**	**0.1450**	**3.1900e-003**	**0.1482**	**0.0387**	**3.0100e-003**	**0.0417**						**235.5362**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8855	1.8045	12.1323	0.0295	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						2,938.7778
Unmitigated	0.8855	1.8045	12.1323	0.0295	2.8953	0.0257	2.9210	0.7688	0.0239	0.7927						2,938.7778

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.98	400.00	400.00	790,364	790,364
Parking Lot	0.00	0.00	0.00		
Total	159.98	400.00	400.00	790,364	790,364

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	9.50	9.50	33.00	48.00	19.00	100	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.599234	0.028716	0.205211	0.131753	0.021859	0.005504	0.000000	0.000000	0.000000	0.000000	0.007724	0.000000	0.000000
Parking Lot	0.543895	0.028716	0.205211	0.131753	0.021859	0.005504	0.019097	0.027308	0.004155	0.002738	0.007724	0.001236	0.000805

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Unmitigated	0.0160	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4900e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.0145					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.0000e-005	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Total	**0.0160**	**0.0000**	**4.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.1000e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4900e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.0145					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.0000e-005	0.0000	4.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000						1.1000e-003
Total	**0.0160**	**0.0000**	**4.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.1000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Tractors	1	8.00	104	20	0.44	Diesel

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CA Central Coast Veterans Cemetery - Construction Emissions

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.30	Acre	0.30	13,068.00	0
City Park	4.40	Acre	4.40	191,664.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Project Characteristics - Includes RPS adjustment for utility intensity factors.

Land Use - Based on default data for park construction. Project-specific information included where available. 4.4 acres to be developed. 0.3 acres to be paved.

Construction Phase - Assumes 80 days for basin excavation and demolition. 40 days for site preparation. 100 days for grading and excavation. 40 days for paving.

Off-road Equipment - Assumes 3 excavators, 2 loaders, 1 30-hp chipper/grinder, 1 tractor/loader/backhoe, 1 water truck; 8 hours/day. Hp & load factors based on model defaults.

Off-road Equipment - Assumes 1 excavator, 1 grader, 1 dozer, 3 tractor/loader/backhoe, 1 water truck, 1 roller/compactor; 8 hours per day based on model defaults.

Off-road Equipment - 1 paver, 2 paving equipment, 2 rollers, 1 tractor/loader/backhoe, 1 trencher; 8 hours per day.

Off-road Equipment - Assumes 3 dozers, 4 tractor/loader/backhoes, 1 water truck; 8 hours per day based on model defaults.

Trips and VMT - Worker trips and trip distances based on model defaults. Truck trips for import of soil based on project-specific info: 4200 cy imported. Assumes 50 concrete/asphalt haul trips based on 0.3 acres to be paved.

Demolition - No structures to be demolished.

Grading - Based on model defaults. Assumes 4,200 cy material imported. No material exported.

Vehicle Trips - Assumes a maximum of 80 vehicles (160 vehicle trips) on weekdays (36.36 trips/acre); 200 vehicles (400 vehicle trips) on weekend days (90.91 trips/acre). Trip lengths are based on maximum model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - 50% CE for watering onsite roads, 61% CE for watering disturbed areas, 15 mph speed limit. T3 off-road equipment included for informational purposes.

Operational Off-Road Equipment - Assumes 1 landscape mower (20 hp) for turf maintenance. Average of 8 hours per day, 2 days per week (104 days/year).

Fleet Mix - Fleet mix excludes MDT, bus, and HDT.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	8.00	100.00
tblConstructionPhase	NumDays	18.00	40.00
tblConstructionPhase	NumDays	5.00	40.00
tblGrading	AcresOfGrading	50.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	104.00
tblOperationalOffRoadEquipment	OperHorsePower	124.00	20.00

tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblTripsAndVMT	HaulingTripNumber	0.00	525.00
tblTripsAndVMT	HaulingTripNumber	0.00	50.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	18.00	15.00
tblVehicleTrips	CC_TL	7.30	9.50
tblVehicleTrips	CNW_TL	7.30	9.50
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	ST_TR	22.75	90.91
tblVehicleTrips	SU_TR	16.74	90.91
tblVehicleTrips	WD_TR	1.89	36.36

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4680	4.8872	3.3358	6.7500e-003	0.6893	0.2290	0.9182	0.3710	0.2107	0.5816						612.3667
Maximum	**0.4680**	**4.8872**	**3.3358**	**6.7500e-003**	**0.6893**	**0.2290**	**0.9182**	**0.3710**	**0.2107**	**0.5816**						**612.3667**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1558	3.1517	4.2724	6.7500e-003	0.2839	0.1457	0.4296	0.1487	0.1465	0.2952						612.3661
Maximum	**0.1558**	**3.1517**	**4.2724**	**6.7500e-003**	**0.2839**	**0.1457**	**0.4296**	**0.1487**	**0.1465**	**0.2952**						**612.3661**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**66.70**	**35.51**	**-28.08**	**0.00**	**58.81**	**36.35**	**53.21**	**59.91**	**30.47**	**49.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	3-9-2019	6-8-2019	3.7522	2.3143
2	6-9-2019	9-8-2019	1.5998	0.9900
		Highest	3.7522	2.3143

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9300e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						1.0173
Mobile	0.1178	0.5351	1.5061	3.9600e-003	0.2965	4.5700e-003	0.3010	0.0796	4.3000e-003	0.0839						362.3869
Waste						0.0000	0.0000		0.0000	0.0000						0.1911
Water						0.0000	0.0000		0.0000	0.0000						4.0810
Total	**0.1207**	**0.5351**	**1.5061**	**3.9600e-003**	**0.2965**	**4.5700e-003**	**0.3010**	**0.0796**	**4.3000e-003**	**0.0839**						**367.6764**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9300e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						1.0173
Mobile	0.1178	0.5351	1.5061	3.9600e-003	0.2965	4.5700e-003	0.3010	0.0796	4.3000e-003	0.0839						362.3869
Waste						0.0000	0.0000		0.0000	0.0000						0.1911
Water						0.0000	0.0000		0.0000	0.0000						4.0810
Total	**0.1207**	**0.5351**	**1.5061**	**3.9600e-003**	**0.2965**	**4.5700e-003**	**0.3010**	**0.0796**	**4.3000e-003**	**0.0839**						**367.6764**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/9/2019	6/28/2019	5	80	Basin Excavation & Demo
2	Site Preparation	Site Preparation	4/6/2019	5/31/2019	5	40	Site Prep & Grubbing
3	Grading	Grading	4/13/2019	8/30/2019	5	100	Grading & Excavation
4	Paving	Paving	4/25/2019	6/19/2019	5	40	Onsite Road Const. & Paving

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Off-Highway Trucks	1	8.00	402	0.38
Demolition	Other Material Handling Equipment	1	30.00	168	0.40
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	2	8.00	203	0.36
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Trenchers	1	8.00	78	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	7	20.00	0.00	525.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	15.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1506	1.5821	1.3441	2.6400e-003		0.0698	0.0698		0.0643	0.0643						238.8927
Total	**0.1506**	**1.5821**	**1.3441**	**2.6400e-003**		**0.0698**	**0.0698**		**0.0643**	**0.0643**						**238.8927**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8700e-003	3.6800e-003	0.0329	7.0000e-005	6.3600e-003	6.0000e-005	6.4200e-003	1.6900e-003	5.0000e-005	1.7400e-003						6.2423
Total	**3.8700e-003**	**3.6800e-003**	**0.0329**	**7.0000e-005**	**6.3600e-003**	**6.0000e-005**	**6.4200e-003**	**1.6900e-003**	**5.0000e-005**	**1.7400e-003**						**6.2423**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0598	1.2535	1.8096	2.6400e-003		0.0572	0.0572		0.0575	0.0575						238.8924
Total	**0.0598**	**1.2535**	**1.8096**	**2.6400e-003**		**0.0572**	**0.0572**		**0.0575**	**0.0575**						**238.8924**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8700e-003	3.6800e-003	0.0329	7.0000e-005	6.3600e-003	6.0000e-005	6.4200e-003	1.6900e-003	5.0000e-005	1.7400e-003						6.2423
Total	**3.8700e-003**	**3.6800e-003**	**0.0329**	**7.0000e-005**	**6.3600e-003**	**6.0000e-005**	**6.4200e-003**	**1.6900e-003**	**5.0000e-005**	**1.7400e-003**						**6.2423**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986						0.0000
Off-Road	0.1009	1.0553	0.5212	1.0200e-003		0.0530	0.0530		0.0488	0.0488						92.7927
Total	**0.1009**	**1.0553**	**0.5212**	**1.0200e-003**	**0.3613**	**0.0530**	**0.4144**	**0.1986**	**0.0488**	**0.2474**						**92.7927**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9300e-003	1.8400e-003	0.0164	3.0000e-005	3.1800e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004						3.1211
Total	**1.9300e-003**	**1.8400e-003**	**0.0164**	**3.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**						**3.1211**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1409	0.0000	0.1409	0.0775	0.0000	0.0775						0.0000
Off-Road	0.0225	0.5001	0.6192	1.0200e-003		0.0235	0.0235		0.0236	0.0236						92.7926
Total	**0.0225**	**0.5001**	**0.6192**	**1.0200e-003**	**0.1409**	**0.0235**	**0.1644**	**0.0775**	**0.0236**	**0.1011**						**92.7926**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9300e-003	1.8400e-003	0.0164	3.0000e-005	3.1800e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004						3.1211
Total	**1.9300e-003**	**1.8400e-003**	**0.0164**	**3.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**						**3.1211**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3032	0.0000	0.3032	0.1657	0.0000	0.1657						0.0000
Off-Road	0.1645	1.7769	1.0145	2.1400e-003		0.0829	0.0829		0.0763	0.0763						194.0519
Total	**0.1645**	**1.7769**	**1.0145**	**2.1400e-003**	**0.3032**	**0.0829**	**0.3862**	**0.1657**	**0.0763**	**0.2420**						**194.0519**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.5600e-003	0.0858	0.0175	2.1000e-004	4.4500e-003	4.3000e-004	4.8800e-003	1.2200e-003	4.1000e-004	1.6300e-003						20.6635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.8300e-003	4.6000e-003	0.0411	9.0000e-005	7.9500e-003	7.0000e-005	8.0200e-003	2.1100e-003	7.0000e-005	2.1800e-003						7.8028
Total	**7.3900e-003**	**0.0904**	**0.0586**	**3.0000e-004**	**0.0124**	**5.0000e-004**	**0.0129**	**3.3300e-003**	**4.8000e-004**	**3.8100e-003**						**28.4664**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1183	0.0000	0.1183	0.0646	0.0000	0.0646						0.0000
Off-Road	0.0461	1.0390	1.3494	2.1400e-003		0.0492	0.0492		0.0496	0.0496						194.0516
Total	**0.0461**	**1.0390**	**1.3494**	**2.1400e-003**	**0.1183**	**0.0492**	**0.1675**	**0.0646**	**0.0496**	**0.1142**						**194.0516**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.5600e-003	0.0858	0.0175	2.1000e-004	4.4500e-003	4.3000e-004	4.8800e-003	1.2200e-003	4.1000e-004	1.6300e-003						20.6635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.8300e-003	4.6000e-003	0.0411	9.0000e-005	7.9500e-003	7.0000e-005	8.0200e-003	2.1100e-003	7.0000e-005	2.1800e-003						7.8028
Total	**7.3900e-003**	**0.0904**	**0.0586**	**3.0000e-004**	**0.0124**	**5.0000e-004**	**0.0129**	**3.3300e-003**	**4.8000e-004**	**3.8100e-003**						**28.4664**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0367	0.3675	0.3341	4.9000e-004		0.0225	0.0225		0.0207	0.0207						44.4909
Paving	3.9000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0371**	**0.3675**	**0.3341**	**4.9000e-004**		**0.0225**	**0.0225**		**0.0207**	**0.0207**						**44.4909**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.1700e-003	1.6700e-003	2.0000e-005	4.2000e-004	4.0000e-005	4.6000e-004	1.2000e-004	4.0000e-005	1.6000e-004						1.9680
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4500e-003	1.3800e-003	0.0123	3.0000e-005	2.3800e-003	2.0000e-005	2.4100e-003	6.3000e-004	2.0000e-005	6.5000e-004						2.3409
Total	**1.6900e-003**	**9.5500e-003**	**0.0140**	**5.0000e-005**	**2.8000e-003**	**6.0000e-005**	**2.8700e-003**	**7.5000e-004**	**6.0000e-005**	**8.1000e-004**						**4.3088**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0121	0.2536	0.3724	4.9000e-004		0.0151	0.0151		0.0151	0.0151						44.4909
Paving	3.9000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0125**	**0.2536**	**0.3724**	**4.9000e-004**		**0.0151**	**0.0151**		**0.0151**	**0.0151**						**44.4909**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.1700e-003	1.6700e-003	2.0000e-005	4.2000e-004	4.0000e-005	4.6000e-004	1.2000e-004	4.0000e-005	1.6000e-004						1.9680
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4500e-003	1.3800e-003	0.0123	3.0000e-005	2.3800e-003	2.0000e-005	2.4100e-003	6.3000e-004	2.0000e-005	6.5000e-004						2.3409
Total	**1.6900e-003**	**9.5500e-003**	**0.0140**	**5.0000e-005**	**2.8000e-003**	**6.0000e-005**	**2.8700e-003**	**7.5000e-004**	**6.0000e-005**	**8.1000e-004**						**4.3088**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1178	0.5351	1.5061	3.9600e-003	0.2965	4.5700e-003	0.3010	0.0796	4.3000e-003	0.0839						362.3869
Unmitigated	0.1178	0.5351	1.5061	3.9600e-003	0.2965	4.5700e-003	0.3010	0.0796	4.3000e-003	0.0839						362.3869

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.98	400.00	400.00	790,364	790,364
Parking Lot	0.00	0.00	0.00		
Total	159.98	400.00	400.00	790,364	790,364

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	9.50	9.50	33.00	48.00	19.00	100	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.533135	0.030877	0.202665	0.141212	0.024955	0.006027	0.018072	0.025901	0.004150	0.002959	0.007890	0.001253	0.000905
Parking Lot	0.533135	0.030877	0.202665	0.141212	0.024955	0.006027	0.018072	0.025901	0.004150	0.002959	0.007890	0.001253	0.000905

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						1.0173
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						1.0173
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0				0.0000
Parking Lot	4573.8				1.0173
Total					**1.0173**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0				0.0000
Parking Lot	4573.8				1.0173
Total					**1.0173**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.9300e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Unmitigated	2.9300e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.7000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	2.6500e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Total	**2.9300e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.2000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.7000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	2.6500e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Total	**2.9300e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				4.0810
Unmitigated				4.0810

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 5.24252				4.0810
Parking Lot	0 / 0				0.0000
Total					**4.0810**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 5.24252				4.0810
Parking Lot	0 / 0				0.0000
Total					**4.0810**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				0.1911
Unmitigated				0.1911

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.38				0.1911
Parking Lot	0				0.0000
Total					**0.1911**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.38				0.1911
Parking Lot	0				0.0000
Total					**0.1911**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Tractors	1	8.00	104	20	0.44	Diesel

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CA Central Coast Veterans Cemetery - Construction Emissions

Monterey County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.30	Acre	0.30	13,068.00	0
City Park	4.40	Acre	4.40	191,664.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	55
Climate Zone	4			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	364.4	**CH4 Intensity (lb/MWhr)**	0.016	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Project Characteristics - Includes RPS adjustment for utility intensity factors.

Land Use - Based on default data for park construction. Project-specific information included where available. 4.4 acres to be developed. 0.3 acres to be paved.

Construction Phase - Assumes 80 days for basin excavation and demolition. 40 days for site preparation. 100 days for grading and excavation. 40 days for paving.

Off-road Equipment - Assumes 3 excavators, 2 loaders, 1 30-hp chipper/grinder, 1 tractor/loader/backhoe, 1 water truck; 8 hours/day. Hp & load factors based on model defaults.

Off-road Equipment - Assumes 1 excavator, 1 grader, 1 dozer, 3 tractor/loader/backhoe, 1 water truck, 1 roller/compactor; 8 hours per day based on model defaults.

Off-road Equipment - 1 paver, 2 paving equipment, 2 rollers, 1 tractor/loader/backhoe, 1 trencher; 8 hours per day.

Off-road Equipment - Assumes 3 dozers, 4 tractor/loader/backhoes, 1 water truck; 8 hours per day based on model defaults.

Trips and VMT - Worker trips and trip distances based on model defaults. Truck trips for import of soil based on project-specific info: 4200 cy imported. Assumes 50 concrete/asphalt haul trips based on 0.3 acres to be paved.

Demolition - No structures to be demolished.

Grading - Based on model defaults. Assumes 4,200 cy material imported. No material exported.

Vehicle Trips - Assumes a maximum of 80 vehicles (160 vehicle trips) on weekdays (36.36 trips/acre); 200 vehicles (400 vehicle trips) on weekend days (90.91 trips/acre). Trip lengths are based on maximum model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - 50% CE for watering onsite roads, 61% CE for watering disturbed areas, 15 mph speed limit. T3 off-road equipment included for informational purposes.

Operational Off-Road Equipment - Assumes 1 landscape mower (20 hp) for turf maintenance. Average of 8 hours per day, 2 days per week (104 days/year).

Fleet Mix - Fleet mix excludes MDT, bus, and HDT.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	80.00
tblConstructionPhase	NumDays	8.00	100.00
tblConstructionPhase	NumDays	18.00	40.00
tblConstructionPhase	NumDays	5.00	40.00
tblFleetMix	HHD	0.03	0.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.57	0.60
tblFleetMix	LDA	0.57	0.54
tblFleetMix	LDT1	0.03	0.03
tblFleetMix	LDT1	0.03	0.03
tblFleetMix	LDT2	0.21	0.21
tblFleetMix	LDT2	0.21	0.21

tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD2	4.1950e-003	5.5040e-003
tblFleetMix	LHD2	4.1950e-003	5.5040e-003
tblFleetMix	MCY	7.2120e-003	7.7240e-003
tblFleetMix	MCY	7.2120e-003	7.7240e-003
tblFleetMix	MDV	0.11	0.13
tblFleetMix	MDV	0.11	0.13
tblFleetMix	MH	5.6600e-004	0.00
tblFleetMix	MH	5.6600e-004	8.0500e-004
tblFleetMix	MHD	0.02	0.00
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	4.1390e-003	0.00
tblFleetMix	OBUS	4.1390e-003	4.1550e-003
tblFleetMix	SBUS	1.2320e-003	0.00
tblFleetMix	SBUS	1.2320e-003	1.2360e-003
tblFleetMix	UBUS	2.1090e-003	0.00
tblFleetMix	UBUS	2.1090e-003	2.7380e-003
tblGrading	AcresOfGrading	50.00	4.00
tblGrading	MaterialImported	0.00	4,200.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	104.00
tblOperationalOffRoadEquipment	OperHorsePower	124.00	20.00

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tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.016
tblProjectCharacteristics	CO2IntensityFactor	641.35	364.4
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	HaulingTripNumber	0.00	50.00
tblTripsAndVMT	WorkerTripNumber	18.00	20.00
tblTripsAndVMT	WorkerTripNumber	18.00	15.00
tblVehicleEF	HHD	0.48	0.63
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.07	0.14
tblVehicleEF	HHD	1.83	2.92
tblVehicleEF	HHD	0.84	0.96
tblVehicleEF	HHD	2.40	3.02
tblVehicleEF	HHD	5,177.28	5,526.45
tblVehicleEF	HHD	1,520.44	1,617.31
tblVehicleEF	HHD	7.27	9.16
tblVehicleEF	HHD	15.81	23.32
tblVehicleEF	HHD	1.67	3.55
tblVehicleEF	HHD	19.91	19.84
tblVehicleEF	HHD	4.9410e-003	0.03
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.4180e-003	0.02
tblVehicleEF	HHD	7.9000e-005	9.6000e-005
tblVehicleEF	HHD	4.7270e-003	0.03
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.7970e-003	8.7590e-003

tblVehicleEF	HHD	6.1390e-003	0.02
tblVehicleEF	HHD	7.2000e-005	8.9000e-005
tblVehicleEF	HHD	5.8000e-005	9.0000e-005
tblVehicleEF	HHD	3.4110e-003	6.2690e-003
tblVehicleEF	HHD	0.48	0.79
tblVehicleEF	HHD	4.1000e-005	6.1000e-005
tblVehicleEF	HHD	0.08	0.12
tblVehicleEF	HHD	2.9100e-004	4.9600e-004
tblVehicleEF	HHD	0.05	0.13
tblVehicleEF	HHD	0.05	0.05
tblVehicleEF	HHD	0.01	0.02
tblVehicleEF	HHD	1.1200e-004	1.4300e-004
tblVehicleEF	HHD	5.8000e-005	9.0000e-005
tblVehicleEF	HHD	3.4110e-003	6.2690e-003
tblVehicleEF	HHD	0.56	0.90
tblVehicleEF	HHD	4.1000e-005	6.1000e-005
tblVehicleEF	HHD	0.12	0.16
tblVehicleEF	HHD	2.9100e-004	4.9600e-004
tblVehicleEF	HHD	0.06	0.14
tblVehicleEF	HHD	0.45	0.59
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.06	0.13
tblVehicleEF	HHD	1.33	2.13
tblVehicleEF	HHD	0.85	0.97
tblVehicleEF	HHD	2.19	2.76
tblVehicleEF	HHD	5,484.35	5,852.15
tblVehicleEF	HHD	1,520.44	1,617.31

tblVehicleEF	HHD	7.27	9.16
tblVehicleEF	HHD	16.32	24.06
tblVehicleEF	HHD	1.60	3.41
tblVehicleEF	HHD	19.90	19.82
tblVehicleEF	HHD	4.2430e-003	0.03
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.4180e-003	0.02
tblVehicleEF	HHD	7.9000e-005	9.6000e-005
tblVehicleEF	HHD	4.0600e-003	0.03
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.7970e-003	8.7590e-003
tblVehicleEF	HHD	6.1390e-003	0.02
tblVehicleEF	HHD	7.2000e-005	8.9000e-005
tblVehicleEF	HHD	1.0300e-004	1.6800e-004
tblVehicleEF	HHD	3.5490e-003	6.5280e-003
tblVehicleEF	HHD	0.46	0.74
tblVehicleEF	HHD	9.4000e-005	1.5100e-004
tblVehicleEF	HHD	0.08	0.12
tblVehicleEF	HHD	2.7600e-004	4.7700e-004
tblVehicleEF	HHD	0.05	0.12
tblVehicleEF	HHD	0.05	0.06
tblVehicleEF	HHD	0.01	0.02
tblVehicleEF	HHD	1.0900e-004	1.3900e-004
tblVehicleEF	HHD	1.0300e-004	1.6800e-004
tblVehicleEF	HHD	3.5490e-003	6.5280e-003
tblVehicleEF	HHD	0.52	0.85

tblVehicleEF	HHD	9.4000e-005	1.5100e-004
tblVehicleEF	HHD	0.12	0.16
tblVehicleEF	HHD	2.7600e-004	4.7700e-004
tblVehicleEF	HHD	0.05	0.13
tblVehicleEF	HHD	0.52	0.68
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.07	0.15
tblVehicleEF	HHD	2.52	4.01
tblVehicleEF	HHD	0.83	0.95
tblVehicleEF	HHD	2.60	3.29
tblVehicleEF	HHD	4,753.23	5,076.67
tblVehicleEF	HHD	1,520.44	1,617.31
tblVehicleEF	HHD	7.27	9.16
tblVehicleEF	HHD	15.11	22.29
tblVehicleEF	HHD	1.70	3.61
tblVehicleEF	HHD	19.93	19.86
tblVehicleEF	HHD	5.9040e-003	0.04
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	6.4180e-003	0.02
tblVehicleEF	HHD	7.9000e-005	9.6000e-005
tblVehicleEF	HHD	5.6490e-003	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.7970e-003	8.7590e-003
tblVehicleEF	HHD	6.1390e-003	0.02
tblVehicleEF	HHD	7.2000e-005	8.9000e-005
tblVehicleEF	HHD	2.6000e-005	3.8000e-005

tblVehicleEF	HHD	3.4890e-003	6.5210e-003
tblVehicleEF	HHD	0.52	0.85
tblVehicleEF	HHD	2.0000e-005	2.8000e-005
tblVehicleEF	HHD	0.08	0.12
tblVehicleEF	HHD	3.2700e-004	5.5100e-004
tblVehicleEF	HHD	0.06	0.13
tblVehicleEF	HHD	0.04	0.05
tblVehicleEF	HHD	0.01	0.02
tblVehicleEF	HHD	1.1500e-004	1.4700e-004
tblVehicleEF	HHD	2.6000e-005	3.8000e-005
tblVehicleEF	HHD	3.4890e-003	6.5210e-003
tblVehicleEF	HHD	0.60	0.97
tblVehicleEF	HHD	2.0000e-005	2.8000e-005
tblVehicleEF	HHD	0.12	0.16
tblVehicleEF	HHD	3.2700e-004	5.5100e-004
tblVehicleEF	HHD	0.06	0.15
tblVehicleEF	LDA	3.1400e-003	6.7410e-003
tblVehicleEF	LDA	3.1150e-003	8.2720e-003
tblVehicleEF	LDA	0.41	0.70
tblVehicleEF	LDA	0.82	1.66
tblVehicleEF	LDA	202.53	273.21
tblVehicleEF	LDA	43.76	58.45
tblVehicleEF	LDA	0.04	0.07
tblVehicleEF	LDA	0.04	0.11
tblVehicleEF	LDA	1.4960e-003	2.2210e-003
tblVehicleEF	LDA	1.9040e-003	2.3630e-003
tblVehicleEF	LDA	1.3770e-003	2.0490e-003

tblVehicleEF	LDA	1.7500e-003	2.1730e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.07	0.12
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	7.8830e-003	0.02
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.04	0.11
tblVehicleEF	LDA	2.0270e-003	2.7370e-003
tblVehicleEF	LDA	4.5100e-004	6.1300e-004
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.07	0.12
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.01	0.02
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.05	0.12
tblVehicleEF	LDA	3.4300e-003	7.3350e-003
tblVehicleEF	LDA	2.5820e-003	6.8200e-003
tblVehicleEF	LDA	0.46	0.79
tblVehicleEF	LDA	0.64	1.30
tblVehicleEF	LDA	215.50	290.77
tblVehicleEF	LDA	43.76	58.45
tblVehicleEF	LDA	0.03	0.06
tblVehicleEF	LDA	0.04	0.10
tblVehicleEF	LDA	1.4960e-003	2.2210e-003
tblVehicleEF	LDA	1.9040e-003	2.3630e-003
tblVehicleEF	LDA	1.3770e-003	2.0490e-003
tblVehicleEF	LDA	1.7500e-003	2.1730e-003

tblVehicleEF	LDA	0.03	0.06
tblVehicleEF	LDA	0.08	0.13
tblVehicleEF	LDA	0.04	0.07
tblVehicleEF	LDA	8.6010e-003	0.02
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.03	0.09
tblVehicleEF	LDA	2.1580e-003	2.9140e-003
tblVehicleEF	LDA	4.4800e-004	6.0700e-004
tblVehicleEF	LDA	0.03	0.06
tblVehicleEF	LDA	0.08	0.13
tblVehicleEF	LDA	0.04	0.07
tblVehicleEF	LDA	0.01	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.04	0.10
tblVehicleEF	LDA	3.0660e-003	6.6160e-003
tblVehicleEF	LDA	3.5570e-003	9.4890e-003
tblVehicleEF	LDA	0.41	0.70
tblVehicleEF	LDA	0.96	1.96
tblVehicleEF	LDA	201.31	271.56
tblVehicleEF	LDA	43.76	58.45
tblVehicleEF	LDA	0.04	0.08
tblVehicleEF	LDA	0.05	0.12
tblVehicleEF	LDA	1.4960e-003	2.2210e-003
tblVehicleEF	LDA	1.9040e-003	2.3630e-003
tblVehicleEF	LDA	1.3770e-003	2.0490e-003
tblVehicleEF	LDA	1.7500e-003	2.1730e-003
tblVehicleEF	LDA	7.7560e-003	0.01

tblVehicleEF	LDA	0.08	0.13
tblVehicleEF	LDA	7.0710e-003	0.01
tblVehicleEF	LDA	7.7000e-003	0.02
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.05	0.13
tblVehicleEF	LDA	2.0150e-003	2.7210e-003
tblVehicleEF	LDA	4.5400e-004	6.1800e-004
tblVehicleEF	LDA	7.7560e-003	0.01
tblVehicleEF	LDA	0.08	0.13
tblVehicleEF	LDA	7.0710e-003	0.01
tblVehicleEF	LDA	0.01	0.02
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.05	0.14
tblVehicleEF	LDT1	6.4470e-003	0.02
tblVehicleEF	LDT1	7.1710e-003	0.02
tblVehicleEF	LDT1	0.68	1.52
tblVehicleEF	LDT1	1.60	3.70
tblVehicleEF	LDT1	246.13	329.78
tblVehicleEF	LDT1	53.33	70.42
tblVehicleEF	LDT1	0.07	0.17
tblVehicleEF	LDT1	0.08	0.21
tblVehicleEF	LDT1	1.8390e-003	3.2210e-003
tblVehicleEF	LDT1	2.3150e-003	3.3630e-003
tblVehicleEF	LDT1	1.6920e-003	2.9730e-003
tblVehicleEF	LDT1	2.1290e-003	3.0920e-003
tblVehicleEF	LDT1	0.05	0.09
tblVehicleEF	LDT1	0.14	0.26

tblVehicleEF	LDT1	0.04	0.07
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.09	0.16
tblVehicleEF	LDT1	0.10	0.25
tblVehicleEF	LDT1	2.4680e-003	3.3170e-003
tblVehicleEF	LDT1	5.6100e-004	7.6900e-004
tblVehicleEF	LDT1	0.05	0.09
tblVehicleEF	LDT1	0.14	0.26
tblVehicleEF	LDT1	0.04	0.07
tblVehicleEF	LDT1	0.02	0.06
tblVehicleEF	LDT1	0.09	0.16
tblVehicleEF	LDT1	0.11	0.28
tblVehicleEF	LDT1	6.9910e-003	0.02
tblVehicleEF	LDT1	5.9160e-003	0.02
tblVehicleEF	LDT1	0.76	1.69
tblVehicleEF	LDT1	1.24	2.86
tblVehicleEF	LDT1	261.62	350.16
tblVehicleEF	LDT1	53.33	70.42
tblVehicleEF	LDT1	0.06	0.15
tblVehicleEF	LDT1	0.07	0.19
tblVehicleEF	LDT1	1.8390e-003	3.2210e-003
tblVehicleEF	LDT1	2.3150e-003	3.3630e-003
tblVehicleEF	LDT1	1.6920e-003	2.9730e-003
tblVehicleEF	LDT1	2.1290e-003	3.0920e-003
tblVehicleEF	LDT1	0.09	0.16
tblVehicleEF	LDT1	0.15	0.28
tblVehicleEF	LDT1	0.09	0.16

tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.08	0.14
tblVehicleEF	LDT1	0.08	0.21
tblVehicleEF	LDT1	2.6240e-003	3.5230e-003
tblVehicleEF	LDT1	5.5400e-004	7.5500e-004
tblVehicleEF	LDT1	0.09	0.16
tblVehicleEF	LDT1	0.15	0.28
tblVehicleEF	LDT1	0.09	0.16
tblVehicleEF	LDT1	0.03	0.06
tblVehicleEF	LDT1	0.08	0.14
tblVehicleEF	LDT1	0.09	0.23
tblVehicleEF	LDT1	6.3070e-003	0.02
tblVehicleEF	LDT1	8.2200e-003	0.02
tblVehicleEF	LDT1	0.68	1.53
tblVehicleEF	LDT1	1.89	4.40
tblVehicleEF	LDT1	244.67	327.86
tblVehicleEF	LDT1	53.33	70.42
tblVehicleEF	LDT1	0.08	0.19
tblVehicleEF	LDT1	0.09	0.23
tblVehicleEF	LDT1	1.8390e-003	3.2210e-003
tblVehicleEF	LDT1	2.3150e-003	3.3630e-003
tblVehicleEF	LDT1	1.6920e-003	2.9730e-003
tblVehicleEF	LDT1	2.1290e-003	3.0920e-003
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.15	0.28
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.02	0.04

tblVehicleEF	LDT1	0.11	0.20
tblVehicleEF	LDT1	0.11	0.29
tblVehicleEF	LDT1	2.4540e-003	3.2980e-003
tblVehicleEF	LDT1	5.6600e-004	7.8200e-004
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.15	0.28
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.02	0.06
tblVehicleEF	LDT1	0.11	0.20
tblVehicleEF	LDT1	0.12	0.32
tblVehicleEF	LDT2	6.0580e-003	0.01
tblVehicleEF	LDT2	6.4340e-003	0.02
tblVehicleEF	LDT2	0.69	1.19
tblVehicleEF	LDT2	1.46	2.97
tblVehicleEF	LDT2	304.57	392.18
tblVehicleEF	LDT2	65.97	83.46
tblVehicleEF	LDT2	0.08	0.16
tblVehicleEF	LDT2	0.11	0.29
tblVehicleEF	LDT2	1.7610e-003	2.3600e-003
tblVehicleEF	LDT2	2.1720e-003	2.6310e-003
tblVehicleEF	LDT2	1.6190e-003	2.1720e-003
tblVehicleEF	LDT2	1.9970e-003	2.4190e-003
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.12	0.20
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.08	0.11

tblVehicleEF	LDT2	0.09	0.21
tblVehicleEF	LDT2	3.0510e-003	3.9340e-003
tblVehicleEF	LDT2	6.8400e-004	8.8700e-004
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.12	0.20
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.02	0.05
tblVehicleEF	LDT2	0.08	0.11
tblVehicleEF	LDT2	0.10	0.23
tblVehicleEF	LDT2	6.6000e-003	0.01
tblVehicleEF	LDT2	5.3480e-003	0.01
tblVehicleEF	LDT2	0.79	1.34
tblVehicleEF	LDT2	1.16	2.31
tblVehicleEF	LDT2	323.53	416.60
tblVehicleEF	LDT2	65.97	83.46
tblVehicleEF	LDT2	0.07	0.14
tblVehicleEF	LDT2	0.10	0.26
tblVehicleEF	LDT2	1.7610e-003	2.3600e-003
tblVehicleEF	LDT2	2.1720e-003	2.6310e-003
tblVehicleEF	LDT2	1.6190e-003	2.1720e-003
tblVehicleEF	LDT2	1.9970e-003	2.4190e-003
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tblVehicleEF	LDT2	0.13	0.21
tblVehicleEF	LDT2	0.09	0.12
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.10
tblVehicleEF	LDT2	0.07	0.18

tblVehicleEF	LDT2	3.2420e-003	4.1810e-003
tblVehicleEF	LDT2	6.7900e-004	8.7500e-004
tblVehicleEF	LDT2	0.07	0.11
tblVehicleEF	LDT2	0.13	0.21
tblVehicleEF	LDT2	0.09	0.12
tblVehicleEF	LDT2	0.02	0.05
tblVehicleEF	LDT2	0.07	0.10
tblVehicleEF	LDT2	0.08	0.19
tblVehicleEF	LDT2	5.9190e-003	0.01
tblVehicleEF	LDT2	7.3390e-003	0.02
tblVehicleEF	LDT2	0.69	1.19
tblVehicleEF	LDT2	1.71	3.51
tblVehicleEF	LDT2	302.79	389.88
tblVehicleEF	LDT2	65.97	83.46
tblVehicleEF	LDT2	0.08	0.18
tblVehicleEF	LDT2	0.13	0.32
tblVehicleEF	LDT2	1.7610e-003	2.3600e-003
tblVehicleEF	LDT2	2.1720e-003	2.6310e-003
tblVehicleEF	LDT2	1.6190e-003	2.1720e-003
tblVehicleEF	LDT2	1.9970e-003	2.4190e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.13	0.21
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.01	0.03
tblVehicleEF	LDT2	0.10	0.14
tblVehicleEF	LDT2	0.10	0.25
tblVehicleEF	LDT2	3.0340e-003	3.9110e-003

tblVehicleEF	LDT2	6.8900e-004	8.9600e-004
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.13	0.21
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.02	0.05
tblVehicleEF	LDT2	0.10	0.14
tblVehicleEF	LDT2	0.11	0.27
tblVehicleEF	LHD1	4.6360e-003	5.4820e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.80	1.33
tblVehicleEF	LHD1	1.96	2.77
tblVehicleEF	LHD1	9.07	9.20
tblVehicleEF	LHD1	671.80	709.55
tblVehicleEF	LHD1	29.63	31.83
tblVehicleEF	LHD1	0.08	0.09
tblVehicleEF	LHD1	1.16	2.01
tblVehicleEF	LHD1	0.91	1.09
tblVehicleEF	LHD1	8.5000e-004	9.6000e-004
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	7.4100e-004	9.8700e-004
tblVehicleEF	LHD1	8.1300e-004	9.1800e-004
tblVehicleEF	LHD1	2.5520e-003	2.5060e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	6.8200e-004	9.0700e-004

tblVehicleEF	LHD1	2.0710e-003	2.3600e-003
tblVehicleEF	LHD1	0.11	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.3040e-003	1.3540e-003
tblVehicleEF	LHD1	0.11	0.15
tblVehicleEF	LHD1	0.36	0.35
tblVehicleEF	LHD1	0.20	0.29
tblVehicleEF	LHD1	9.0000e-005	9.2000e-005
tblVehicleEF	LHD1	6.5800e-003	6.9700e-003
tblVehicleEF	LHD1	3.3300e-004	3.7100e-004
tblVehicleEF	LHD1	2.0710e-003	2.3600e-003
tblVehicleEF	LHD1	0.11	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.3040e-003	1.3540e-003
tblVehicleEF	LHD1	0.13	0.18
tblVehicleEF	LHD1	0.36	0.35
tblVehicleEF	LHD1	0.22	0.32
tblVehicleEF	LHD1	4.6360e-003	5.4820e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.81	1.36
tblVehicleEF	LHD1	1.80	2.54
tblVehicleEF	LHD1	9.07	9.20
tblVehicleEF	LHD1	671.80	709.55
tblVehicleEF	LHD1	29.63	31.83
tblVehicleEF	LHD1	0.08	0.09

tblVehicleEF	LHD1	1.11	1.91
tblVehicleEF	LHD1	0.85	1.01
tblVehicleEF	LHD1	8.5000e-004	9.6000e-004
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	7.4100e-004	9.8700e-004
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tblVehicleEF	LHD1	2.5520e-003	2.5060e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	6.8200e-004	9.0700e-004
tblVehicleEF	LHD1	3.6600e-003	4.2740e-003
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.8760e-003	3.1040e-003
tblVehicleEF	LHD1	0.11	0.15
tblVehicleEF	LHD1	0.35	0.33
tblVehicleEF	LHD1	0.19	0.28
tblVehicleEF	LHD1	9.0000e-005	9.2000e-005
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tblVehicleEF	LHD1	3.6600e-003	4.2740e-003
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.8760e-003	3.1040e-003
tblVehicleEF	LHD1	0.13	0.19
tblVehicleEF	LHD1	0.35	0.33
tblVehicleEF	LHD1	0.21	0.30

tblVehicleEF	LHD1	4.6360e-003	5.4820e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.79	1.30
tblVehicleEF	LHD1	2.11	3.00
tblVehicleEF	LHD1	9.07	9.20
tblVehicleEF	LHD1	671.80	709.55
tblVehicleEF	LHD1	29.63	31.83
tblVehicleEF	LHD1	0.08	0.09
tblVehicleEF	LHD1	1.18	2.04
tblVehicleEF	LHD1	0.97	1.16
tblVehicleEF	LHD1	8.5000e-004	9.6000e-004
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	7.4100e-004	9.8700e-004
tblVehicleEF	LHD1	8.1300e-004	9.1800e-004
tblVehicleEF	LHD1	2.5520e-003	2.5060e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	6.8200e-004	9.0700e-004
tblVehicleEF	LHD1	8.7900e-004	9.3400e-004
tblVehicleEF	LHD1	0.12	0.12
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	6.2600e-004	6.3300e-004
tblVehicleEF	LHD1	0.11	0.15
tblVehicleEF	LHD1	0.40	0.39
tblVehicleEF	LHD1	0.22	0.31

tblVehicleEF	LHD1	9.0000e-005	9.2000e-005
tblVehicleEF	LHD1	6.5800e-003	6.9700e-003
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tblVehicleEF	LHD1	8.7900e-004	9.3400e-004
tblVehicleEF	LHD1	0.12	0.12
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	6.2600e-004	6.3300e-004
tblVehicleEF	LHD1	0.13	0.18
tblVehicleEF	LHD1	0.40	0.39
tblVehicleEF	LHD1	0.24	0.34
tblVehicleEF	LHD2	2.6380e-003	3.4590e-003
tblVehicleEF	LHD2	6.1340e-003	0.01
tblVehicleEF	LHD2	4.2100e-003	9.0900e-003
tblVehicleEF	LHD2	0.12	0.12
tblVehicleEF	LHD2	0.53	0.82
tblVehicleEF	LHD2	0.94	1.36
tblVehicleEF	LHD2	13.95	14.54
tblVehicleEF	LHD2	682.05	723.25
tblVehicleEF	LHD2	21.57	23.26
tblVehicleEF	LHD2	0.08	0.12
tblVehicleEF	LHD2	0.47	1.58
tblVehicleEF	LHD2	0.32	0.55
tblVehicleEF	LHD2	1.1280e-003	1.3500e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.5900e-004	4.2900e-004
tblVehicleEF	LHD2	1.0790e-003	1.2910e-003

tblVehicleEF	LHD2	2.7120e-003	2.7000e-003
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.3000e-004	3.9500e-004
tblVehicleEF	LHD2	5.8700e-004	9.6100e-004
tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.8900e-004	5.6200e-004
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tblVehicleEF	LHD2	0.06	0.11
tblVehicleEF	LHD2	0.06	0.12
tblVehicleEF	LHD2	1.3600e-004	1.4200e-004
tblVehicleEF	LHD2	6.6250e-003	7.0310e-003
tblVehicleEF	LHD2	2.3200e-004	2.5800e-004
tblVehicleEF	LHD2	5.8700e-004	9.6100e-004
tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	3.8900e-004	5.6200e-004
tblVehicleEF	LHD2	0.11	0.16
tblVehicleEF	LHD2	0.06	0.11
tblVehicleEF	LHD2	0.06	0.13
tblVehicleEF	LHD2	2.6380e-003	3.4590e-003
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tblVehicleEF	LHD2	4.0150e-003	8.5480e-003
tblVehicleEF	LHD2	0.12	0.12
tblVehicleEF	LHD2	0.53	0.82
tblVehicleEF	LHD2	0.87	1.25
tblVehicleEF	LHD2	13.95	14.54

tblVehicleEF	LHD2	682.05	723.25
tblVehicleEF	LHD2	21.57	23.26
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tblVehicleEF	LHD2	1.1280e-003	1.3500e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.5900e-004	4.2900e-004
tblVehicleEF	LHD2	1.0790e-003	1.2910e-003
tblVehicleEF	LHD2	2.7120e-003	2.7000e-003
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.3000e-004	3.9500e-004
tblVehicleEF	LHD2	1.0390e-003	1.7410e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	8.6500e-004	1.2870e-003
tblVehicleEF	LHD2	0.10	0.13
tblVehicleEF	LHD2	0.06	0.11
tblVehicleEF	LHD2	0.05	0.12
tblVehicleEF	LHD2	1.3600e-004	1.4200e-004
tblVehicleEF	LHD2	6.6250e-003	7.0310e-003
tblVehicleEF	LHD2	2.3100e-004	2.5600e-004
tblVehicleEF	LHD2	1.0390e-003	1.7410e-003
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	8.6500e-004	1.2870e-003

tblVehicleEF	LHD2	0.12	0.16
tblVehicleEF	LHD2	0.06	0.11
tblVehicleEF	LHD2	0.06	0.13
tblVehicleEF	LHD2	2.6380e-003	3.4590e-003
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tblVehicleEF	LHD2	13.95	14.54
tblVehicleEF	LHD2	682.05	723.25
tblVehicleEF	LHD2	21.57	23.26
tblVehicleEF	LHD2	0.08	0.12
tblVehicleEF	LHD2	0.48	1.60
tblVehicleEF	LHD2	0.34	0.58
tblVehicleEF	LHD2	1.1280e-003	1.3500e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.5900e-004	4.2900e-004
tblVehicleEF	LHD2	1.0790e-003	1.2910e-003
tblVehicleEF	LHD2	2.7120e-003	2.7000e-003
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.3000e-004	3.9500e-004
tblVehicleEF	LHD2	2.5400e-004	3.8500e-004
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	1.8700e-004	2.6400e-004

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tblVehicleEF	LHD2	0.07	0.13
tblVehicleEF	LHD2	0.06	0.13
tblVehicleEF	LHD2	1.3600e-004	1.4200e-004
tblVehicleEF	LHD2	6.6250e-003	7.0310e-003
tblVehicleEF	LHD2	2.3300e-004	2.5900e-004
tblVehicleEF	LHD2	2.5400e-004	3.8500e-004
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.8700e-004	2.6400e-004
tblVehicleEF	LHD2	0.11	0.15
tblVehicleEF	LHD2	0.07	0.13
tblVehicleEF	LHD2	0.06	0.14
tblVehicleEF	MCY	0.54	0.52
tblVehicleEF	MCY	0.16	0.17
tblVehicleEF	MCY	19.21	21.50
tblVehicleEF	MCY	10.54	10.32
tblVehicleEF	MCY	186.80	184.46
tblVehicleEF	MCY	44.53	47.48
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.32	0.32
tblVehicleEF	MCY	2.5170e-003	2.3100e-003
tblVehicleEF	MCY	3.2350e-003	3.9680e-003
tblVehicleEF	MCY	2.3490e-003	2.1640e-003
tblVehicleEF	MCY	3.0330e-003	3.7490e-003
tblVehicleEF	MCY	0.80	0.82
tblVehicleEF	MCY	0.73	0.84

tblVehicleEF	MCY	0.45	0.48
tblVehicleEF	MCY	2.59	2.76
tblVehicleEF	MCY	0.31	0.43
tblVehicleEF	MCY	2.23	2.34
tblVehicleEF	MCY	2.2610e-003	2.2780e-003
tblVehicleEF	MCY	6.8300e-004	7.1300e-004
tblVehicleEF	MCY	0.80	0.82
tblVehicleEF	MCY	0.73	0.84
tblVehicleEF	MCY	0.45	0.48
tblVehicleEF	MCY	3.23	3.38
tblVehicleEF	MCY	0.31	0.43
tblVehicleEF	MCY	2.42	2.55
tblVehicleEF	MCY	0.52	0.50
tblVehicleEF	MCY	0.14	0.14
tblVehicleEF	MCY	18.06	20.04
tblVehicleEF	MCY	9.01	8.92
tblVehicleEF	MCY	186.80	184.46
tblVehicleEF	MCY	44.53	47.48
tblVehicleEF	MCY	1.04	1.05
tblVehicleEF	MCY	0.29	0.30
tblVehicleEF	MCY	2.5170e-003	2.3100e-003
tblVehicleEF	MCY	3.2350e-003	3.9680e-003
tblVehicleEF	MCY	2.3490e-003	2.1640e-003
tblVehicleEF	MCY	3.0330e-003	3.7490e-003
tblVehicleEF	MCY	1.61	1.65
tblVehicleEF	MCY	0.89	0.98
tblVehicleEF	MCY	1.28	1.39

tblVehicleEF	MCY	2.49	2.63
tblVehicleEF	MCY	0.29	0.40
tblVehicleEF	MCY	1.84	1.92
tblVehicleEF	MCY	2.2390e-003	2.2500e-003
tblVehicleEF	MCY	6.4700e-004	6.7700e-004
tblVehicleEF	MCY	1.61	1.65
tblVehicleEF	MCY	0.89	0.98
tblVehicleEF	MCY	1.28	1.39
tblVehicleEF	MCY	3.11	3.22
tblVehicleEF	MCY	0.29	0.40
tblVehicleEF	MCY	2.01	2.09
tblVehicleEF	MCY	0.56	0.54
tblVehicleEF	MCY	0.19	0.20
tblVehicleEF	MCY	20.88	23.58
tblVehicleEF	MCY	12.31	12.00
tblVehicleEF	MCY	186.80	184.46
tblVehicleEF	MCY	44.53	47.48
tblVehicleEF	MCY	1.27	1.29
tblVehicleEF	MCY	0.34	0.35
tblVehicleEF	MCY	2.5170e-003	2.3100e-003
tblVehicleEF	MCY	3.2350e-003	3.9680e-003
tblVehicleEF	MCY	2.3490e-003	2.1640e-003
tblVehicleEF	MCY	3.0330e-003	3.7490e-003
tblVehicleEF	MCY	0.26	0.26
tblVehicleEF	MCY	0.83	0.99
tblVehicleEF	MCY	0.15	0.16
tblVehicleEF	MCY	2.69	2.90

tblVehicleEF	MCY	0.38	0.50
tblVehicleEF	MCY	2.62	2.79
tblVehicleEF	MCY	2.2910e-003	2.3150e-003
tblVehicleEF	MCY	7.2400e-004	7.5400e-004
tblVehicleEF	MCY	0.26	0.26
tblVehicleEF	MCY	0.83	0.99
tblVehicleEF	MCY	0.15	0.16
tblVehicleEF	MCY	3.36	3.55
tblVehicleEF	MCY	0.38	0.50
tblVehicleEF	MCY	2.85	3.03
tblVehicleEF	MDV	0.01	0.02
tblVehicleEF	MDV	0.01	0.03
tblVehicleEF	MDV	0.98	1.67
tblVehicleEF	MDV	2.63	4.59
tblVehicleEF	MDV	417.62	533.68
tblVehicleEF	MDV	90.55	111.77
tblVehicleEF	MDV	0.14	0.26
tblVehicleEF	MDV	0.26	0.49
tblVehicleEF	MDV	1.8060e-003	2.2720e-003
tblVehicleEF	MDV	2.2520e-003	2.6090e-003
tblVehicleEF	MDV	1.6630e-003	2.0940e-003
tblVehicleEF	MDV	2.0700e-003	2.4000e-003
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.21	0.24
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.13	0.15

tblVehicleEF	MDV	0.19	0.36
tblVehicleEF	MDV	4.1810e-003	5.3520e-003
tblVehicleEF	MDV	9.5200e-004	1.2000e-003
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.21	0.24
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.04	0.07
tblVehicleEF	MDV	0.13	0.15
tblVehicleEF	MDV	0.21	0.40
tblVehicleEF	MDV	0.01	0.02
tblVehicleEF	MDV	0.01	0.02
tblVehicleEF	MDV	1.11	1.88
tblVehicleEF	MDV	2.07	3.58
tblVehicleEF	MDV	443.00	566.18
tblVehicleEF	MDV	90.55	111.77
tblVehicleEF	MDV	0.12	0.23
tblVehicleEF	MDV	0.23	0.43
tblVehicleEF	MDV	1.8060e-003	2.2720e-003
tblVehicleEF	MDV	2.2520e-003	2.6090e-003
tblVehicleEF	MDV	1.6630e-003	2.0940e-003
tblVehicleEF	MDV	2.0700e-003	2.4000e-003
tblVehicleEF	MDV	0.12	0.12
tblVehicleEF	MDV	0.22	0.26
tblVehicleEF	MDV	0.15	0.16
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.12	0.13
tblVehicleEF	MDV	0.16	0.30

tblVehicleEF	MDV	4.4370e-003	5.6800e-003
tblVehicleEF	MDV	9.4200e-004	1.1820e-003
tblVehicleEF	MDV	0.12	0.12
tblVehicleEF	MDV	0.22	0.26
tblVehicleEF	MDV	0.15	0.16
tblVehicleEF	MDV	0.04	0.08
tblVehicleEF	MDV	0.12	0.13
tblVehicleEF	MDV	0.17	0.33
tblVehicleEF	MDV	0.01	0.02
tblVehicleEF	MDV	0.02	0.03
tblVehicleEF	MDV	0.98	1.67
tblVehicleEF	MDV	3.10	5.43
tblVehicleEF	MDV	415.24	530.62
tblVehicleEF	MDV	90.55	111.77
tblVehicleEF	MDV	0.15	0.29
tblVehicleEF	MDV	0.28	0.54
tblVehicleEF	MDV	1.8060e-003	2.2720e-003
tblVehicleEF	MDV	2.2520e-003	2.6090e-003
tblVehicleEF	MDV	1.6630e-003	2.0940e-003
tblVehicleEF	MDV	2.0700e-003	2.4000e-003
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.21	0.25
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.16	0.18
tblVehicleEF	MDV	0.22	0.42
tblVehicleEF	MDV	4.1570e-003	5.3210e-003

tblVehicleEF	MDV	9.6000e-004	1.2150e-003
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.21	0.25
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.04	0.07
tblVehicleEF	MDV	0.16	0.18
tblVehicleEF	MDV	0.24	0.46
tblVehicleEF	MH	0.01	0.05
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.72	3.46
tblVehicleEF	MH	4.33	7.31
tblVehicleEF	MH	1,196.54	1,231.91
tblVehicleEF	MH	56.72	59.35
tblVehicleEF	MH	1.09	1.77
tblVehicleEF	MH	0.75	1.01
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	9.0800e-004	1.3530e-003
tblVehicleEF	MH	3.2310e-003	3.2280e-003
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	8.3500e-004	1.2440e-003
tblVehicleEF	MH	0.58	1.01
tblVehicleEF	MH	0.06	0.10
tblVehicleEF	MH	0.25	0.39
tblVehicleEF	MH	0.05	0.15
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.26	0.41

tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.4300e-004	7.2100e-004
tblVehicleEF	MH	0.58	1.01
tblVehicleEF	MH	0.06	0.10
tblVehicleEF	MH	0.25	0.39
tblVehicleEF	MH	0.07	0.20
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.28	0.45
tblVehicleEF	MH	0.01	0.05
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.74	3.63
tblVehicleEF	MH	3.92	6.57
tblVehicleEF	MH	1,196.54	1,231.91
tblVehicleEF	MH	56.72	59.35
tblVehicleEF	MH	1.03	1.65
tblVehicleEF	MH	0.69	0.94
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	9.0800e-004	1.3530e-003
tblVehicleEF	MH	3.2310e-003	3.2280e-003
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	8.3500e-004	1.2440e-003
tblVehicleEF	MH	1.05	1.85
tblVehicleEF	MH	0.06	0.10
tblVehicleEF	MH	0.56	0.91
tblVehicleEF	MH	0.05	0.15
tblVehicleEF	MH	0.02	0.03

tblVehicleEF	MH	0.24	0.38
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.3600e-004	7.0800e-004
tblVehicleEF	MH	1.05	1.85
tblVehicleEF	MH	0.06	0.10
tblVehicleEF	MH	0.56	0.91
tblVehicleEF	MH	0.07	0.21
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.26	0.42
tblVehicleEF	MH	0.01	0.05
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.70	3.34
tblVehicleEF	MH	4.73	8.13
tblVehicleEF	MH	1,196.54	1,231.91
tblVehicleEF	MH	56.72	59.35
tblVehicleEF	MH	1.12	1.83
tblVehicleEF	MH	0.79	1.07
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	9.0800e-004	1.3530e-003
tblVehicleEF	MH	3.2310e-003	3.2280e-003
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	8.3500e-004	1.2440e-003
tblVehicleEF	MH	0.25	0.39
tblVehicleEF	MH	0.06	0.12
tblVehicleEF	MH	0.13	0.20
tblVehicleEF	MH	0.05	0.14

tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.27	0.44
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.5000e-004	7.3500e-004
tblVehicleEF	MH	0.25	0.39
tblVehicleEF	MH	0.06	0.12
tblVehicleEF	MH	0.13	0.20
tblVehicleEF	MH	0.07	0.20
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.30	0.48
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	3.0760e-003	8.6690e-003
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.27	0.40
tblVehicleEF	MHD	0.28	0.59
tblVehicleEF	MHD	3.00	6.73
tblVehicleEF	MHD	177.81	167.39
tblVehicleEF	MHD	1,172.83	1,208.48
tblVehicleEF	MHD	38.92	48.18
tblVehicleEF	MHD	0.53	0.87
tblVehicleEF	MHD	1.19	1.92
tblVehicleEF	MHD	13.91	12.93
tblVehicleEF	MHD	1.3500e-004	5.0150e-003
tblVehicleEF	MHD	3.7280e-003	0.01
tblVehicleEF	MHD	5.5100e-004	9.0700e-004
tblVehicleEF	MHD	1.2900e-004	4.7980e-003
tblVehicleEF	MHD	3.5610e-003	0.01

tblVehicleEF	MHD	5.0700e-004	8.3400e-004
tblVehicleEF	MHD	4.8400e-004	1.0270e-003
tblVehicleEF	MHD	0.03	0.05
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	3.1200e-004	5.5700e-004
tblVehicleEF	MHD	0.04	0.08
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.18	0.39
tblVehicleEF	MHD	1.7050e-003	1.6070e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	4.4200e-004	6.0000e-004
tblVehicleEF	MHD	4.8400e-004	1.0270e-003
tblVehicleEF	MHD	0.03	0.05
tblVehicleEF	MHD	0.03	0.05
tblVehicleEF	MHD	3.1200e-004	5.5700e-004
tblVehicleEF	MHD	0.05	0.09
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.20	0.43
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	3.1170e-003	8.9020e-003
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.18	0.27
tblVehicleEF	MHD	0.28	0.60
tblVehicleEF	MHD	2.74	6.15
tblVehicleEF	MHD	188.57	177.57
tblVehicleEF	MHD	1,172.83	1,208.48
tblVehicleEF	MHD	38.92	48.18

tblVehicleEF	MHD	0.55	0.90
tblVehicleEF	MHD	1.14	1.83
tblVehicleEF	MHD	13.87	12.87
tblVehicleEF	MHD	1.1400e-004	4.2270e-003
tblVehicleEF	MHD	3.7280e-003	0.01
tblVehicleEF	MHD	5.5100e-004	9.0700e-004
tblVehicleEF	MHD	1.0900e-004	4.0450e-003
tblVehicleEF	MHD	3.5610e-003	0.01
tblVehicleEF	MHD	5.0700e-004	8.3400e-004
tblVehicleEF	MHD	8.7100e-004	1.9390e-003
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	7.1200e-004	1.3750e-003
tblVehicleEF	MHD	0.04	0.08
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.17	0.37
tblVehicleEF	MHD	1.8060e-003	1.7030e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	4.3700e-004	5.9000e-004
tblVehicleEF	MHD	8.7100e-004	1.9390e-003
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	7.1200e-004	1.3750e-003
tblVehicleEF	MHD	0.05	0.10
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.19	0.40
tblVehicleEF	MHD	0.02	0.02

tblVehicleEF	MHD	3.0440e-003	8.4970e-003
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.34	0.51
tblVehicleEF	MHD	0.27	0.58
tblVehicleEF	MHD	3.26	7.33
tblVehicleEF	MHD	163.43	153.91
tblVehicleEF	MHD	1,172.83	1,208.48
tblVehicleEF	MHD	38.92	48.18
tblVehicleEF	MHD	0.51	0.84
tblVehicleEF	MHD	1.21	1.95
tblVehicleEF	MHD	13.93	12.99
tblVehicleEF	MHD	1.6400e-004	6.1020e-003
tblVehicleEF	MHD	3.7280e-003	0.01
tblVehicleEF	MHD	5.5100e-004	9.0700e-004
tblVehicleEF	MHD	1.5700e-004	5.8380e-003
tblVehicleEF	MHD	3.5610e-003	0.01
tblVehicleEF	MHD	5.0700e-004	8.3400e-004
tblVehicleEF	MHD	2.0500e-004	3.8100e-004
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	1.4900e-004	2.5100e-004
tblVehicleEF	MHD	0.04	0.08
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.19	0.42
tblVehicleEF	MHD	1.5680e-003	1.4790e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	4.4600e-004	6.1000e-004

tblVehicleEF	MHD	2.0500e-004	3.8100e-004
tblVehicleEF	MHD	0.03	0.06
tblVehicleEF	MHD	0.03	0.05
tblVehicleEF	MHD	1.4900e-004	2.5100e-004
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tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.21	0.46
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tblVehicleEF	OBUS	5.8340e-003	0.02
tblVehicleEF	OBUS	0.03	0.05
tblVehicleEF	OBUS	0.29	0.38
tblVehicleEF	OBUS	0.48	1.03
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tblVehicleEF	OBUS	0.98	1.71
tblVehicleEF	OBUS	1.27	2.38
tblVehicleEF	OBUS	6.30	5.93
tblVehicleEF	OBUS	9.2000e-005	3.9100e-004
tblVehicleEF	OBUS	3.6940e-003	9.4650e-003
tblVehicleEF	OBUS	9.0700e-004	1.0460e-003
tblVehicleEF	OBUS	8.8000e-005	3.7400e-004
tblVehicleEF	OBUS	3.5180e-003	9.0400e-003
tblVehicleEF	OBUS	8.3400e-004	9.6100e-004
tblVehicleEF	OBUS	1.3330e-003	1.8460e-003
tblVehicleEF	OBUS	0.02	0.03

tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	6.4400e-004	8.1800e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.30	0.49
tblVehicleEF	OBUS	3.8120e-003	3.2470e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	6.2100e-004	7.2300e-004
tblVehicleEF	OBUS	1.3330e-003	1.8460e-003
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.06	0.09
tblVehicleEF	OBUS	6.4400e-004	8.1800e-004
tblVehicleEF	OBUS	0.07	0.13
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.33	0.53
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	5.9630e-003	0.02
tblVehicleEF	OBUS	0.03	0.04
tblVehicleEF	OBUS	0.26	0.33
tblVehicleEF	OBUS	0.48	1.06
tblVehicleEF	OBUS	4.41	7.30
tblVehicleEF	OBUS	421.48	358.53
tblVehicleEF	OBUS	1,370.49	1,406.57
tblVehicleEF	OBUS	53.57	58.13
tblVehicleEF	OBUS	1.01	1.77
tblVehicleEF	OBUS	1.21	2.27
tblVehicleEF	OBUS	6.24	5.84

tblVehicleEF	OBUS	7.7000e-005	3.3000e-004
tblVehicleEF	OBUS	3.6940e-003	9.4650e-003
tblVehicleEF	OBUS	9.0700e-004	1.0460e-003
tblVehicleEF	OBUS	7.4000e-005	3.1600e-004
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tblVehicleEF	OBUS	8.3400e-004	9.6100e-004
tblVehicleEF	OBUS	2.4080e-003	3.4040e-003
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	1.5050e-003	1.9770e-003
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.28	0.45
tblVehicleEF	OBUS	4.0310e-003	3.4310e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	6.1300e-004	7.1000e-004
tblVehicleEF	OBUS	2.4080e-003	3.4040e-003
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.06	0.08
tblVehicleEF	OBUS	1.5050e-003	1.9770e-003
tblVehicleEF	OBUS	0.07	0.13
tblVehicleEF	OBUS	0.02	0.03
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tblVehicleEF	OBUS	0.01	0.01
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tblVehicleEF	OBUS	0.03	0.05
tblVehicleEF	OBUS	0.33	0.45

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tblVehicleEF	OBUS	1.29	2.42
tblVehicleEF	OBUS	6.35	6.01
tblVehicleEF	OBUS	1.1200e-004	4.7600e-004
tblVehicleEF	OBUS	3.6940e-003	9.4650e-003
tblVehicleEF	OBUS	9.0700e-004	1.0460e-003
tblVehicleEF	OBUS	1.0700e-004	4.5500e-004
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tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	3.4300e-004	4.2200e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.03	0.03
tblVehicleEF	OBUS	0.32	0.51
tblVehicleEF	OBUS	3.5100e-003	2.9920e-003
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tblVehicleEF	OBUS	6.2900e-004	7.3600e-004
tblVehicleEF	OBUS	5.9900e-004	7.6900e-004
tblVehicleEF	OBUS	0.02	0.03
tblVehicleEF	OBUS	0.07	0.09

tblVehicleEF	OBUS	3.4300e-004	4.2200e-004
tblVehicleEF	OBUS	0.07	0.13
tblVehicleEF	OBUS	0.03	0.03
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tblVehicleEF	SBUS	0.06	0.08
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tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.01	0.03
tblVehicleEF	SBUS	4.6200e-004	3.3300e-004
tblVehicleEF	SBUS	3.4320e-003	0.01
tblVehicleEF	SBUS	2.7290e-003	2.7640e-003
tblVehicleEF	SBUS	0.01	0.03
tblVehicleEF	SBUS	4.2500e-004	3.0600e-004
tblVehicleEF	SBUS	1.4710e-003	1.4250e-003
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tblVehicleEF	SBUS	0.50	0.45

tblVehicleEF	SBUS	8.0200e-004	6.7700e-004
tblVehicleEF	SBUS	0.07	0.11
tblVehicleEF	SBUS	6.4380e-003	7.3420e-003
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tblVehicleEF	SBUS	0.01	0.01
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tblVehicleEF	SBUS	5.1540e-003	0.01
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tblVehicleEF	SBUS	0.01	0.03
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tblVehicleEF	SBUS	4.1760e-003	0.02
tblVehicleEF	SBUS	2.7290e-003	2.7640e-003
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tblVehicleEF	SBUS	7.3200e-004	6.4800e-004
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tblVehicleEF	SBUS	0.50	0.46
tblVehicleEF	SBUS	4.4300e-004	3.6400e-004
tblVehicleEF	SBUS	0.07	0.11
tblVehicleEF	SBUS	8.1280e-003	9.3220e-003
tblVehicleEF	SBUS	0.20	0.23
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	3.4600e-004	3.1800e-004

tblVehicleEF	SBUS	7.3200e-004	6.4800e-004
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tblVehicleEF	SBUS	0.71	0.65
tblVehicleEF	SBUS	4.4300e-004	3.6400e-004
tblVehicleEF	SBUS	0.08	0.14
tblVehicleEF	SBUS	8.1280e-003	9.3220e-003
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tblVehicleEF	UBUS	0.62	0.74
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	5.46	8.00
tblVehicleEF	UBUS	16.16	21.72
tblVehicleEF	UBUS	1,847.13	1,956.55
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tblVehicleEF	UBUS	12.59	13.35
tblVehicleEF	UBUS	0.48	0.49
tblVehicleEF	UBUS	0.03	0.07
tblVehicleEF	UBUS	1.3780e-003	1.1740e-003
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tblVehicleEF	UBUS	1.2670e-003	1.0790e-003
tblVehicleEF	UBUS	4.7710e-003	6.1110e-003
tblVehicleEF	UBUS	0.08	0.12
tblVehicleEF	UBUS	2.9850e-003	3.5110e-003
tblVehicleEF	UBUS	0.26	0.59
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	1.22	1.53

tblVehicleEF	UBUS	0.01	0.02
tblVehicleEF	UBUS	1.8100e-003	1.9060e-003
tblVehicleEF	UBUS	4.7710e-003	6.1110e-003
tblVehicleEF	UBUS	0.08	0.12
tblVehicleEF	UBUS	2.9850e-003	3.5110e-003
tblVehicleEF	UBUS	0.91	1.39
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	1.33	1.68
tblVehicleEF	UBUS	0.62	0.75
tblVehicleEF	UBUS	0.08	0.10
tblVehicleEF	UBUS	5.54	8.15
tblVehicleEF	UBUS	13.01	17.39
tblVehicleEF	UBUS	1,847.13	1,956.55
tblVehicleEF	UBUS	151.84	151.70
tblVehicleEF	UBUS	2.94	6.11
tblVehicleEF	UBUS	12.43	13.15
tblVehicleEF	UBUS	0.48	0.49
tblVehicleEF	UBUS	0.03	0.07
tblVehicleEF	UBUS	1.3780e-003	1.1740e-003
tblVehicleEF	UBUS	0.21	0.21
tblVehicleEF	UBUS	0.03	0.07
tblVehicleEF	UBUS	1.2670e-003	1.0790e-003
tblVehicleEF	UBUS	7.4700e-003	9.7030e-003
tblVehicleEF	UBUS	0.09	0.13
tblVehicleEF	UBUS	7.0270e-003	8.4440e-003
tblVehicleEF	UBUS	0.27	0.61
tblVehicleEF	UBUS	0.01	0.01

tblVehicleEF	UBUS	1.07	1.34
tblVehicleEF	UBUS	0.01	0.02
tblVehicleEF	UBUS	1.7550e-003	1.8320e-003
tblVehicleEF	UBUS	7.4700e-003	9.7030e-003
tblVehicleEF	UBUS	0.09	0.13
tblVehicleEF	UBUS	7.0270e-003	8.4440e-003
tblVehicleEF	UBUS	0.91	1.41
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	1.18	1.47
tblVehicleEF	UBUS	0.62	0.74
tblVehicleEF	UBUS	0.10	0.13
tblVehicleEF	UBUS	5.40	7.88
tblVehicleEF	UBUS	19.35	26.15
tblVehicleEF	UBUS	1,847.13	1,956.55
tblVehicleEF	UBUS	151.84	151.70
tblVehicleEF	UBUS	3.20	6.60
tblVehicleEF	UBUS	12.73	13.52
tblVehicleEF	UBUS	0.48	0.49
tblVehicleEF	UBUS	0.03	0.07
tblVehicleEF	UBUS	1.3780e-003	1.1740e-003
tblVehicleEF	UBUS	0.21	0.21
tblVehicleEF	UBUS	0.03	0.07
tblVehicleEF	UBUS	1.2670e-003	1.0790e-003
tblVehicleEF	UBUS	2.1760e-003	2.6360e-003
tblVehicleEF	UBUS	0.09	0.13
tblVehicleEF	UBUS	1.6650e-003	1.8900e-003
tblVehicleEF	UBUS	0.26	0.58

tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	1.35	1.71
tblVehicleEF	UBUS	0.01	0.02
tblVehicleEF	UBUS	1.8640e-003	1.9810e-003
tblVehicleEF	UBUS	2.1760e-003	2.6360e-003
tblVehicleEF	UBUS	0.09	0.13
tblVehicleEF	UBUS	1.6650e-003	1.8900e-003
tblVehicleEF	UBUS	0.90	1.37
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	1.48	1.87
tblVehicleTrips	CC_TL	7.30	9.50
tblVehicleTrips	CNW_TL	7.30	9.50
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	ST_TR	22.75	90.91
tblVehicleTrips	SU_TR	16.74	90.91
tblVehicleTrips	WD_TR	1.89	36.36

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4680	4.8872	3.3358	6.7500e-003	0.6897	0.2290	0.9187	0.3710	0.2107	0.5817						612.3667
Maximum	**0.4680**	**4.8872**	**3.3358**	**6.7500e-003**	**0.6897**	**0.2290**	**0.9187**	**0.3710**	**0.2107**	**0.5817**						**612.3667**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1699	3.1858	4.1632	6.7500e-003	0.2841	0.1466	0.4307	0.1488	0.1466	0.2953						612.3661
Maximum	**0.1699**	**3.1858**	**4.1632**	**6.7500e-003**	**0.2841**	**0.1466**	**0.4307**	**0.1488**	**0.1466**	**0.2953**						**612.3661**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**63.70**	**34.81**	**-24.81**	**0.00**	**58.81**	**35.96**	**53.12**	**59.91**	**30.42**	**49.23**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	3-9-2019	6-8-2019	3.7522	2.3463
2	6-9-2019	9-8-2019	1.5998	1.0061
		Highest	3.7522	2.3463

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9200e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.7593
Mobile	0.0922	0.1741	1.2055	3.0800e-003	0.2913	2.6700e-003	0.2939	0.0775	2.4800e-003	0.0800						278.4297
Waste						0.0000	0.0000		0.0000	0.0000						0.1911
Water						0.0000	0.0000		0.0000	0.0000						3.0461
Total	**0.0951**	**0.1741**	**1.2055**	**3.0800e-003**	**0.2913**	**2.6700e-003**	**0.2939**	**0.0775**	**2.4800e-003**	**0.0800**						**282.4264**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9200e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.7593
Mobile	0.0922	0.1741	1.2055	3.0800e-003	0.2913	2.6700e-003	0.2939	0.0775	2.4800e-003	0.0800						278.4297
Waste						0.0000	0.0000		0.0000	0.0000						0.1911
Water						0.0000	0.0000		0.0000	0.0000						3.0461
Total	**0.0951**	**0.1741**	**1.2055**	**3.0800e-003**	**0.2913**	**2.6700e-003**	**0.2939**	**0.0775**	**2.4800e-003**	**0.0800**						**282.4264**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/9/2019	6/28/2019	5	80	Basin Excavation & Demo
2	Site Preparation	Site Preparation	4/6/2019	5/31/2019	5	40	Site Prep & Grubbing
3	Grading	Grading	4/13/2019	8/30/2019	5	100	Grading & Excavation
4	Paving	Paving	4/25/2019	6/19/2019	5	40	Onsite Road Const. & Paving

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

CA Central Coast Veterans Cemetery - Construction Emissions - Monterey County, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Off-Highway Trucks	1	8.00	402	0.38
Demolition	Other Material Handling Equipment	1	30.00	168	0.40
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	2	8.00	203	0.36
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Off-Highway Trucks	1	8.00	402	0.38
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Trenchers	1	8.00	78	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	7	20.00	0.00	525.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	15.00	0.00	50.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1506	1.5821	1.3441	2.6400e-003		0.0698	0.0698		0.0643	0.0643						238.8927
Total	**0.1506**	**1.5821**	**1.3441**	**2.6400e-003**		**0.0698**	**0.0698**		**0.0643**	**0.0643**						**238.8927**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8700e-003	3.6800e-003	0.0329	7.0000e-005	6.3600e-003	6.0000e-005	6.4200e-003	1.6900e-003	5.0000e-005	1.7400e-003						6.2423
Total	**3.8700e-003**	**3.6800e-003**	**0.0329**	**7.0000e-005**	**6.3600e-003**	**6.0000e-005**	**6.4200e-003**	**1.6900e-003**	**5.0000e-005**	**1.7400e-003**						**6.2423**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0649	1.2659	1.7699	2.6400e-003		0.0576	0.0576		0.0576	0.0576						238.8924
Total	**0.0649**	**1.2659**	**1.7699**	**2.6400e-003**		**0.0576**	**0.0576**		**0.0576**	**0.0576**						**238.8924**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8700e-003	3.6800e-003	0.0329	7.0000e-005	6.3600e-003	6.0000e-005	6.4200e-003	1.6900e-003	5.0000e-005	1.7400e-003						6.2423
Total	**3.8700e-003**	**3.6800e-003**	**0.0329**	**7.0000e-005**	**6.3600e-003**	**6.0000e-005**	**6.4200e-003**	**1.6900e-003**	**5.0000e-005**	**1.7400e-003**						**6.2423**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986						0.0000
Off-Road	0.1009	1.0553	0.5212	1.0200e-003		0.0530	0.0530		0.0488	0.0488						92.7927
Total	**0.1009**	**1.0553**	**0.5212**	**1.0200e-003**	**0.3613**	**0.0530**	**0.4144**	**0.1986**	**0.0488**	**0.2474**						**92.7927**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9300e-003	1.8400e-003	0.0164	3.0000e-005	3.1800e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004						3.1211
Total	**1.9300e-003**	**1.8400e-003**	**0.0164**	**3.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**						**3.1211**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1409	0.0000	0.1409	0.0775	0.0000	0.0775						0.0000
Off-Road	0.0251	0.5063	0.5993	1.0200e-003		0.0237	0.0237		0.0237	0.0237						92.7926
Total	**0.0251**	**0.5063**	**0.5993**	**1.0200e-003**	**0.1409**	**0.0237**	**0.1646**	**0.0775**	**0.0237**	**0.1011**						**92.7926**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9300e-003	1.8400e-003	0.0164	3.0000e-005	3.1800e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004						3.1211
Total	**1.9300e-003**	**1.8400e-003**	**0.0164**	**3.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**						**3.1211**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3037	0.0000	0.3037	0.1658	0.0000	0.1658						0.0000
Off-Road	0.1645	1.7769	1.0145	2.1400e-003		0.0829	0.0829		0.0763	0.0763						194.0519
Total	**0.1645**	**1.7769**	**1.0145**	**2.1400e-003**	**0.3037**	**0.0829**	**0.3866**	**0.1658**	**0.0763**	**0.2421**						**194.0519**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.5600e-003	0.0858	0.0175	2.1000e-004	4.4500e-003	4.3000e-004	4.8800e-003	1.2200e-003	4.1000e-004	1.6300e-003						20.6635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.8300e-003	4.6000e-003	0.0411	9.0000e-005	7.9500e-003	7.0000e-005	8.0200e-003	2.1100e-003	7.0000e-005	2.1800e-003						7.8028
Total	**7.3900e-003**	**0.0904**	**0.0586**	**3.0000e-004**	**0.0124**	**5.0000e-004**	**0.0129**	**3.3300e-003**	**4.8000e-004**	**3.8100e-003**						**28.4664**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1184	0.0000	0.1184	0.0647	0.0000	0.0647						0.0000
Off-Road	0.0525	1.0545	1.2998	2.1400e-003		0.0496	0.0496		0.0496	0.0496						194.0516
Total	**0.0525**	**1.0545**	**1.2998**	**2.1400e-003**	**0.1184**	**0.0496**	**0.1681**	**0.0647**	**0.0496**	**0.1143**						**194.0516**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.5600e-003	0.0858	0.0175	2.1000e-004	4.4500e-003	4.3000e-004	4.8800e-003	1.2200e-003	4.1000e-004	1.6300e-003						20.6635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.8300e-003	4.6000e-003	0.0411	9.0000e-005	7.9500e-003	7.0000e-005	8.0200e-003	2.1100e-003	7.0000e-005	2.1800e-003						7.8028
Total	**7.3900e-003**	**0.0904**	**0.0586**	**3.0000e-004**	**0.0124**	**5.0000e-004**	**0.0129**	**3.3300e-003**	**4.8000e-004**	**3.8100e-003**						**28.4664**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0367	0.3675	0.3341	4.9000e-004		0.0225	0.0225		0.0207	0.0207						44.4909
Paving	3.9000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0371**	**0.3675**	**0.3341**	**4.9000e-004**		**0.0225**	**0.0225**		**0.0207**	**0.0207**						**44.4909**

3.5 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.1700e-003	1.6700e-003	2.0000e-005	4.2000e-004	4.0000e-005	4.6000e-004	1.2000e-004	4.0000e-005	1.6000e-004						1.9680
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4500e-003	1.3800e-003	0.0123	3.0000e-005	2.3800e-003	2.0000e-005	2.4100e-003	6.3000e-004	2.0000e-005	6.5000e-004						2.3409
Total	**1.6900e-003**	**9.5500e-003**	**0.0140**	**5.0000e-005**	**2.8000e-003**	**6.0000e-005**	**2.8700e-003**	**7.5000e-004**	**6.0000e-005**	**8.1000e-004**						**4.3088**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0121	0.2536	0.3724	4.9000e-004		0.0151	0.0151		0.0151	0.0151						44.4909
Paving	3.9000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0125**	**0.2536**	**0.3724**	**4.9000e-004**		**0.0151**	**0.0151**		**0.0151**	**0.0151**						**44.4909**

3.5 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.4000e-004	8.1700e-003	1.6700e-003	2.0000e-005	4.2000e-004	4.0000e-005	4.6000e-004	1.2000e-004	4.0000e-005	1.6000e-004						1.9680
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4500e-003	1.3800e-003	0.0123	3.0000e-005	2.3800e-003	2.0000e-005	2.4100e-003	6.3000e-004	2.0000e-005	6.5000e-004						2.3409
Total	**1.6900e-003**	**9.5500e-003**	**0.0140**	**5.0000e-005**	**2.8000e-003**	**6.0000e-005**	**2.8700e-003**	**7.5000e-004**	**6.0000e-005**	**8.1000e-004**						**4.3088**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0922	0.1741	1.2055	3.0800e-003	0.2913	2.6700e-003	0.2939	0.0775	2.4800e-003	0.0800						278.4297
Unmitigated	0.0922	0.1741	1.2055	3.0800e-003	0.2913	2.6700e-003	0.2939	0.0775	2.4800e-003	0.0800						278.4297

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	159.98	400.00	400.00	790,364	790,364
Parking Lot	0.00	0.00	0.00		
Total	159.98	400.00	400.00	790,364	790,364

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	9.50	9.50	33.00	48.00	19.00	100	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.599234	0.028716	0.205211	0.131753	0.021859	0.005504	0.000000	0.000000	0.000000	0.000000	0.007724	0.000000	0.000000
Parking Lot	0.543895	0.028716	0.205211	0.131753	0.021859	0.005504	0.019097	0.027308	0.004155	0.002738	0.007724	0.001236	0.000805

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						0.7593
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						0.7593
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0				0.0000
Parking Lot	4573.8				0.7593
Total					**0.7593**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0				0.0000
Parking Lot	4573.8				0.7593
Total					**0.7593**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.9200e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Unmitigated	2.9200e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.7000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	2.6500e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Total	**2.9300e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.2000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.7000e-004					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	2.6500e-003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000						1.2000e-004
Total	**2.9300e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				3.0461
Unmitigated				3.0461

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 5.24252				3.0461
Parking Lot	0 / 0				0.0000
Total					**3.0461**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 5.24252				3.0461
Parking Lot	0 / 0				0.0000
Total					**3.0461**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				0.1911
Unmitigated				0.1911

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.38				0.1911
Parking Lot	0				0.0000
Total					**0.1911**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.38				0.1911
Parking Lot	0				0.0000
Total					**0.1911**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Off-Highway Tractors	1	8.00	104	20	0.44	Diesel

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix D

Biological Resources Report

CALIFORNIA CENTRAL COAST
VETERANS CEMETERY



DRAFT
BIOLOGICAL RESOURCES REPORT

April 2019

Prepared by

Denise Duffy & Associates, Inc.
947 Cass St. Suite 5
Monterey, California 93940

Prepared for

California Department of General Services
Real Estate Services Division
Project Management and Development Branch

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1.0 PROJECT SUMMARY

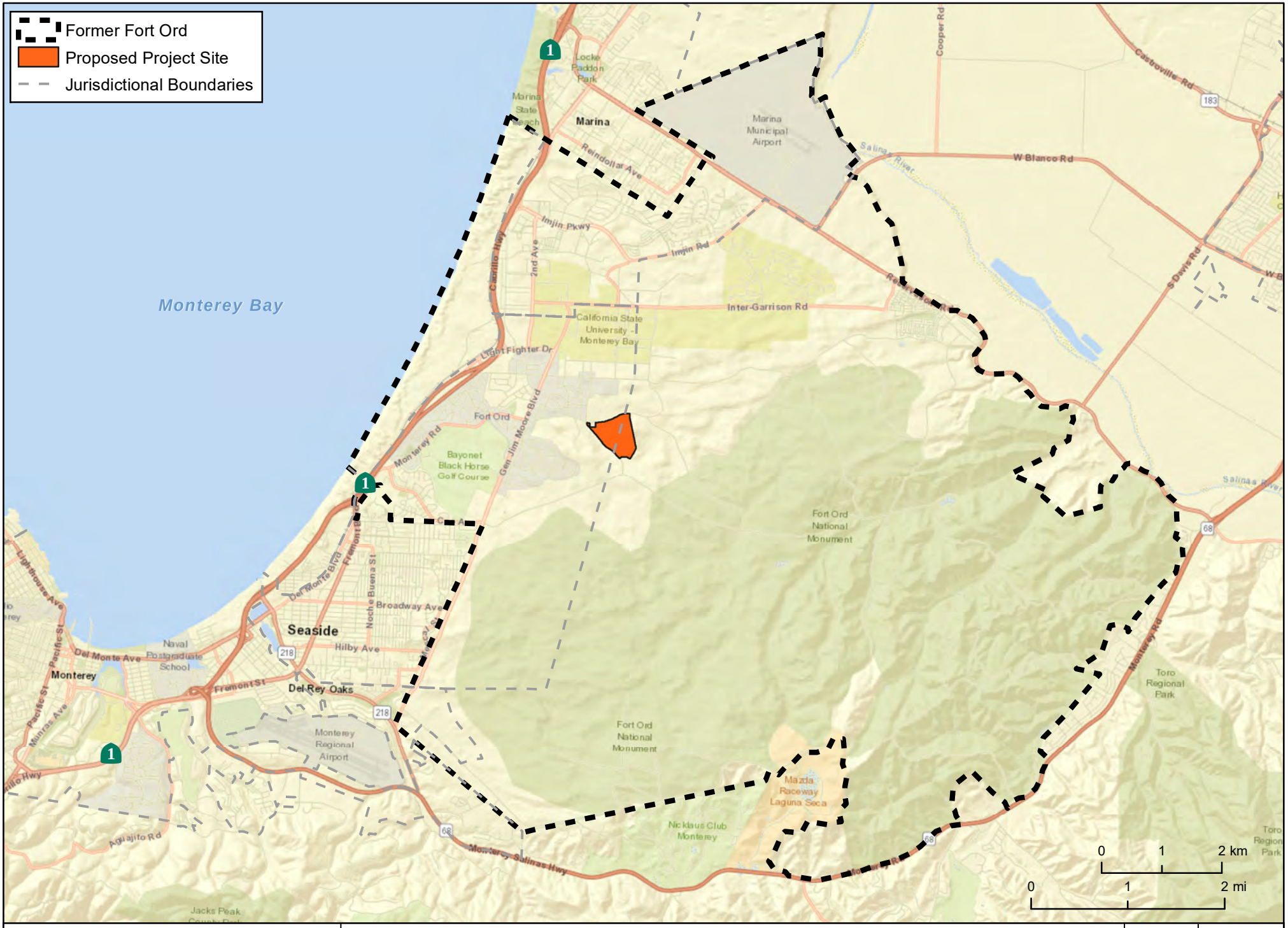
On behalf of the State of California (State), the California Department of General Services – Real Estate Services Division (DGS) and the California Department of Veterans Affairs (CalVet) are proposing to implement the California Central Coast Veterans Cemetery (CCCVC) 2015 Master Plan (proposed project) located within the former Fort Ord military base, in Monterey County, California (**Figure 1**). The 2015 Master Plan is a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. It outlines a process and strategy for the implementation of the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing and associated cost estimates. The phased approach to buildout of the 2015 Master Plan will serve the anticipated needs of veterans for the next hundred years.

Since Phase 1 has already been constructed, the proposed project involves implementing the remaining Phases 2 through 11 of the 2015 Master. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in late 2019 or early 2020. Therefore, this report analyzes the build-out of the 2015 Master Plan at a programmatic level, while analyzing Phase 2 at a project level (**Figure 2**). Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property. Phase 2 includes 1,000 in-ground cremains, 1,831 crypts, and supporting roads and infrastructure to provide increased burial options for the next 10 years. Construction of Phase 2 is anticipated to begin in spring 2020 and would take approximately 13 months.

1.1 Summary of Results

Five vegetation types were observed within the project site: coast live oak woodland, central maritime chaparral, central coastal scrub, non-native grassland, and ruderal. In addition, a small portion of the project site is developed. Central maritime chaparral habitat is listed as sensitive on the California Department of Fish and Wildlife's (CDFW's) *California Natural Communities List.*

Several special-status species are known or have the potential to occur within the project site based on observations, presence of appropriate habitat, and known occurrences within the vicinity. This report evaluates the potential for occurrence of special-status species within each project component (i.e., 2015 Master Plan and Phase 2). As such, although the following species are known or have the potential to occur within the proposed project site, they may not occur within both project components. Please refer to **Appendix C** and Section 4.0 "Results" for an analysis of each species within the specific project component. All other species evaluated have a low potential to occur, are assumed unlikely to occur, or were determined not present within the project site for the species-specific reasons presented in **Appendix C**.



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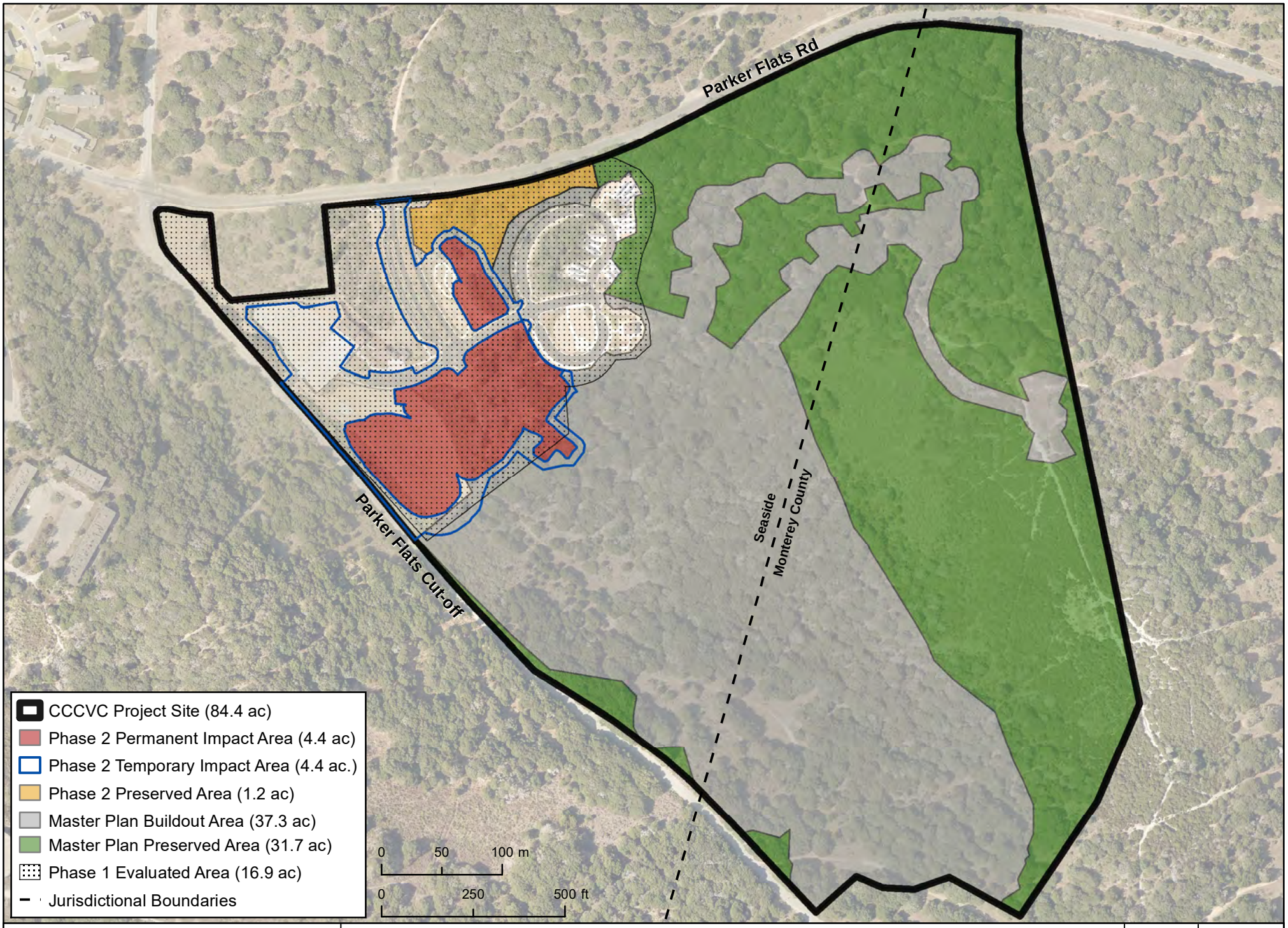
Vicinity Map

N

Date: 03-08-2019
Scale: 1 in=1.3 mi

Figure 1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\EIR Maps\Fig 1-2 Vicinity Map v1.mxd



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Planning and Environmental Consulting

Project Site Map

N

Date
04-11-2019

Scale
1 in=333.3 ft

Figure
2

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 2 - Project Site Map 4-11-19.mxd

The following special-status wildlife species are known or have the potential to occur on the project site:

- Townsend's big-eared bat (*Corynorhinus townsendii*) – CSC [1],
- Hoary bat (*Lasiurus cinereus*) – CNDDB,
- Monterey dusky-footed woodrat (*Neotoma macrotis luciana*) – CSC,
- Monterey ornate shrew (*Sorex ornatus salarius*) – CSC/HMP,
- California tiger salamander (CTS, *Ambystoma californiense*) – FT/ST/HMP,
- Northern California legless lizard (*Anniella pulchra*) – CSC/HMP,
- Coast horned lizard (*Phrynosoma blainvillii*) – CSC,
- Obscure bumble bee (*Bombus caliginosus*) – CNDDB,
- Western bumble bee (*Bombus occidentalis*) – CNDDB, and
- Nesting raptors and other protected avian species, including:
  - Cooper's hawk (*Accipiter cooperii*) – CNDDB,
  - Oak titmouse (*Baeolophus inornatus*) – BCC,
  - Lawrence's goldfinch (*Carduelis lawrencei*) – BCC,
  - Wrentit (*Chamaea fasciata*) – BCC,
  - White-tailed kite (*Elanus leucurus*) – CFP,
  - California horned lark (*Eremophila alpestris actia*) – WL
  - Nuttall's woodpecker (*Picoides muttalli*) – BCC,
  - Spotted towhee (*Pipilo maculatus*) – BCC,
  - Rufous hummingbird (*Selasphorus rufus*) – BCC, and
  - Allen's hummingbird (*Selasphorus sasin*) – BCC.

The following special-status plant species are known or have the potential to occur on the project site:

- Hooker's manzanita (*Arctostaphylos hookeri*) – CRPR 1B/HMP,
- Sandmat manzanita (*Arctostaphylos pumila*) – CRPR 1B/HMP,
- Monterey ceanothus (*Ceanothus rigidus*) – CRPR 4/HMP,
- Fort Ord spineflower (*Chorizanthe minutiflora*) – CRPR 1B,
- Monterey spineflower (*Chorizanthe pungens* var. *pungens*) – FT/ CRPR 1B/HMP,
- Virgate eriastrum (*Eriastrum virgatum*) – CRPR 4, and
- Northern curly-leaved monardella (*Monardella sinuata* ssp. *nigrescens*) – CRPR 1B.

[1] Status Definitions – FT: Federally threatened; ST: State threatened; CSC: California Species of Concern; CFP: California Fully Protected Species; WL: CDFW Watch List; BCC: USFWS Bird of Conservation Concern; HMP: Fort Ord Habitat Management Plan Species; CRPR 1B: California Rare Plant Rank (CRPR) 1B; CRPR 4: CRPR 4 Species; CNDDB: animal species on the CNDDB "Special Animals" list that are not assigned any of the other status designations but the CDFW considers to be those of greatest conservation need, regardless of their legal or protection status.

2.0 INTRODUCTION

On behalf of the State of California (State), the California Department of General Services – Real Estate Services Division (DGS) and the California Department of Veterans Affairs (CalVet) are proposing to implement the California Central Coast Veteran Cemetery (CCCVC) 2015 Master Plan (proposed project) located within the former Fort Ord military base, in Monterey County, California (**Figure 1**). This report presents the findings of a biological resource assessment conducted by Denise Duffy & Associates, Inc. (DD&A) for the proposed project. The emphasis of this study is to describe existing biological resources within and surrounding the project, identify any special-status species and sensitive habitats within and adjacent to the project site, assess potential impacts that may occur to biological resources, and recommend appropriate avoidance, minimization, and mitigation measures necessary to reduce those impacts to a less-than-significant level in accordance with the California Environmental Quality Act (CEQA).

2.1 Project Description Summary

As part of the Defense Base Closure and Realignment Act of 1990 (BRAC), Fort Ord was downsized and realigned in 1991 and officially closed in 1994. An initiative to develop a veterans cemetery at the former Fort Ord began a few weeks after announcement in 1991 of the BRAC (RHAA and Whitson Engineers, 2008). The CCCVC 2008 Development Master Plan (2008 Master Plan) was prepared in support of this effort (RHAA and Whitson Engineers, 2008). Phase 1 of the CCCVC was approved and constructed in 2015. After the approval of Phase 1, an updated master plan, the CCCVC 2015 Master Plan (2015 Master Plan), was prepared (Wood Rodgers, 2015).

The proposed project would involve implementing the 2015 Master Plan. Since Phase 1 has already been constructed, the proposed project involves implementing the remaining Phases 2 through 11 of the 2015 Master Plan. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in late 2019 or early 2020. Therefore, this report analyzes Phase 2 at a project level, while analyzing the build-out of the 2015 Master Plan at a programmatic level.

The 2015 Master Plan is a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. It outlines a process and strategy for the implementation of the entire CCCVC, including utility constraints, architectural and design concepts, environmental issues, a signage plan, grading and geotechnical considerations, landscaping needs, phasing, and associated cost estimates. The 2015 Master Plan includes a phased approach to buildout that will serve the anticipated needs of veterans for the next hundred years. A joint CEQA/National Environmental Policy Act (NEPA) document (Initial Study/Environmental Assessment, or IS/EA) was prepared for Phase 1 of the CCCVC in 2014 and approved in 2015 (ECORP Consulting, Inc [ECORP], 2014). Phase 1 of the CCCVC has been constructed and the opening ceremony was held in October 2016. Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property. Phase 2 includes 1,000 in-ground cremains, 1,831 crypts, and supporting roads and infrastructure to provide increased burial options for the next 10 years.

2.2 Project Location and Area

The project site is located within the former Fort Ord in Monterey County, California, which is approximately 80 miles south of San Francisco and 42 miles southwest of San Jose (**Figure 1**). The project

site is approximately 84.4 acres and is owned by the State of California. The City of Seaside/County of Monterey (County) boundary bisects the State's property. Approximately 32 acres (including the Phase 2 site) are within the Seaside city limits; the balance of the property is located within unincorporated County land (**Figure 2**).

The project site is bound by Parker Flats Road to the north, Parker Flats Cut-Off to the west, and natural lands to the east (**Figure 2**). The land uses in the project vicinity include the City of Seaside to the west, California State University Monterey Bay (CSUMB) to the north, and the Fort Ord National Monument (FONM) to the east. The existing land uses surrounding the project site include residential to the northwest and undeveloped lands to the east, south, and west. Access to the project site is from Parker Flats Road located approximately 1.25 miles east of the Highway 1 and Lightfighter Drive exit.

The site consists of rolling topography ranging from 285 to 350 feet above mean sea level. A rolling, densely oak-covered ridgeline forms the site's southern and eastern boundary. The western half of the site is composed mostly of hilly topography ranging from two to seven percent slopes with oak woodland covering much of this portion of the site. Runoff from winter rains collects in the existing retention basin before percolating into the sandy soil and replenishing groundwater supplies. Overlooking the site is Artillery Hill, one of the most prominent features in the area. This shrub- and grass-covered hill is located on the eastern border of the site and provides views of the ocean to the Salinas Valley.

2.3 Project Description

2.3.1 Proposed 2015 Master Plan

The 2015 Master Plan lays out the process and strategy for the implementation of the entire CCCVC over the next 100 years (**Figure 3**). At full build-out, the cemetery would supply 105,560 gravesites with 81,040 columbaria and 25,450 casket burial sites – enough to serve the anticipated needs of veterans for the next 100 years. The cemetery would be completed in phases; Phase 1 is already completed and in operation. Phase 1 included 5,000 columbaria, an administration building/public information/maintenance complex, a committal service shelter, assembly area, memorial walk/wall, and associated roads and infrastructure.

Through its National Cemetery Administration (NCA) State Cemetery Grants Program (SCGP), the USDVA would provide funds for the design and construction of the cemetery. The 2015 Master Plan has been developed to include the content requirements published by the NCA.

Layout

The overall design intent of the site plan is to create a monument to the service and sacrifice of California State Veterans. Part of this goal is accomplished through the inclusion of features that would make a lasting and memorable impression on veterans visiting the cemetery. The cemetery would have a combination of burial facilities to meet veterans' needs, including columbaria, standard burial plots, over-sized plots, and a scatter garden.

The cemetery layout is designed to enhance the visitor experience by preserving much of the oak woodland and yet maintain an intuitive layout pattern (**Figure 4**). The main visitor facilities are easily found near the entrance within the Phase 1 development area. In the 2015 Master Plan, a loop road organizes the spaces within the cemetery, with smaller loops and cul-de-sacs branching off the main loop. The burial sections and columbaria are organized around the smaller loops. Oak trees would be preserved wherever possible,

PHASES

1 ROAD
COLUMBARIA: 5,000
BUILDING & LANDSCAPE
9.1 ACRES

2 ROAD
COLUMBARIA: 9,800
CRYPTS: 2,875 (101 OVERSIZE)
4,29 ACRES

3 ROAD
COLUMBARIA: 8,000
CRYPTS: 1,403 (74 OVERSIZE)
2.07 ACRES

4 COLUMBARIA: 6,400
CRYPTS: 2,447 (100 OVERSIZE)
2.51 ACRES

5 ROAD
COLUMBARIA: 7,440
CRYPTS: 3,283 (140 OVERSIZE)
3.77 ACRES

6 ROAD
COLUMBARIA: 8,800
CRYPTS: 2,578 (120 OVERSIZE)
4.43 ACRES

7 ROAD
COLUMBARIA: 6,800
CRYPTS: 2,406 (104 OVERSIZE)
3.17 ACRES

8 ROAD
COLUMBARIA: 9,760
CRYPTS: 3,147 (130 OVERSIZE)
4.77 ACRES

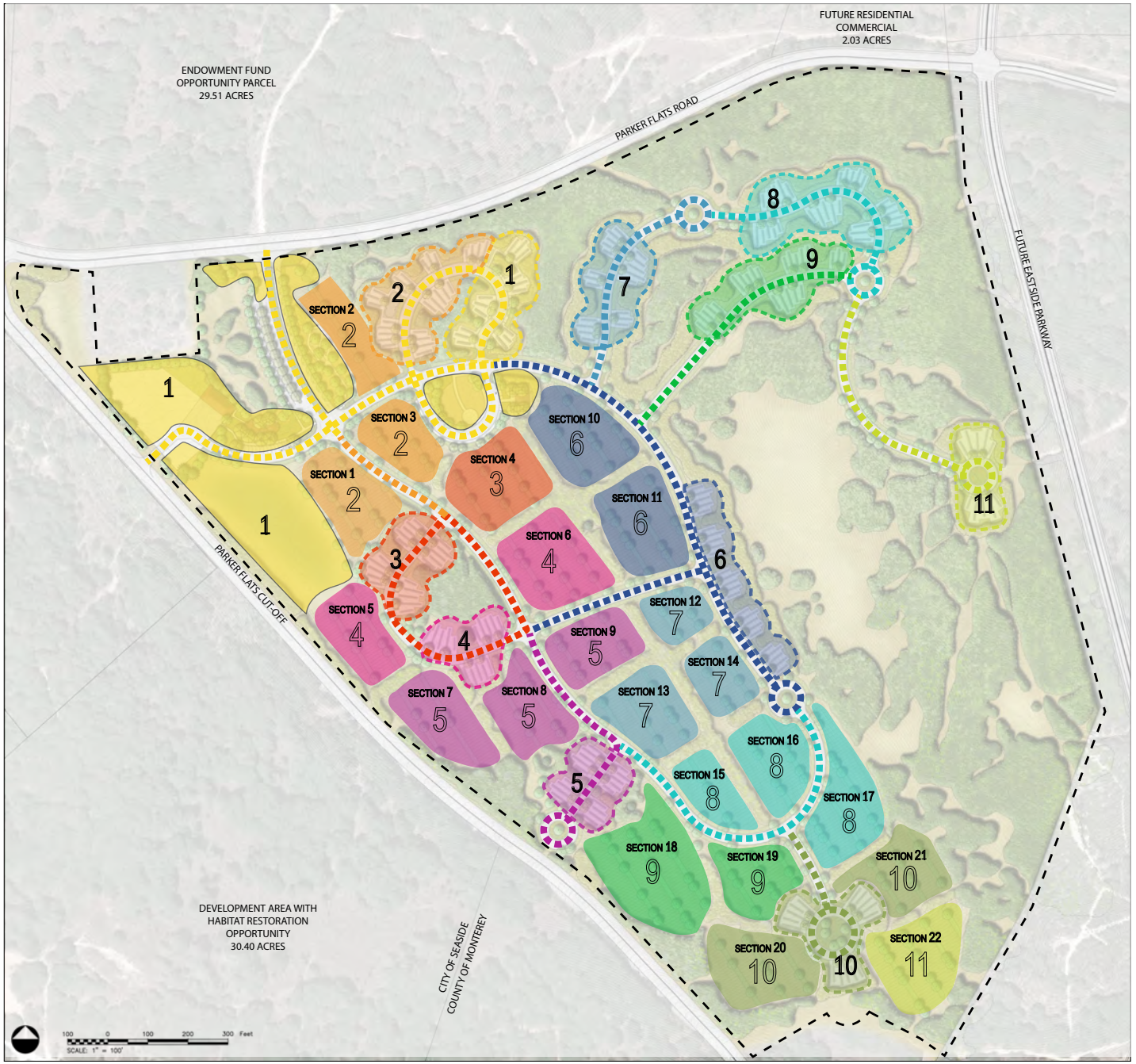
9 ROAD
COLUMBARIA: 8,240
CRYPTS: 2,856 (123 OVERSIZE)
3.77 ACRES

10 ROAD
COLUMBARIA: 6,480
CRYPTS: 2,243 (87 OVERSIZE)
2.94 ACRES

11 ROAD
COLUMBARIA: 4,320
CRYPTS: 1,282 (52 OVERSIZE)
0.83 ACRES

TOTALS

81,040	COLUMBARIA *
24,520	CASKET BURIALS
23,490	STANDARD CRYPTS
1,030	OVERSIZE PLOTS
105,560	TOTAL BURIALS
41.65	DEVELOPED ACRES
78.80	TOTAL ACRES



Source: 2015 Master Plan

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

2015 Master Plan Phasing Plan

N

Date
02-28-2019

Figure
3



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Proposed Project Layout

N

Date
03-07-2019

Figure
4

including locating columbaria within the oak woodland and preserving oak woodland between burial sections to reduce potential impacts. Where major grading is proposed, new oaks would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. The 2015 Master Plan includes a preservation area on-site that would protect approximately 17 acres of oak woodland

Site topography is one of the main constraints in the cemetery's site design. Areas suitable for crypt development are limited to the western half of the site. Benching would be required in most crypt areas to create the maximum two percent slopes necessary to sustain the use of decomposed granite as the ground plane cover (steeper slopes lead to migration of the decomposed granite material). The slopes in the eastern half, while not accommodating crypts, would accommodate some columbarium development.

Burial Options

The cemetery would provide a combination of burial facilities to meet the desires of all veterans. The proposed 105,560 burials would accommodate approximately 76 percent columbarium for cremains and 24 percent in-ground casket burials (**Figures 3** and **4**). For cremated remains, burial would be in niches in freestanding double columbarium walls arranged in courts. Many of the courts would be woven into the oak woodland, providing a serene setting. Of the 25,436 full casket burials planned for the cemetery, approximately 95 percent would be three-foot by eight-foot plots with the remaining five percent as over-sized five-foot by ten-foot plots. Full casket burials would utilize pre-placed double-depth vaults. Burial sections would be separated by vegetated edges and slopes. Due to the limited water available for the cemetery, the cover for the burial sections would be comprised of decomposed granite (a local crushed rock) rather than turf. The sections would be benched into the existing slopes to flatten areas to no more than two percent in order to accommodate the decomposed granite. Edges along the street would be planted with a colorful significant vegetated edge. In addition to burial sites, the 2015 Master Plan includes memorials walls for those who do not desire burial on-site but want to be memorialized as a veteran. Each wall would consist of 40 plaques in five rows mounted on a stucco wall. Wall sections would be added as demand increased.

Phasing Plan

The cemetery layout has been developed to include flexibility through sequential phases which allows the cemetery to be completed on an as-needed basis determined by the burial demands anticipated over the next 100 years (**Figure 3**). While it is anticipated that each phase would accommodate burial needs for approximately ten years, phases would be implemented based on demand and available funding.[2] For the purposes of this analysis, it is assumed that future phases would be implemented every ten years with build-out occurring in 2101.

Phase 1 provided the majority of the upfront improvements and established a foundation and structure for future cemetery phases. Subsequent phases provide for additional capacity (both columbaria and crypts) with the final phase, Phase 11, completing the Flag Plaza on top of Artillery Hill.

[2] For consistency purposes, Phase 2 is shown as proposed in the 2015 Master Plan. However, as described in Proposed Phase 2 project description, Phase 2 consists of 1,000 in-ground cremains and 2,831 crypts. The Phase 2 facilities were determined based on demand and funding, consistent with the intent of the 2015 Master Plan.

Landscaping and Irrigation

The landscape design incorporates the USDVA and CalVet mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. The design strategy includes primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials, that require no irrigation once established (**Figure 5**). These plants reflect the character of Seaside and the surrounding region of the County and meet the necessary demand of low water usage. The cemetery has minimal water allocation (see below) that would not support the traditional lawns of most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and season variation. Hardscape complements plant materials in areas where vehicular or heavy foot traffic is anticipated.

Irrigation would be temporary and is intended only for the establishment of new plants due to the limited water resources available for the project. Landscape irrigation would maximize efficiency while delivering water in the most appropriate method for the planting area, including drip emitters and tree bubblers. Future burial areas would not be planted and irrigated, but would be covered with decomposed granite; however, burial areas would have aisles set aside for potential future irrigation and planted where necessary to provide slope stabilization.

Infrastructure

Drainage

Nearly all the existing site runoff and a small amount of off-site runoff currently collect in the retention basin constructed as part of Phase 1. The Fort Ord Reuse Authority (FORA) Reuse Plan requires all new development to contain 100 percent of storm water runoff on-site by retention and percolation. Therefore, future off-site development would be required to capture flows that currently may overland onto the cemetery site and runoff from future phases of the cemetery would need to be accommodated on-site.

A portion of the project site is identified as being within a 100-year floodplain by the Federal Emergency Management Agency (FEMA). The pre-project mapping was not accurate, and, as part of Phase 1, the floodplain limits were updated and a Letter of Map Revision (LOMR) was issued by FEMA that revised the 100-year floodplain as that area below elevation 286 feet. The LOMR was not based on the as-built Phase 1 grading, which created the retention basin below elevation 286 feet. If future phases of the cemetery propose filling in this area, additional excavation would be required to provide the required storage in a reduced footprint.

Drainage improvements under the 2015 Master Plan would use Low Impact Design (LID) methods by conveying runoff in a combination of sheet flow, bio-swales, and conveyance piping. The natural drainage patterns of the project site would be preserved to the maximum extent possible, in line with the stormwater management policies of FORA, Seaside, and the County.

Water

The Marina Coast Water District (MCWD) is responsible for providing water and wastewater service within their service area on the former Fort Ord. An existing 24-inch water main crosses Normandy Road approximately 100 feet west of the intersection of Parker Flats Cut-Off and Normandy Road, which is approximately 150 feet west of the project boundary. This is the point of connection for the cemetery.

PLANTING + GROUNDCOVER TYPOLOGY LEGEND

- EXISTING OAK WOODLAND
- NEW OAK WOODLAND
- ACCENT TREES (ROADSIDE + COLUMBARIUM AREAS)
- CRYPT FIELD BANK TREES
- HERITAGE OAKS (QTY: 4)
- CRYPT FIELD BANK PLANTING
- SIGNIFICANT VEGETATED EDGE
- NATURALIZED ZONES
- NATIVE GRASSES
- DECOMPOSED GRANITE (CRYPT FIELDS)



PLANT LIST (SEE SHEET L4.01 FOR PHOTOS)

TREES

BOTANICAL NAME	COMMON NAME
ARBUTUS 'MARINA'	STRAWBERRY TREE
CUPRESSUS MACROCARPA	MONTEREY CYPRESS
OLEA EUROPAEA 'SWAN HILL'	SWAN HILL FRUITLESS OLIVE
PITTOSPORUM UNDULATUM	VICTORIAN BOX
QUERCUS AGRIFOLIA	COAST LIVE OAK
SAMBUCUS MEXICANA	MEXICAN ELDERBERRY

HYDROSEED MIX FOR EROSION CONTROL

PLANT TYPE	BOTANICAL NAME	COMMON NAME
PERENNIALS	ACHILLEA MILLEFOLIUM	WHITE YARROW
	ESCHSCHOLZIA CALIFORNICA	CALIFORNIA POPPY
	LOBULARIA MARITIMA	SWEET ALYSSUM
	LUPINUS BICOLOR	PYGMY-LEAF LUPINE
GRASSES	BROMUS CARINATUS	CALIFORNIA BROME
	ELYMUS GLAUCUS	BLUE WILDRYE
	TRIFOLIUM OBTUSIFLORUM	CLOVER
	VULPIA MICROSTACHYS	THREE-WEEKS FESCUE

SHRUBS + PERENNIALS

BOTANICAL NAME	COMMON NAME
ACHILLEA 'MOONSHINE'	FERN LEAF YARROW
ARCTOSTAPHYLOS EDMUNDSII 'BIG SUR'	BIG SUR MANZANITA
ARCTOSTAPHYLOS UVA-URSI 'POINT REYES'	POINT REYES MANZANITA
CEANOTHUS GLORIOSUS 'HEART'S DESIRE'	MOUNTAIN LILAC
ERIOGONUM FASCICULATUM FOLIOLOSUM	CALIFORNIA BUCKWHEAT
ESCHSCHOLZIA CALIFORNICA VAR. MARITIMA	COASTAL CALIFORNIA POPPY
FESTUCA MAIREI	ATLAS FESCUE
LAVANDULA STOECHAS	SPANISH LAVENDER
PENNISETUM SPATHIOLATUM	SLENDER VELDT GRASS
RHAMNUS CALIFORNICA 'SALT POINT'	COASTAL COFFEEBERRY
ROSMARINUS OFFICINALIS 'PROSTRATUS'	CREEPING ROSEMARY
SALVIA CLEVELANDII	CLEVELAND SAGE
SALVIA MELLIFERA	BLACK SAGE

Source: 2015 Master Plan

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Proposed Project Planting Plan

N

Date 03-07-2019

Figure 5

Long-term water demand for the cemetery is anticipated to be a maximum of 5 acre-feet/year (afy). Of this, the combined potable water demand for the office and maintenance yard is anticipated to be 0.8 afy. Through the use of local, drought-tolerant species, a long-term water demand of 1 to 2 afy for landscape and general maintenance activities may be achieved after the initial plant establishment period for each phase. Seaside requires that the project's irrigation systems be plumbed for reclaimed water in anticipation of the availability of recycled water for the cemetery. The MCWD has installed several trunk lines; however, it is assumed that the 3,500 linear feet of new reclaimed water main required off-site to connect the project would not be constructed by the cemetery due to its low anticipated irrigation water demand. As such, it is unknown when the system will go online and when recycled water will become available. It is assumed that potable water would be used for irrigation until such time as recycled water is available.

Water for fire suppression would also be provided by the MCWD. Approximately 6,200 linear feet of water main may be constructed to serve fire hydrants. Fire hydrants spread throughout the site are assumed to be required, although given the lack of buildings and limited landscaping, it is possible this requirement may be waived.

Sanitary Sewer, Electrical, and Gas

The MCWD provides sanitary sewer to the project site. Phase 1 built-out the project's sewer infrastructure.

The proposed development is located with the jurisdiction of Pacific Gas and Electric (PG&E) for electric services. Natural gas service is not being provided. Phase 1 constructed the entirety of the cemetery's electric infrastructure.

Roadway System

Roadway improvements constructed as part of Phase 1 included a main entry roadway, an access road, a primary road forming a loop, and multiple secondary roadways (**Figure 4**). Phase 1 also included a visitor/employee parking area for the administration and maintenance buildings, which consisted of ten standard parking spaces and one accessible parking space. The maintenance yard has a non-public secondary access via Parker Flats Cut-Off, which is normally used for large delivery vehicles only. This secondary access also serves as an emergency vehicle access for the site. Phase 1 provided sidewalks connecting the visitor/employee parking and cortege assembly areas with the administration and maintenance buildings. Sidewalks were also constructed along B Street to connect the administration building to the memorial walk, flag/assembly area, and committal shelter area.

Future roadway improvements consist of loops and cul-de-sacs to provide access to the additional columbaria, flag plaza, and burial sites. Future roadways would generally be 24-feet wide (face of curb to face of curb), which is the NCA standard. In some cases, roadways may be larger (29-feet wide) to provide emergency access and access compliance.

Off-Site Improvements

All utility points of connection are located on Normandy Road near the project entrance. Water, sewer, electric, and telephone are all located within 150 feet of the project boundary and were connected to as part of Phase 1. The nearest recycled water point of connection is at General Jim Moore Boulevard.

As part of Phase 1, Parker Flats Road was widened from Parker Flats Cut-Off to the cemetery entrance. Curb and gutter were installed and provisions were made for possible future sidewalk installation. It is

unknown at this time whether the cemetery would be responsible for any additional future frontage improvements along Parker Flats Road.

Grading

The site has varying terrain and the cemetery layout generally occurs on the less steep western side of the site. The soils are mostly sandy silt. The overall grading seeks to balance the excavation and fill needed. The former Fort Ord, including the project site, was used for training military personnel with equipment and munitions. These training activities left behind munitions and explosives of concern (MEC), specifically unexploded ordinance (UXO) and discarded military munitions (DMM). The site has been evaluated for the presence of UXO, including a geophysical survey, and the site has been cleared for non-residential development (EMC and EDAW, 1997). Removal of hazardous materials at this location is not anticipated; however, UXO and DMM have been documented at the site. Therefore, grading and soil movement cannot occur within a Soils Management Plan area due to a deed restriction for all remediated parcels on the former Fort Ord, including the project site, and ordinances by Seaside and the County on digging and excavating on the former Fort Ord. These codes require a plan to ensure that any soil from the site is stored on-site or in an acceptable location. In addition, due to the risk of UXO on the site, grading operations in previously undisturbed areas would require direct observation by UXO-trained personnel. A site-specific UXO Plan would be developed during the design phase and included as part of the construction requirements. UXO-trained construction support personnel would be required to be on-site to serve as a consultant to the contractor during all grading and/or excavating operations (Chapter 15.34 City Code and Chapter 16.10 of County Code). These plans would be prepared during the construction document phase for each phase of work.

A unique challenge for cemetery development is that is requires a substantial amount of earthwork and excavation to accommodate the burial sites, particularly the burial crypts, which create a void of approximately 5.3 cubic yards each. Crypt construction requires raising the site in many areas to accommodate this excess fill. In addition, it is necessary that all potential areas that would receive any type of burial be excavated and the soil cleaned, in order to avoid the cost and delay of having unexploded ordinance technicians on-site during excavation of each burial. Ideally, the earthwork would be balanced by phase, though this is not readily achievable. Therefore, moving of materials in following phases within the site may be used to minimize earthwork costs.

Signage

The signage system provides visitors with information, direction, and regulations for the cemetery. Signs are proposed to be located to direct the visitor and where best observable. Directional signs are proposed at key intersections. Section markers are proposed at each corner of the burial sections.

Sustainability

Sustainability is an important feature of the cemetery design. High efficiency mechanical equipment would be provided as well as low usage high-efficiency plumbing features. Finishes would be selected to contain low volatile organic compounds (VOCs), rapidly renewable materials, and recycled content.

Construction

Build-out of the 2015 Master Plan would not occur at one time, rather it would be developed in multiple phases (**Figure 3**). Each phase is anticipated to be approximately ten years apart for the next 100 years.

Each phase would vary in overall size, but development would generally range between three and four acres. The duration of each phase of construction is anticipated to take approximately 12 to 24 months. Hours of construction would typically be between 8:00 AM and 5:00 PM, excluding federal holidays.

Each phase would be designed to balance all cut and fill from earthwork (grading) where feasible. No soils would be exported off-site in accordance with deed restrictions. Types of construction equipment anticipated to be used for each phase of construction include graders, excavators, backhoe, loaders, and tractors. The anticipated number of construction workers for each phase could range from 20-30. Staging areas for future phases of development would occur adjacent to the current phase being developed and would be restored to pre-project conditions. Staging areas would be used for staging equipment and supplies, and stockpiling of excavated soils.

Operations and Maintenance

Operations and maintenance (O&M) would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1). Maintenance activities would include: landscaping such as trimming and replanting of trees, shrubs, groundcover, or perennials, as needed; trash and debris removal; cleaning and repainting buildings and structures as needed; irrigation repair (until landscaping is established by phase); cleaning and repairing storm drainage facilities, including the existing retention basin, and maintenance of oil water separator; maintenance of roads, parking, and fencing. Each State cemetery is managed by CalVet personnel in conformance with national, state, and regional policies, goals, and objectives. Typical operation activities include burial or inurnment of veterans and eligible family members and the placement and maintenance of a grave marker or niche cover.

Cemetery operations include conducting Memorial Day and other special ceremonies (please refer to discussion below), as well as the care of the graves, structures, and grounds. Operating hours for the cemetery are 8:00 AM to 5:00 PM every day of the year. The number of visitors is expected to increase over time as the number of burials increase. It is anticipated that an average of approximately 500 veterans and dependents would be buried at the CCCVC per year.

Special Events

Memorial Day, Veterans Day, and Independence Day are special events that are expected to generate an average of approximately 1,000 visitors per event. These special events would be organized by the local community and off-site parking with shuttle service would be required.

2.3.2 Proposed Phase 2

Phase 2 is proposed within approximately 4.4 acres adjacent to the Phase 1 development, located within the larger 84.4-acre cemetery property owned by the State (**Figure 2**). Based on demand and available funding, the burial facilities and site location proposed for Phase 2 differ from that described in the proposed 2015 Master Plan (**Figure 6**). Based on demand and funding, Phase 2 proposed to accommodate 2,000 crypts and 1,700 in-ground cremains, as compared to a combination of 2,875 casket burials and 9,800 columbaria in the 2015 Master Plan. During the preliminary design and planning process, a preference for certain design features and desire to reduce impacts to the natural landscape resulted in the proposed combination of burial facilities and site layout.

Source: Phase 2 Schematic

PHASING LEGEND

- PHASE 1 (EXISTING)
- PHASE 2
- PHASE 3 (FUTURE)
- PHASE 4 (FUTURE)
- PHASE 6 (FUTURE)

GRAVESITE SUMMARY

PHASE 2 SUMMARY	PROVIDED
CRYPTS	1,791
OVERSIZE CRYPTS	40
IN-GROUND CREMAINS (IGC)	1,000
TOTAL	2,831

DESIGN DESCRIPTION

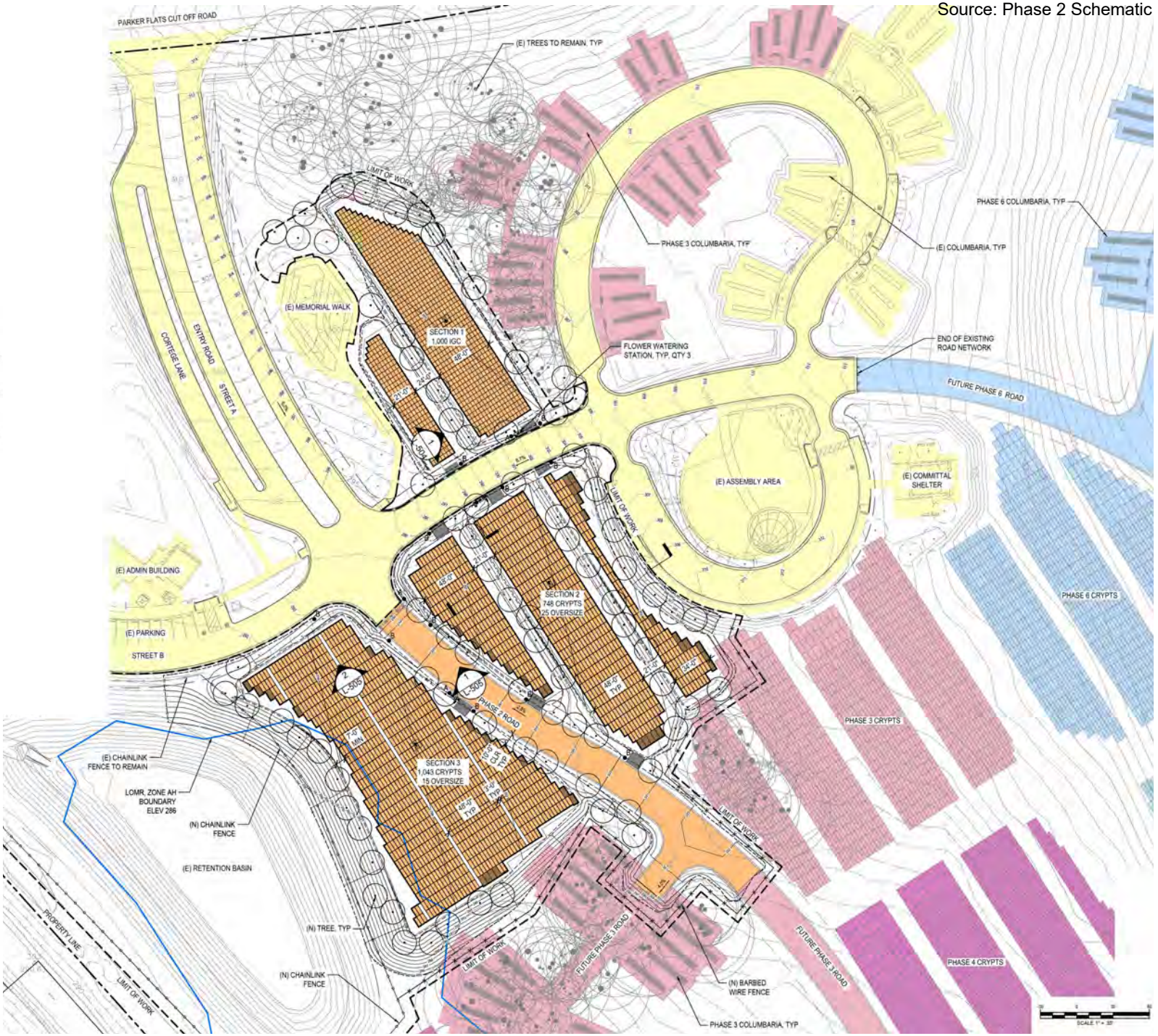
1. DESIGN HAS GRADING AND CRYPTS WITHIN THE LOMR. BOUNDARY TO BE REDEFINED DURING CLOMR PROCESS.
2. TREES ARE PRESERVED NORTH OF SECTION 1.
3. ELIMINATES 158 TREES (>24" DBH) AND 252 TREES (<24" DBH) = 410.
4. 395 LF OF NEW ROAD.
5. MIN CRYPT ELEVATION IS 294, ALLOWING FOR 8 FEET OF COVER OVER THE LOMR FLOOD ELEVATION 286.
6. IRRIGATION AISLES VARY FROM 3-FT TO 15-FT BASED ON GRADING NEEDS. AISLES OCCUR EVERY 48 FEET.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- (N) FENCE - 6 FT HIGH VINYL COATED CHAINLINK FENCE W/ PRIVACY SLATS
- (E) FENCE - 6 FT HIGH VINYL COATED CHAINLINK FENCE W/ PRIVACY SLATS
- (N) FENCE - BARBED WIRE
- CRYPTS 3 x 8 FEET
- OVERSIZE CRYPTS 4.5 x 9 FEET
- IN-GROUND CREMAINS (IGC) 3 x 4 FEET
- DECOMPOSED GRANITE W/ METAL HEADER
- STABILIZED DECOMPOSED GRANITE W/ METAL HEADER
- FLOWER WATERING STATION
- (N) TREE
- (E) TREE TO BE RETAINED
- A TYPE A: TRAFFIC AND REGULATORY SIGNAGE
- B TYPE B: DIRECTIONAL SIGNAGE

NOTE: ALL SIGNS TO BE INSTALLED W/ CAST STONE POST AND COLLAR PLATE PER NCA STANDARD. GRAVESITE NUMBERING TO BE GRANITE.

- DIRECTION OF GRAVESITE MARKER



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Site Layout

N

Date: 03-07-2019

Figure: 6

The Proposed Phase 2 project description is based primarily on the 35% Schematic Design Plans for Phase 2 and the 35% Schematic Design – Design Narrative and Program Information (Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019a and 2019b). The proposed Phase 2 facilities have been designed to take advantage of the topography and open areas within the existing native vegetation to reduce costs and minimize impacts to the site. Phase 2 of the CCCVC would include the following on-site improvements[3]:

- 1,000 In-Ground Cremains;
- 1,791 Standard Crypts;
- 40 Oversize Crypts; and
- Supporting roads and infrastructure.

Site Design

In-Ground Cremains

Section 1 of Phase 2 would be developed east of the existing memorial walk (**Figure 6**). Two terraces of in-ground cremains would allow for 1,000 burials with minimal disturbance to the adjacent hillside. Cremains plots would be established as three-foot by four-foot plots with upright headstones. A 15-foot planting aisle would allow for absorption of the three-foot grade change between the two rows. Unstabilized decomposed granite would cover the ground to eliminate the need for high water-use turf. A 12-foot access path of stabilized decomposed granite would be provided for access from the roadway. An eight-foot unstabilized decomposed granite buffer will provide maintenance access along the east side of each burial section.

Crypts

Sections 2 and 3 would be developed south of the existing B Street (**Figure 6**). An additional 395 feet, approximately 0.3 acres, of A Street would be added to access these burials and allow for vehicle turn-around. Combined, these sections would include 1,791 standard three-foot by eight-foot double-depth precast concrete crypts and 40 oversize 4.5-foot by nine-foot double-depth precast concrete crypts. Double-depth crypts allow for the placement of two caskets per burial plot. Section 2 would utilize planting aisles to address the three-foot grade change between the terraced rows. Section 3 would utilize standard three-foot irrigation aisles and maintain a slope of less than two percent across the entire section. Unstabilized decomposed granite would cover the ground to eliminate the need for high water-use turf.

A 12-foot access path of stabilized decomposed granite would be provided for both visitors and cemetery maintenance from the roadway. An eight-foot unstabilized decomposed granite buffer would provide maintenance access along the edge of each burial section. Crypts would utilize upright headstones.

Landscaping and Irrigation

The Planting Plan for Phase 2 of the CCCVC is shown in **Figure 7**. The 35% Schematic Design Plans include a minimum of 111 coast live oak trees planted on-site. The plan includes various tree and shrub plantings, including species that are either native to the site or have proven successful in the Phase 1 planting areas. The design strategy employs primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials that require no irrigation once established.

[3] No new structures or mechanical systems are proposed in Phase 2.

Source: Phase 2 Schematic



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Phase 2 Planting Plan

N

Date
03-07-2019

Figure
7

These plants reflect the character of Seaside and the County, and would meet the necessary requirement for low water usage. As described above, the cemetery has a limited water supply that would not support the traditional lawns associated with most cemeteries. The landscape is designed to maximize the diversity of plant species and to provide year-round interest and seasonal variation. Hardscape would complement plant material in areas where vehicular or heavy foot traffic is anticipated. Existing oaks would be preserved where possible.

The irrigation system currently uses potable water. Phase 2 irrigation would tie into the existing irrigation mainline. New irrigation valves would be installed and controlled by the site's existing Rainbird ESP-LXD Controller, which can be expanded for use with up to 200 stations. The current irrigation system makes use of 71 stations.

Infrastructure

Drainage

All runoff from Phase 2 development would drain into the retention basin located along Parker Flats Cut-Off Road. The existing retention basin was converted from a natural depression during Phase 1 to serve as an earth borrow site and was not designed as a flood control basin for any specific event. As defined in Seaside Municipal Code Section 16.24.070, Seaside requires that storm drain facilities accommodate the 100-year storm event. Therefore, Phase 2 includes improvements to the retention basin to contain the 100-year flood volume from Phases 1 and 2 with a 100-year maximum water surface elevation of 283 feet.

Water

The initial water needed for plant establishment would be provided by the MCWD as part of the existing allocation. Phase 2 irrigation would tie into the existing irrigation mainline.

The California Department of Forestry and Fire Prevention (CAL FIRE) would be contacted during the design process to determine if a fire water loop system with fire hydrants would be needed in the A Street/B Street loop. There are no combustible structures currently planned for future phases, but due to the heavy brush and dense tree coverage, and the proliferation of wildfires in California in recent years, CalFire may require such a system for combating vegetation fires. An eight-inch fire water mainline would be installed within A Street if CAL FIRE confirms that a fire loop is needed, and a fire hydrant would be installed at the A Street and E Street intersection.

Sewer

Since the 2015 Master Plan does not include any buildings or restrooms in future phases, sanitary sewer pipelines are not included in Phase 2.

Electric/Phone

Since the 2015 Master Plan does not include any buildings or restrooms in future phases, electrical and telecommunications systems are not proposed to be extended through Phase 2. As described above, the irrigation system for Phase 2 would utilize the existing irrigation control from Phase 1.

Roadway and Access Improvements

Roadway improvement in Phase 2 would be limited to the 395 linear feet expansion of Street A to access the Phase 2 crypt sections. The street would consist of a 30-foot wide, two-lane roadway with parking allowed on one side. Per USDVA standards, no sidewalks would be provided in the in-ground cremains or

crypt sections. A fire-access turnaround would be provided at the end of the new roadway. All burial sections would be accessed via a 12-foot wide stabilized decomposed granite path. Access paths would be sloped less than two percent. Where possible, burial sections have been provided with multiple access points.

Site Preparation

The implementation of Phase 2 involves the development of approximately 4.4 acres (**Figure 2**). Site preparation would primarily consist of improvements to the existing retention basin and vegetation removal, including approximately 1.3 acres of disturbed habitat associated with the existing retention basin and approximately 3.1 acres of native and non-native groundcover, shrubs, and trees (shown as the Phase 2 Permanent Impact Area on **Figure 2**). The basin would be dewatered, excavated, and removed of silt to increase the capacity of the basin to accommodate the 100-year flood volume for Phases 1 and 2. The silt would be placed in the maintenance yard, dried, and blended with on-site soils for placement as engineered fill. Silt and soil with high organic content will be either stockpiled in the maintenance yard or used for landscaping. In addition, existing rip-rap, interfering fencing, pavement, and wooden barrier would be removed to facilitate construction activities. Within the 3.1 acres of existing vegetation, the 35% Schematic Design Plans estimate the removal of approximately 410 coast live oak trees equal to or greater than six inches in diameter at two feet above the ground. Approximately 443 coast live oak trees equal to or greater than six inches in diameter at two feet above the ground would be retained on-site and protected during construction activities.

Removal of hazardous materials at this location is not anticipated; however, UXO and MEC have been documented at the site. The site has been evaluated for the presence of UXO and MEC, including a geophysical survey, and the site has been cleared for non-residential development (EMC and EDAW, 1997). A site-specific UXO plan would be developed during the design phase and included as part of the construction requirements. UXO-trained construction support personnel would be required to be on-site to serve as a consultant to the contractor during all grading and/or excavating operations (Chapter 15.34, Seaside Municipal Code).

Grading

As discussed above in the 2015 Master Plan project description, a unique challenge for cemetery development is that it requires a substantial amount of earthwork and excavation to accommodate the burial sites, particularly the burial crypts, which create a void of approximately 4.5 cubic yards each. Crypt construction requires raising the site in many areas to accommodate this excess fill. Therefore, grading on-site would be designed to achieve several goals:

- Respect the natural drainage pattern, vegetation, and contours of the site to the extent feasible;
- Provide overland release that avoids adverse impacts to existing development and gathering areas, and does not result in significant erosion and sedimentation in natural areas;
- Provide ADA paths of travel as required;
- Provide a balanced site to the extent feasible; and
- Meet the aesthetics of the landscape design required by CalVet and USDVA.

The 35% Schematic Design Plans estimate that approximately 4,200 cubic yards of fill would be imported, and no soils would be exported, in accordance with deed restrictions**.**

Sustainability

Sustainability is an important feature of project design. As described above, Phase 2 would include significant water conservation features. The design would also include using finishes and materials that contain low VOCs, rapidly renewable materials, and recycled content.

Construction

Construction of Phase 2 is anticipated to begin in late 2019 or early 2020 and would take approximately 13 months. Construction activities would require various equipment including, but not limited to, chipper/grinder, dump truck, loader, water truck, bulldozer, compactor, excavator, paving machine, delivery trucks, steel wheel compactor, backhoes, trenchers, golf carts or "gators," and concrete truck and related paving equipment.

Approximately 4.4 acres would be temporarily impacted during construction to provide staging areas for equipment and supplies, access, and stockpiling (**Figure 2**). The temporary construction zone (TCZ) is primarily developed and paved; any vegetated areas disturbed during construction would be restored to pre-project conditions. The existing maintenance yard would serve as the construction staging area to reduce temporary impacts to existing vegetation; its non-public secondary access via Parker Flats Cut-Off would serve as the main access point for construction crew and equipment. The existing main entrance to the CCCVC and existing roadways within the cemetery property would also be used to access various portions of the Phase 2 site during construction. Parker Flats Cut-Off may also provide access to construction equipment while performing improvements to the existing retention basin.

It is anticipated that construction equipment and vehicles would use Parker Flats Road and Normandy Road as the primary local routes to the site. Construction workers would be instructed to enter the site via the maintenance entrance and park in the maintenance yard.

Operations, Maintenance, and Special Events

O&M and special events during Phase 2 would consist of similar activities as those currently conducted for the existing developed cemetery (i.e., Phase 1) and as described above for the 2015 Master Plan. Visitation may increase with the implementation of Phase 2. Visitation is allowed between the hours of 8:00 AM and 5:00 PM every day of the year.

3.0 METHODS

3.1 Personnel and Survey Dates

Multiple biological surveys were conducted at the project site between 2010 and 2019 by DD&A biologists, including Senior Environmental Scientists Josh Harwayne, Matthew Johnson, and Jami Davis, Assistant Environmental Scientists Patric Krabacher and Liz Camilo, and Environmental Scientist Intern Max Hofmarcher. Additionally, ECORP conducted biological surveys of the site in 2013 and 2014 in support of the IS/EA for Phase 1 of the CCCVC project. Staub Forestry & Environmental prepared a Forest Resource Evaluation of the site in 2010, and DD&A conducted a Supplemental Forest Resource Evaluation of the Phase 2 and 2015 Master Plan areas in 2019 to verify and update the data provided in the 2010 evaluation. The locations and dates for each of these surveys are outlined in **Table 3-1** below. Data collected during these surveys were used to assess the environmental conditions of the project site and its surroundings, evaluate environmental constraints at the site and within the local vicinity, and provide a basis for recommendations to minimize and avoid impacts.

Table 3-1. Biological Surveys within the Project Site

Survey Type	Location	Date	Surveyor
Focused Botanical, Vegetation Types, and Reconnaissance-Level Wildlife Surveys	CCCVC Project Site	July 20 and 29, 2010; April 11, 12, 13, 15, and 18, 2011; and July 5, 2011	DD&A
Forest Resource Evaluation	CCCVC Project Site	November 2010	Staub Forestry & Environmental Consulting
Reconnaissance Survey	Phase 1 Survey Area	March 20 and 21, 2013	ECORP
Focused Botanical Survey (Spring-Blooming Species)	Phase 1 Survey Area	May 15, 2014	ECORP
Focused Botanical Survey (Summer-Blooming Species)	Phase 1 Survey Area	July15, 2014	ECORP
Vegetation Type Mapping	CCCVC Project Site[4]	December 5-12, 2016	DD&A
Forest Resource Evaluation and Reconnaissance Survey	Phase 2 and 2015 Master Plan Areas	January 8, 2019	DD&A

U.S. Fish and Wildlife Service's (USFWS) protocol for special-status plant surveys requires that surveys are conducted approximately every three years (USFWS, 2000), while CDFW's protocol requires that surveys are conducted every one to five years depending on the vegetation types present (CDFW, 2018). Given these protocols and that Phase 1 was constructed in 2015, the results of biological surveys prior to 2015 do not reflect current conditions. DD&A updated the vegetation map for the site in 2016 and conducted the Supplemental Forest Resource Evaluation in 2019. This analysis utilizes the best scientific information available at the time of publication.

The analysis of special-status plant species within the Phase 2 site and 2015 Master Plan area is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. To

[4] Final Biological Baseline Report for the Fort Ord Oak Woodland Conservation Plan project (DD&A, 2017).

provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results. As phases are proposed approximately every 10 years, future phases of the 2015 Master Plan will be required to conduct biological surveys and analyses. Because special-status plant survey data would be outdated and no longer considered valid by the resources agencies, special-status plant surveys are not proposed within the 2015 Master Plan and the programmatic analysis of special-status plant species within the 2015 Master Plan area is based on previous surveys and existing habitat conditions.

3.1.1 DD&A Surveys

DD&A conducted surveys of the entire project site in summer 2010 and spring 2011 in support of the Biological Resources Report for the Monterey Downs Specific Plan Project (DD&A, 2013). Botanical survey methods in 2010 and 2011 included walking the survey area and using aerial maps to identify general vegetation types and potential sensitive vegetation types, and conducting a focused survey of appropriate habitat for special-status plant species. Concurrently, reconnaissance-level wildlife habitat surveys were conducted to identify suitable habitat and observe any special-status wildlife species.

The project site was surveyed for botanical resources following the applicable guidelines outlined in: *Guidelines for Conducting and Reporting Botanical Inventories for Federally listed, Proposed and Candidate Plants* (USFWS, 2000), *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018[5]), and *CNPS Botanical Survey Guidelines* (CNPS, 2001). All special-status plant species identified were mapped using a Trimble Pro XH GPS unit or by hand drawing very large population areas on aerial maps, which were later digitized using ArcGIS software. Populations of plants with greater than six individuals were mapped as a polygon and the density of the population was documented. Densities were recorded as low (1-33% cover), medium (34-66% cover), and high (67-100% cover). Individual plants or populations of less than six individuals were mapped as a point and a count of the number of individual plants was documented. Populations included all individuals within approximately three feet of another individual; individual plants further than three feet apart were mapped as a separate polygon or point. General and sensitive vegetation types were also mapped during the survey effort in 2010 and 2011 using a combination of GPS and hand drawing on aerial maps, which were later digitized using ArcGIS software.

The data collected in 2010 and 2011 were reviewed and updated in 2016 as a part of the evaluation conducted for the Oak Woodlands Conservation Area Project (DD&A, 2017), which included the project site. The data were reviewed and updated again during the site visit in January 2019.

Staub Forestry & Environmental prepared a Forest Resource Evaluation of the project site in November 2010 (Staub, 2010). DD&A conducted a forest resource evaluation of the 2015 Master Plan area in January 2019 to verify or update the data provided in the 2010 Forest Resource Evaluation (DD&A, 2019; **Appendix E**).

[5] Surveys conducted in 2010 and 2011 followed the *2009 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2009); however, these surveys are consistent with the updated 2018 protocol.

3.1.2 ECORP Surveys

ECORP conducted reconnaissance and botanical surveys of the Phase 1 area in 2013 and 2014 (ECORP, 2014). Although this report does not include an analysis of the Phase 1 project, portions of the Phase 2 area overlap with the Phase 1 area (**Figure 2**). Additionally, data from ECORP surveys were used to inform analysis of the adjacent Phase 2 and 2015 Master Plan areas.

ECORP surveys were conducted by walking meandering transects throughout the site and within all suitable habitat for the target species. Every plant species encountered was identified to species or subspecies level, unless features necessary for identification were absent (in such cases the plant was identified to the lowest taxonomic level possible). For target species found during the survey, the largest and most dense groups were mapped using a Trimble GeoXT GPS unit (ECORP, 2014). ECORP also searched for animal signs (e.g. scat, tracks), active bird nests, burrows, and other special habitat features to determine the potential presence of special-status wildlife species (ECORP, 2014).

3.2 Special-Status Species

Special-status species are those plants and animals that have been formally listed or proposed for listing as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA). Listed species are afforded legal protection under the ESA and CESA. Species that meet the definition of rare or endangered under the CEQA Section 15380 are also considered special-status species. Animals on the CDFW's list of "species of special concern" (most of which are species whose breeding populations in California may face extirpation if current population trends continue) and avian species on USFWS's "Birds of Conservation Concern" list (birds that, without additional conservation actions, are likely to become candidates for listing under ESA) meet this definition and are typically provided management consideration through the CEQA process, although they are not legally protected under the ESA or CESA. Additionally, the CDFW also includes some animal species that are not assigned any of the other status designations in the CNDDB "Special Animals" list; however, these species have no legal or protection status.

Plants listed as rare under the California Native Plant Protection Act (CNPPA) or included in California Native Plant Society (CNPS) California Rare Plant Ranks (CRPR; formerly known as CNPS Lists) 1A, 1B, 2A, and 2B are also treated as special-status species as they meet the definitions of Sections 2062 and 2067 of the CESA and in accordance with CEQA Guidelines Section 15380.[6] In general, the CDFW requires that plant species on CRPR 1A (Plants presumed extirpated in California and Either Rare or Extinct Elsewhere), CRPR 1B (Plants rare, threatened, or endangered in California and elsewhere), CRPR 2A (Plants presumed extirpated in California, but more common elsewhere); and CRPR 2B (Plants rare, threatened, or endangered in California, but more common elsewhere) of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2018) be fully considered during the preparation of environmental documents relating to CEQA.[7] In addition, species of vascular plants, bryophytes, and lichens listed as having special-status by the CDFW are considered special-status plant species (CDFW, 2018a). CNPS

[6] CNPS initially created five CRPR to categorize degrees of concern; however, to better define and categorize rarity in California's flora, the CNPS Rare Plant Program and Rare Plant Program Committee have developed the new CRPR 2A and CRPR 2B.

[7] CRPR 3 species (Plants about which we need more information - a review list) and CRPR 4 species (Plants of limited distribution - a watch list) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA.

CRPR 4 species (plants of limited distribution) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA. While other species (i.e., CRPR 3 or 4 species) are sometimes found in database searches or within the literature, these were not included within the analysis as they did not meet the definitions of Section 2062 and 2067 of CESA.

Raptors (e.g., eagles, hawks, and owls) and their nests are protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy the nest or eggs of any such bird except otherwise provided by this code or any regulation adopted pursuant thereto."

In addition, fully protected species under the Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians) are also considered special-status animal species. Species with no formal special-status designation but thought by experts to be rare or in serious decline may also be considered special-status animal species in some cases, depending on project-specific analysis and relevant, localized conservation needs or precedence.

3.3 Sensitive Habitats

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species, areas of high biological diversity, areas supporting rare or special-status wildlife habitat, and unusual or regionally restricted vegetation types. Vegetation types considered sensitive include those listed on the CDFW's *California Natural Communities List* (i.e., those habitats that are rare or endangered within the borders of California) (CDFW, 2018b), those that are occupied by species listed under ESA or are critical habitat in accordance with ESA, and those that are defined as Environmentally Sensitive Habitat Areas (ESHA) under the California Coastal Act (CCA). Specific habitats may also be identified as sensitive in city or county general plans or ordinances. Sensitive habitats are regulated under federal regulations (such as the Clean Water Act [CWA] and Executive Order [EO] 11990 – Protection of Wetlands), state regulations (such as CEQA and the CDFW Streambed Alteration Program), or local ordinances or policies (such as city or county tree ordinances and general plan policies).

3.4 Data Sources

The primary literature and data sources reviewed in order to determine the occurrence or potential for occurrence of special-status species at the project site are as follows:

- Current agency status information from USFWS and CDFW for species listed, proposed for listing, or candidates for listing as threatened or endangered under ESA or CESA, and those considered CDFW "species of special concern", including:
    - CNDDB occurrences reports from the Marina quadrangle and the six surrounding quadrangles, including Monterey, Moss Landing, Prunedale, Salinas, Seaside, and Spreckels (CDFW, 2019; **Appendix A**); and
    - USFWS IPaC Resource List (USFWS, 2019; **Appendix B**).
- CNDDB Special Animals List (CDFW, 2018a);
- The CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2019);
- The *Flora and Fauna Baseline Study of Fort Ord* (ACOE, 1992);
- The *Biological Resources Report for the Monterey Downs Specific Plan Project* (DD&A, 2013);

- The *Final Initial Study and Mitigated Negative Declaration/Environmental Assessment and Response to Comments for the California Central Coast Veterans Cemetery, Phase 1* (ECORP, 2014);
- The *Final Biological Baseline Report for the Oak Woodlands Conservation Area Project* (DD&A, 2017); and
- The *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord* (HMP) (ACOE, 1997).

In addition, all the comment letters received in response to the Notice of Preparation (NOP) for the project's Environmental Impact Report (EIR) were reviewed to ensure all potential biological resources known or with the potential to occur were evaluated and concerns were addressed in accordance with CEQA.

From these resources, a list of special-status plant and wildlife species known or with the potential to occur in the vicinity of the project site was created (**Appendix C**). This list presents these species along with their legal status, habitat requirements, and a brief statement of the likelihood to occur.

3.4.1 Botany

The California Invasive Plant Council (Cal-IPC) Inventory (Cal-IPC, 2019) was reviewed to determine if any invasive plant species are present within the evaluation area.

Vegetation types identified in *A Manual of California Vegetation* (Sawyer et.al., 2009) were utilized to determine if vegetation types identified as sensitive on CDFW's *California Natural Communities List* (CDFW, 2018b) are present within the evaluation area. Information regarding the distribution and habitats of local and state vascular plants was also reviewed (Howitt and Howell, 1964 and 1973; Munz and Keck, 1973; Baldwin et al., 2012; Baldwin, et. al, 2012; Matthews and Mitchell, 2015; Jepson Flora Project, 2019). All plants observed within the project site during the surveys between 2010 and 2014 were identified to species or intraspecific taxon necessary to eliminate them as being special-status species using keys and descriptions in Hickman (1993) and Matthews (2006). Scientific nomenclature for plant species identified within this document follows *The Jepson Manual: Vascular Plants of California, Edition 2* (Baldwin et al., 2012); common names follow *The Plants of Monterey County an Illustrated Field Key* (Matthews and Mitchell, 2015). A full botanical inventory was not recorded for the project site; however, the dominant species within each habitat were recorded. Dominant plant species are those which are more numerous than its competitors in an ecological community or makes up more of the biomass; generally, the species that are most abundant. Most ecological communities are defined by their dominant species.

3.4.2 Wildlife

The following literature and data sources were reviewed: CDFW reports on special-status wildlife (Remsen, 1978; Williams, 1986; Jennings and Hayes, 1994; Thelander, 1994); California Wildlife Habitat Relationships Program species-habitat models (Zeiner et al., 1988 and 1990); and general wildlife references (Stebbins, 1972, 1985, and 2003).

3.5 Level of Analysis and Survey Limitations

The biological analysis herein includes a comprehensive, detailed analysis of the biological resources that are present or have the potential to occur within the proposed project site. As described in the Project

Description, the proposed project is anticipated to be constructed in eleven phases.[8] At this time, there are no specific project plans for Phases 3 through 11 of the 2015 Master Plan. These phases will be planned and designed at a later time and will require future environmental review and approvals. As a result, this analysis evaluates potential impacts to sensitive biological resources within these phases at a programmatic level commensurate with the conceptual level of project information available. Phase 2 of the 2015 Master Plan has been sufficiently developed to a level of certainty within the 35% Schematic Design Plans that it is ready for a detailed environmental impacts analysis associated with its implementation (Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019a; Huitt-Zollars, Inc. and RHAA Landscape Architects, 2019b). Thus, a project-level analysis can and has been performed for Phase 2 in this analysis. Therefore, in addition to the program-level analyses of the 2015 Master Plan, this study analyzes site-specific impacts associated with Phase 2 of the 2015 Master Plan.

3.6 Regulatory Setting

The following regulatory discussion describes the major laws that may be applicable to the project.

3.5.1 Federal Regulations

Federal Endangered Species Act

Provisions of the ESA of 1973 (16 USC 1532 et seq., as amended) protect federally listed threatened or endangered species and their habitats from unlawful take. Listed species include those for which proposed and final rules have been published in the Federal Register. The ESA is administered by USFWS or National Oceanic and Atmospheric Administration Marine Fisheries Service (NMFS). In general, the NMFS is responsible for the protection of ESA-listed marine species and anadromous fish, whereas other listed species are under USFWS jurisdiction.

The U.S. Army's decision to close and dispose of the Fort Ord military base was considered a major federal action that could affect listed species under the ESA. USFWS issued a Final Biological Opinion (BO) on the disposal and reuse of former Fort Ord on October 19, 1993. USFWS issued five additional BOs and one amendment between 1999 and 2014 as a result of consultation reinitiated by the Army. On May 28, 2015, USFWS issued a Programmatic BO that superseded the previous BOs. Then on June 7, 2017, USFWS issued a reinitiated Programmatic BO that supersedes the 2015 Programmatic BO. The 2017 Programmatic BO is the current and relevant BO for activities at the former Fort Ord; the 2017 Programmatic BO contains additional conservation measures and recommendations relating to environmental cleanup actions at former Fort Ord cleanup sites.

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened. Take, as defined by ESA, is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the fish or wildlife…including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife." In addition, Section 9 prohibits removing, digging up, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. Section 9 does not prohibit take of federally listed plants on sites not under federal jurisdiction. If there is the potential for incidental take of a federally listed fish or wildlife species, take of listed species can be authorized through

[8] The proposed project is on its second phase. Phase 1 has already been completed under a separate environmental analysis, and this report does not include an analysis that phase.

either the Section 7 consultation process for federal actions or a Section 10 incidental take permit process for non-federal actions. Federal agency actions include activities that are on federal land, conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits).

Recovery Plans

The ultimate goal of the ESA is the recovery (and subsequent conservation) of endangered and threatened species and the ecosystems on which they depend. A variety of methods and procedures are used to recover listed species, such as protective measures to prevent extinction or further decline, consultation to avoid adverse impacts of federal activities, habitat acquisition and restoration, and other on-the-ground activities for managing and monitoring endangered and threatened species. The collaborative efforts of USFWS and its many partners (federal, state, and local agencies, tribal governments, conservation organizations, the business community, landowners, and other concerned citizens) are critical to the recovery of listed species.

One recovery plan has been prepared for listed species known or with the potential to occur within the Project site: Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*) (USFWS, 2017a).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 prohibits killing, possessing, or trading migratory birds except in accordance with regulation prescribed by the Secretary of the Interior. Most actions that result in permanent or temporary possession of a protected species constitute violations of the MBTA. USFWS is responsible for overseeing compliance with the MBTA and implements Conventions (treaties) between the United States and four countries for the protection of migratory birds – Canada, Mexico, Japan, and Russia. USFWS maintains a list of migratory bird species that are protected under the MBTA, which was updated in 2010 to: 1) correct previous mistakes, such as misspellings or removing species no longer known to occur within the United States; 2) add species, as a result of expanding the geographic scope to include Hawaii and U.S. territories and new evidence of occurrence in the United States or U.S. territories; and 3) update name changes based on new taxonomy (USFWS, 2013).

The Clean Water Act

The ACOE and Environmental Protection Agency (EPA) regulate discharge of dredged and fill material into "Waters of the United States" (waters of the U.S.) under Section 404 of the CWA. Waters of the U.S. are defined broadly as waters susceptible to use in commerce (including waters subject to tides, interstate waters, and interstate wetlands) and other waters (such as interstate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds) (33 CFR 328.3). Potential wetland areas are identified as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils conditions."

Under Section 401 of the CWA, any applicant receiving a Section 404 permit from the ACOE must also obtain a Section 401 Water Quality Certification from the RWQCB. A Section 401 Water Quality Certification is issued when a project is demonstrated to comply with state water quality standards and other aquatic resource protection requirements.

Executive Order 11990 - Protection of Wetlands

EO 11990 - Protection of Wetlands calls for no net loss of wetlands. For the regulatory process, the ACOE and EPA jointly define wetlands as follows: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Federal agencies are required to implement the following procedures for any federal action that involves wetlands: 1) provide an opportunity for early public involvement; 2) consider alternatives that would avoid wetlands, and it avoidance is not possible, measures to minimize harm to wetlands must be included in the action; 3) prepare a "Wetlands Only Practicable Alternative Finding" for actions that require an Environmental Impact Study.

Executive Order 13112 - Invasive Species

EO 13112 - Invasive Species requires the prevention of introduction and spread of invasive species. Invasive species are defined as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Each federal agency whose actions may affect the status of invasive species on a project site shall, to the extent practicable and permitted by law, subject to the availability of appropriations, use relevant programs and authorities to: 1) prevent the introduction of invasive species; 2) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; 3) monitor invasive species populations accurately and reliably; 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; 5) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and 6) promote public education on invasive species and the means to address them. A national invasive species management plan was prepared by the National Invasive Species Council and the Invasive Species Advisory Committee (ISAC) that recommends objectives and measures to implement the EO.

3.5.2 State Regulations

California Endangered Species Act

The CESA was enacted in 1984. The California Code of Regulations (Title 14, §670.5) lists animal species considered endangered or threatened by the state. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. Section 2080 of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. "Take" is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." A Section 2081 Incidental Take Permit from the CDFW may be obtained to authorize "take" of any state listed species.

California Fish and Game Code

Birds. Section 3503 of the Fish and Game Code states that it is "unlawful to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Section 3503.5 prohibits the killing, possession, or destruction of any birds in the orders Falconiformes or Strigiformes (birds-of-prey). Section 3511 prohibits take or possession of fully protected birds. Section 3513 prohibits the take or possession of any migratory nongame birds designated under the federal MBTA. Section 3800 prohibits take of nongame birds.

Fully Protected Species. The classification of fully protected was the state's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish (§5515), mammals (§4700), amphibians and reptiles (§5050), and birds (§3511). Most fully protected species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Species of Special Concern. As noted above, the CDFW also maintains a list of animal "species of special concern." Although these species have no legal status, the CDFW recommends considering these species during analysis of project impacts to protect declining populations and avoid the need to list them as endangered in the future.

Native Plant Protection Act

The CNPPA of 1977 directed the CDFW to carry out the legislature's intent to "preserve, protect and enhance rare and endangered plants in the state." The CNPPA prohibits importing rare and endangered plants into California, taking rare and endangered plants, and selling rare and endangered plants. The CESA and CNPPA authorized the Fish and Game Commission to designate endangered, threatened and rare species and to regulate the taking of these species (§2050-2098, Fish and Game Code). Plants listed as rare under the CNPPA are not protected under CESA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne) is California's statutory authority for the protection of water quality and applies to surface waters, wetlands, and groundwater, and to both point and nonpoint sources. Under the Porter-Cologne, the State Water Resources Control Board (State Board) has the ultimate authority over State water rights and water quality policy. However, Porter-Cologne also establishes nine RWQCBs to oversee water quality on a day-to-day basis at the local/regional level. The project site is located within Region 3 – Central Coast RWQCB. Porter-Cologne incorporates many provisions of the federal CWA, such as delegation to the State Board and RWQCBs of the National Pollutant Discharge Elimination System (NPDES) permitting program.

Under Porter-Cologne, the state must adopt water quality policies, plans, and objectives that protect the state's waters for the use and enjoyment of the people. Regional authority for planning, permitting, and enforcement is delegate to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans. The Porter-Cologne sets forth the obligations of the State Board and RWQCBs to adopt and periodically update water quality control plans (basin plans). The act also requires waste dischargers to notify the RWQCBs of such activities through filing of Reports of Waste Discharge (RWD) and authorizes the State Board and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to RWD requirements and WDRs for broad categories of "low threat" discharge activities that have minimal potential for adverse water quality effects, when implemented according to prescribed terms and conditions.

The term "Waters of the State" is defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state." The RWQCB protects all waters in its

regulatory scope but has special responsibility for wetlands, riparian areas, and headwaters, including isolated wetlands, and waters that many not be regulated by the ACOE under Section 404 of the CWA. Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program, which regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne.

3.5.3 Local Regulations

Fort Ord Habitat Management Plan

The U.S. Army's decision to close and dispose of the Fort Ord military base was considered a major federal action that could affect listed species under the ESA. In 1993, USFWS issued a BO on the disposal and reuse of former Fort Ord requiring that a HMP be developed and implemented to reduce the incidental take of listed species and loss of habitat that supports these species (USFWS, 1993, updated to USFWS, 2017b). The HMP was prepared to assess impacts on vegetation and wildlife resources and provide mitigation for their loss associated with the disposal and reuse of former Fort Ord (ACOE, 1997).

The HMP establishes guidelines for the conservation and management of species and habitats on former Fort Ord lands by identifying lands that are available for development, lands that have some restrictions with development, and habitat reserve areas. The intent of the plan is to establish large, contiguous habitat conservation areas and corridors to compensate for future development in other areas of the former base. The HMP identifies what type of activities can occur on each parcel at former Fort Ord; parcels are designated as "development with no restrictions," "habitat reserves with management requirements," or "habitat reserves with development restrictions." The HMP sets the standards to assure the long-term viability of former Fort Ord's biological resources in the context of base reuse so that no further mitigation should be necessary for impacts to species and habitats considered in the HMP. This plan has been approved by USFWS; the HMP, deed restrictions, and Memoranda of Agreement between the Army and various land recipients provide the legal mechanism to assure HMP implementation. It is a legally binding document, and all recipients of former Fort Ord lands are required to abide by its management requirements and procedures.

The HMP anticipates some losses to special-status species and sensitive habitats as a result of redevelopment of the former Fort Ord. With the designated reserves and corridors and habitat management requirements in place, the losses of individuals of species and sensitive habitats considered in the HMP are not expected to jeopardize the long-term viability of those species, their populations, or sensitive habitats on former Fort Ord. Recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and through deed covenants.

However, the HMP does not provide specific authorization for incidental take of federal or state listed species to existing or future non-federal land recipients under the ESA or CESA. In compliance with the ESA and CESA, FORA is currently in the process of obtaining a Section 10(a)(1)(B) Incidental Take Permit from USFWS and Section 2081 Incidental Take Permit from CDFW, which will provide base-wide coverage for the take of federal and state listed wildlife and plant species to all non-federal entities receiving land on the former Fort Ord. This process involves the preparation of a Habitat Conservation Plan (HCP). The Draft Fort Ord HCP (ICF International, Inc., 2017) is currently in draft form and being reviewed by

the resource agencies. The base-wide incidental take permits are expected to be issued by USFWS and CDFW by the end of 2019.

The project site is located within designated development parcels. Parcels designated as "development" have no management restrictions. However, the Programmatic BO and HMP require the identification of sensitive biological resources within the development parcels that may be salvaged for use in restoration activities in reserve areas (USFWS, 2017b and ACOE, 1997).

City of Seaside Municipal Code Chapter 8.54

The City of Seaside Municipal Code Chapter 8.54 (Trees) outlines the policies regarding tree removal and planting. The policies applicable to this project include Section 8.54.030 (Permit—Required for certain tree removal, alteration or planting), Section 8.54.060 (New construction, development, subdivisions and site plans), and Section 8.54.070 (Replacement of Trees). As outlined in Section 8.54.070, if removal of a tree from a site has been authorized on an undeveloped parcel, the developer shall replace the tree with a minimum five-gallon specimen tree of a species and in a location approved by the board of architectural review, if applicable, or other individual or body responsible for the approval of applicant's plans. This requirement may be modified or waived if it is determined that replacement on one-for-one basis constitutes an unreasonable hardship.

Monterey County Code

Title 16, Chapter 16.60, Monterey County Code, provides for the preservation of oaks and other protected tree species within the unincorporated areas of the County. As defined in Chapter 16.60.040 C, removal of more than three protected trees on a lot in a one-year period requires a Forest Management Plan (FMP) and approval of a Use Permit by the Monterey County Planning Commission. The FMP must be prepared by a qualified forester selected from the County's list of consultants. Chapter 16.060.040 D requires that the applicant relocate or replace each removed tree on a one-to-one ratio. This ratio may be varied upon showing that such a requirement will create a special hardship in the use of the site or that such a replacement would be detrimental to the long-term health and maintenance of the remaining habitat.

Habitat Conservation Plans or NCCP

There are no adopted HCPs or Natural Community Conservation Plans (NCCP) associated with the project site. Please refer to the discussion of the Draft HCP currently in progress in the Fort Ord HMP section above.

Fort Ord Oak Woodland Conservation

The County and City are engaged in meeting their Fort Ord Reuse Plan policies and programs obligations related to oak woodland protection and conservation. Biological Resources Policy B-2 and Programs B-2.1 and B-2.2 of the Reuse Plan require the County and Seaside to designate an oak woodland conservation area within the specified areas of the former Fort Ord, and manage and monitor the conservation area. FORA, Seaside, and the County have identified a proposed oak woodland conservation area and are currently preparing a draft management and monitoring plan for the area. After public review, the jurisdictions will need to complete environmental and other tasks prior to any approvals. As a requirement of the Reuse Plan, it is anticipated that the process will be completed and the oak woodland conservation area established within the next 12 to 14 months.

4.0 RESULTS

4.1 Vegetation Types

Five vegetation units were mapped within the project site (**Figure 8**). Additionally, a small portion of the project site is developed (paved road). **Tables 4-1** and **4-2** provide the acreages of these vegetation types within the Phase 2 and 2015 Master Plan sites, respectively. A brief description of each vegetation type can be found below along with a statement of the presence or potential presence of special-status species within each. In addition, each vegetation type description identifies the vegetation classification from *A Manual of California Vegetation* (Sawyer et al., 2009) and whether the vegetation type is identified as sensitive on CDFW's *California Natural Communities List*.

Table 4-1. Vegetation Types within the Phase 2 Site

Vegetation Type	**Phase 2 Site (Acres)**			
	Permanent Impact Area	Temporary Impact Area/ Staging	Preserved Area	**Total**
Coast Live Oak Woodland	1.1	0.5	1.0	**2.6**
Central Maritime Chaparral	0.0	0.0	0.0	**0.0**
Central Coastal Scrub	1.6	0.7	0.1	**2.4**
Non-Native Grassland	0.0	0.0	0.0	**0.0**
Ruderal/Disturbed/Landscaped	1.7	1.1	0.1	**2.9**
Developed	0.0	2.1	0.0	**2.1**
Total	**4.4**	**4.4**	**1.2**	**10.0**
Bold indicates a sensitive habitat addressed in the Fort Ord HMP.				

Table 4-2. Vegetation Types within the 2015 Master Plan Site

Vegetation Type	**2015 Master Plan Site (Acres)**		
	Buildout Area	Preserved Area	**Total**
Coast Live Oak Woodland	31.1	17.1	**48.2**
Central Maritime Chaparral	1.3	10.0	**11.3**
Central Coastal Scrub	3.4	4	**7.4**
Non-Native Grassland	1.5	0.6	**2.1**
Ruderal/Disturbed/Landscaped	0.0	0.0	**0.0**
Developed	0.0	0.0	**0.0**
Total	**37.3**	**31.7**	**69.0**
Bold indicates a sensitive habitat addressed in the Fort Ord HMP.			

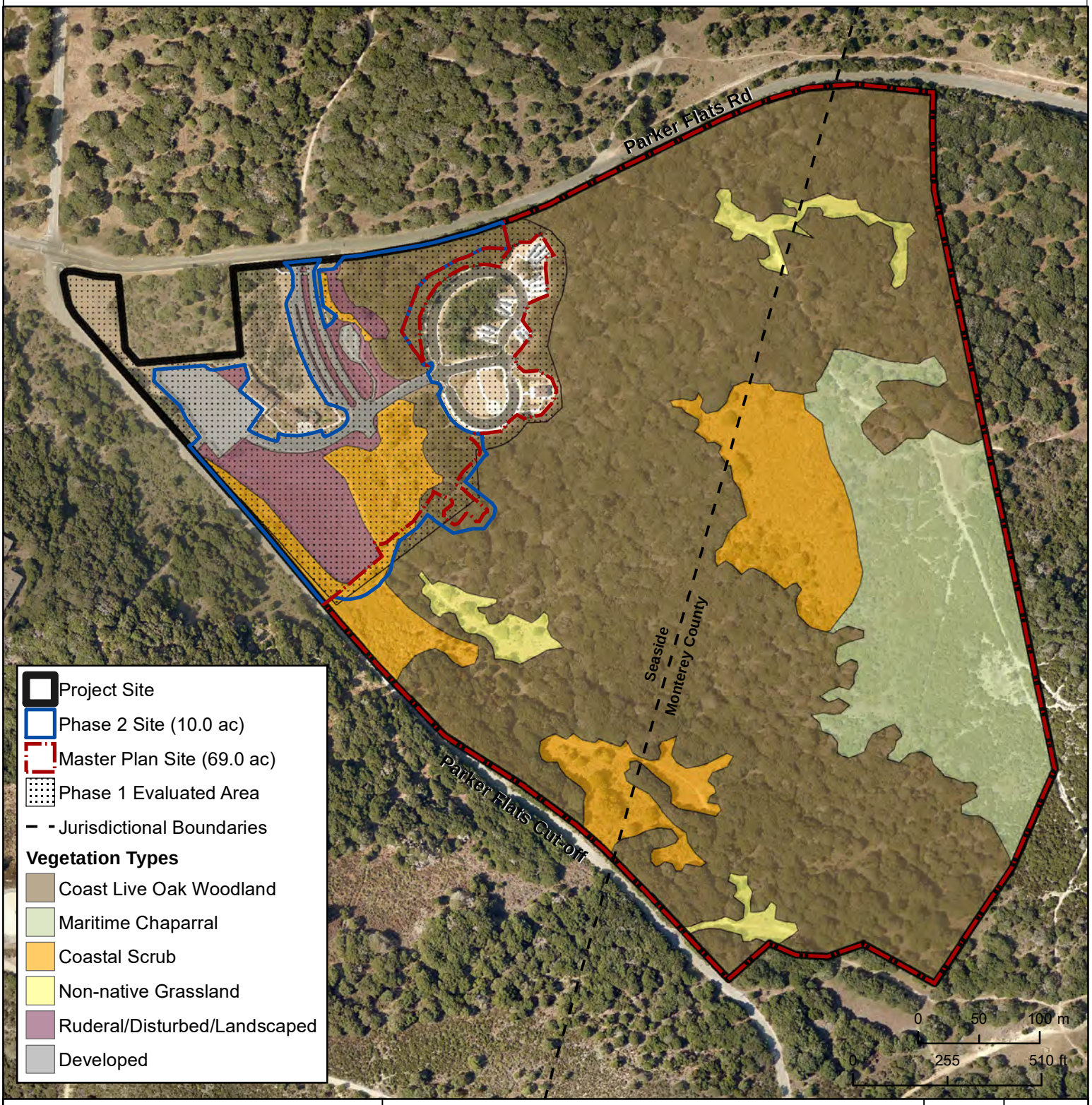
4.1.1 Coast Live Oak Woodland

- *A Manual of California Vegetation* classification: Coast live oak woodland (*Quercus agrifolia*/*Toxicodendron diversilobum*/grass association)
- CDFW's *California Natural Communities List*: Not sensitive

Coast live oak (*Quercus agrifolia*) woodland is the dominant vegetation type within both the 2015 Master Plan and Phase 2 sites (**Figure 8**).

Vegetation Type	Phase 2 Site				Master Plan Site		
	Permanent Impact Area	*Temporary Impact Area/ Staging*	*Preserved Area*	***Total***	*Buildout Area*	*Preserved Area*	***Total***
Coast Live Oak Woodland	1.1	0.5	1.0	**2.6**	31.1	17.1	**48.2**
Maritime Chaparral	0.0	0.0	0.0	**0.0**	1.3	10.0	**11.3**
Central Coastal Scrub	1.6	0.7	0.1	**2.4**	3.4	4	**7.4**
Non-Native Grassland	0.0	0.0	0.0	**0.0**	1.5	0.6	**2.1**
Ruderal/Disturbed/Landscaped	1.7	1.1	0.1	**2.9**	0.0	0.0	**0.0**
Developed	0.0	2.1	0.0	**2.1**	0.0	0.0	**0.0**
Total	**4.4**	**4.4**	**1.2**	**10**	**37.3**	**31.7**	**69**

Please note that the Phase 2 Temporary Impact Area/Staging overlaps with the Master Plan Site. As such, there is overlap in the vegetation type acreages of coast live oak woodland and central coastal scrub.



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Vegetation Map

N

Date 04-09-2019

Scale 1 in = 366.7 ft

Figure 8

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 8 - Vegetation Map.mxd

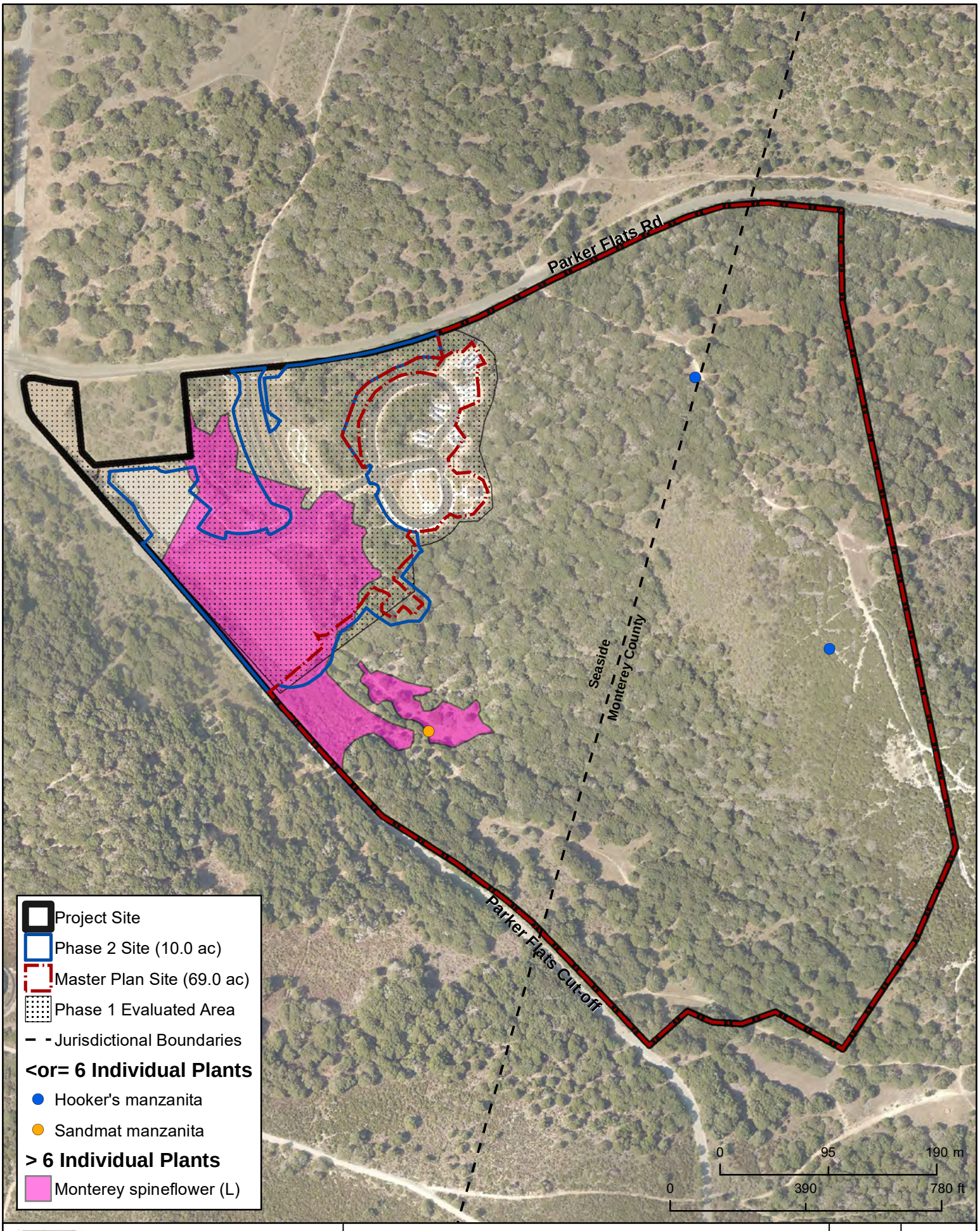
The canopy is quite dense in many areas, and the understory is dominated by poison oak (*Toxicodendron diversilobum*) or, in some areas, invasive hottentot fig (also called ice plant; *Carpobrotus edulis*). Other plant species present within the coast live oak woodland include hedge-nettle (*Stachys* sp.), slender wild oat (*Avena barbata*), sheep sorrel (*Rumex acetosella*), fiesta flower (*Pholistoma auritum*), and scattered shrubs such as fuchsia-flowered gooseberry (*Ribes speciosum*), California coffeeberry (*Frangula californica*), and sticky monkey flower (*Diplacus aurantiacus*).

Coast live oak woodland is important habitat to many wildlife species. Oaks provide nesting sites for many avian species and cover for a variety of mammals, including mourning dove (*Zenaida macroura*), American kestrel (*Falco sparverius*), California ground squirrel (*Spermophilus beecheyi*), and California pocket mouse (*Chaetodipus californicus*). Acorns provide an important food source for acorn woodpecker (*Melanerpes formicivorus*), western scrub jay (*Aphelocoma californica*), and black-tailed deer (*Odocoileus hemionus columbianus*). Other common wildlife species found in the coast live oak woodland are raccoon (*Procyon lotor*), Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*). Generally, red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*) nest and roost in the coast live oaks. Additional avian species that may be found within the oak woodland habitat are presented in **Appendix D**.

No special-status plant species were observed within oak woodlands during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014; **Figures 9** and **10**). However, suitable habitat for several special-status plant species is present within this vegetation type (**Appendix C**). As discussed in Section 3.0 "Methods", additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results. In accordance with CEQA, NEPA, ESA, and CESA, special-status plant surveys will also be required prior to development of each future phase of the 2015 Master Plan.

No special-status wildlife species were observed within the coast live oak woodlands; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. The Northern California legless lizard and the coast horned lizard may also use this vegetation type for foraging and cover, and special-status bats and protected avian species, including Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, oak titmouse, Lawrence's goldfinch, Nuttall's woodpecker, spotted towhee, and Allen's hummingbird, may nest or roost within the coast live oak trees. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a portion of coast live oak woodland habitat within the 2015 Master Plan site is within the known dispersal range of the California tiger salamander (CTS) and may be used as upland aestivation and dispersal habitat for this species.

Oak woodlands are considered important natural communities because they provide a variety of ecological, aesthetic, and economical values. The extent of oak woodland in California has declined due to agricultural conversion, urban development, fuelwood harvesting, and grazing activities. Coast live oak woodland is not considered a sensitive natural community by CDFW (CDFW, 2018b); however, as a native tree and habitat, coast live oak trees and woodlands are typically protected under local tree removal ordinances and impacts are usually addressed and mitigated under CEQA.



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2010 and 2011 Botanical Survey Results

N

Date
04-09-2019

Scale
1 in = 0.1 mi

Figure
9

Path: D:\GIS\GIS_Projects\2018-67 CCCV\C\Map Products\Bio Report Maps\Fig 5 - Rare Plant Map.mxd



Map Features

- Phase 1 Area
- Impact Area

Monterey Spineflower Populations [1]

- Avoided
- Impacted

Virgate Eriastrum Populations [2]

- Impacted

Scale in Feet
0 150

[1] *Monterey spineflower occurs throughout the site. The occurrences mapped here represent only the largest and most dense groups observed on-site.*

[2] *Virgate eriastrum occurs throughout the site. The occurrences mapped here represent only the largest and most dense groups observed on-site.*

Source: Phase 1 IS/EA

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

2014 ECORP Botanical Survey Results

N

Date
04-05-19

Figure
10

4.1.2 Central Maritime Chaparral

- *A Manual of California Vegetation* classifications: Brittle leaf–wooly leaf manzanita chaparral (*Arctostaphylos* [*crustacea, tomentosa*] shrubland alliance) and sandmat manzanita chaparral (*Arctostaphylos pumila* provisional shrubland alliance)
- CDFW's *California Natural Communities List*: Sensitive

Central maritime chaparral is the second most dominant vegetation type within the 2015 Master Plan site (**Figure 8**), where it is dominated by shaggy-barked manzanita, dwarf ceanothus, coyote brush (*Baccharis pilularis*), chamise, and sticky monkey flower. Additional species within this vegetation type include California coffeeberry, fuchsia-flowered gooseberry, chaparral currant (*Ribes malvaceum*), poison oak, black sage (*Salvia mellifera*), sticky cinquefoil (*Drymocallis glandulosa*), and creeping snowberry (*Symphoricarpos mollis*). Central maritime chaparral does not occur within the Phase 2 site.

Common wildlife species that occur within central maritime chaparral include California quail (*Callipepla californica*), California towhee (*Melozone crissalis*), California thrasher (*Toxostoma redivivum*), common poorwill (*Phalaenoptilus nuttallii*), Anna's hummingbird (*Calypte anna*), wrentit (*Chamaea fasciata*), western scrub jay, northern pacific rattlesnake (*Crotalus oreganus* ssp. *oreganus*), coast range fence lizard (*Sceloporus occidentalis bocourtii*), gopher snake (*Pituophis catenifer catenifer*), coast gartersnake (*Thamnophis elegans terrestris*), and brush rabbit (*Sylvilagus bachmani*). Additional avian species that may be found within the central maritime chaparral are presented in **Appendix D**.

Hooker's manzanita (one individual) was the only special-status plant species identified within this vegetation type during focused botanical surveys in 2010 and 2011 (DD&A, 2013; **Figure 9**). However, suitable habitat for several other special-status plant species is present within this vegetation type (**Appendix C**). As discussed in Section 3.0 "Methods" and in accordance with CEQA, NEPA, ESA, and CESA, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan.

No special-status wildlife species were observed within central maritime chaparral; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. Lawrence's goldfinch, wrentit, and spotted towhee may nest within this vegetation type, and the Northern California legless lizard, horned lizard, Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, and rufous hummingbird may use this vegetation type for foraging and/or cover. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a portion of central maritime chaparral within the 2015 Master Plan site is within the known dispersal range for CTS and may be used as upland aestivation and dispersal habitat for this species.

4.1.3 Central Coastal Scrub

- *A Manual of California Vegetation* classifications: Coyote brush scrub (*Baccharis pilularis* shrubland alliance) and black sage scrub (*Salvia mellifera* shrubland alliance)
- CDFW's *California Natural Communities List*: Not sensitive

Central coastal scrub occurs within both the 2015 Master Plan and Phase 2 sites (**Figure 8**). Holland (1986) describes central coastal scrub as an area with dense shrubs, approximately one to two meters tall, which

lacks grassy openings and is often integrated with other vegetation types. Dominant shrub species in the central coastal scrub include black sage, coyote brush, poison oak, mock heather (*Ericameria ericoides*), sticky monkey flower, and coast sagebrush (*Artemisia californica*).

Central coastal scrub communities provide cover and food for a number of wildlife species, including songbirds, snakes, lizards, rodents, and other small mammals. Common species that may occur within central coastal scrub include California quail, blue-gray gnatcatcher (*Polioptila caerulea*), Anna's hummingbird, coast range fence lizard, northern pacific rattlesnake, gopher snake, brush rabbit, and California ground squirrel. Additional avian species that may be found within the central coastal scrub community are presented in **Appendix D**.

Monterey spineflower was the only special-status plant species identified within this vegetation type during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014; **Figures 9** and **10**). However, suitable habitat for several other special-status plant species is present within this vegetation type (**Appendix C**). As discussed in Section 3.0 "Methods", additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results. In accordance with CEQA, NEPA, ESA, and CESA, special-status plant surveys will also be required prior to development of each future phase of the 2015 Master Plan.

No special-status wildlife species were observed within this vegetation type; however, the presence of woodrat nests within this vegetation type indicates the presence of Monterey dusky-footed woodrats. Lawrence's goldfinch, wrentit, spotted towhee, and Allen's hummingbird may nest within this vegetation type, and the Northern California legless lizard, coast horned, Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, and rufous hummingbird may use this vegetation type for foraging and/or cover. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew. Additionally, a very small area of central coastal scrub within the 2015 Master Plan site occurs within the known dispersal range for CTS and may be used as upland aestivation and dispersal habitat for this species.

4.1.4 Non-Native Grassland

- *A Manual of California Vegetation* classification: Annual brome grasslands (*Bromus diandrus-Avena* spp. Association)
- CDFW's *California Natural Communities List*: Not sensitive

Throughout California, non-native grasslands typically occur in open areas of valleys and foothills, usually on fine-textured clay or loam soils that are somewhat poorly drained (Holland, 1986). This vegetation type is often dominated by non-native annual grasses and forbs along with scattered native grasses and wildflowers. Non-native grassland occurs within the 2015 Master Plan site (**Figure 8**). The dominant species observed within this community include slender oat, ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), rat-tail fescue (*Festuca myuros*), and long-beaked filaree (*Erodium botrys*). Additional species found within this habitat include needlegrass (*Stipa* sp.), sky lupine (*Lupinus nanus*), California poppy (*Eschscholzia californica*), wedge-leaved horkelia (*Horkelia cuneata*), sheep sorrel, and telegraphweed (*Heterotheca grandiflora*). Non-native grassland does not occur within the Phase 2 site.

Non-native grasslands provide habitat to a number of common wildlife species. Botta's pocket gopher (*Thomomys bottae*), California ground squirrel, and several rodent species use non-native grasslands for foraging and cover. Raptors, including red-tailed hawk, are also known to forage in this habitat. Reptiles, such as northern pacific rattlesnake, gopher snake, and coast range fence lizard, are also common non-native grassland species. Avian species that may be found within non-native grassland include grasshopper sparrow (*Ammodramus savannarum*), savannah sparrow (*Passerculus sandwhicheneis*), western kingbird (*Tyrannus verticalis*), and red-tailed hawk. Additional avian species are presented in **Appendix D**.

Monterey spineflower and sandmat manzanita (one individual, observed along the boundary between this vegetation type and coast live oak woodland) were identified within this vegetation type during focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014; **Figures 9** and **10**). However, suitable habitat for several other special-status plant species is present within this vegetation type (**Appendix C**). As discussed in Section 3.0 "Methods" and in accordance with CEQA, NEPA, ESA, and CESA, special-status plant surveys will be required prior to development of each future phase of the 2015 Master Plan.

No special-status wildlife was observed within the non-native grassland; however, special-status bats and protected avian species, including Townsend's big-eared bat, hoary bat, Cooper's hawk, white-tailed kite, may forage within this vegetation type. Additionally, suitable nesting and foraging habitat for spotted towhee, California horned lark, obscure bumble bee, and western bumble bee is present within the non-native grassland. The Northern California legless lizard may use this vegetation type for foraging and cover while coast horned lizard may utilize open, sandy areas within non-native grassland for basking. The HMP identifies this vegetation type as potential habitat for the Monterey ornate shrew.

4.1.5 Ruderal

- *A Manual of California Vegetation* classifications: None
- CDFW's *California Natural Communities List*: Not listed

Ruderal areas are those areas which have been disturbed by human activities and are dominated by non-native annual grasses and other "weedy" species. Ruderal areas within the Phase 2 site include areas disturbed by Phase 1 construction, including the detention basin (**Figure 8**). Ruderal areas include vegetation dominated by hottentot fig, ripgut grass, slender oat, cut-leaved plantain (*Plantago coronopus*), English plantain (*P. lanceolata*), sand mat (*Cardionema ramosissimum*), long-beaked filaree, and telegraphweed. Ruderal areas do not occur within the 2015 Master Plan site.

This vegetation type is considered to have low biological value as it is generally dominated by non-native plant species and consists of relatively low-quality habitat from a wildlife perspective. However, common wildlife species which do well in urbanized and disturbed areas, such as the American crow (*Corvus brachyrhynchos*), California ground squirrel, raccoon, striped skunk(*Mephitis mephitis*), western scrub jay, European starling (*Sturnus vulgaris*), coast range fence lizard, and rock pigeon (*Columba livia*), may forage within this vegetation type.

Monterey spineflower was identified within this vegetation type focused botanical surveys in 2010, 2011, and 2014 (DD&A, 2013; ECORP, 2014; **Figures 9** and **10**). However, marginal habitat for several other

special-status plant species is present within this vegetation type (**Appendix C**). As discussed in Section 3.0 "Methods", additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results.

Although ruderal areas represent relatively low-quality wildlife habitat, some special-status wildlife species may occur: coast horned lizards often occupy open, sandy areas; Northern California legless lizard may occur where loose, sandy soils are present; the spotted towhee may forage within this vegetation type; and obscure and western bumble bees may nest and forage within this vegetation type.

4.1.6 Developed

- *A Manual of California Vegetation* classifications: None
- CDFW's *California Natural Communities List*: Not listed

Developed areas within the Phase 2 site include paved roads, parking lots, and structures associated with the Phase 1 development of the site (**Figure 8**). No vegetation is present within these areas and they are considered to have little biological value. However, some common wildlife species that do well in urbanized areas, including American crow, California ground squirrel, raccoon, striped skunk, western scrub jay, European starling, and rock pigeon, may be found foraging within developed areas. Developed areas do not occur within the 2015 Master Plan site.

No special-status plant or wildlife species were observed within developed areas during biological surveys of the project site and none are expected to occur based on lack of suitable habitat.

4.2 Special-Status Species

Published occurrence data within the project area and surrounding USGS quadrangles were evaluated to compile a table of special-status species known to occur in the vicinity of the project site (see "Methods" and **Appendix C**). Each of these species was evaluated for their likelihood to occur within and immediately adjacent to the project site (**Appendix C**). The special-status species that are known to or have been determined to have a moderate or high potential to occur within or immediately adjacent the project site are discussed below. All other species are assumed unlikely to occur or have a low potential to occur based on the species-specific reasons presented in **Appendix C**, are therefore unlikely to be impacted by the project, and are not discussed further.

4.2.1 Special-Status Wildlife Species

Table 4-3 identifies the potential for special-status wildlife species to occur within the proposed project site. A discussion of each species is provided below.

Table 4-3. Potential for Special-Status Wildlife Species Presence within the Project Site

Species	2015 Master Plan	Phase 2
Townsend's big-eared bat	Moderate	Moderate
Hoary bat	Moderate	Moderate
Monterey dusky-footed woodrat	Present	Present
Monterey ornate shrew	Moderate	Moderate

Species	2015 Master Plan	Phase 2
Cooper's hawk	Present	Present
Oak titmouse	High	High
Lawrence's goldfinch	Moderate	Moderate
Wrentit	High	High
White-tailed kite	High	High
California horned lark	Moderate	Unlikely
Nuttall's woodpecker	Moderate	Moderate
Spotted towhee	High	High
Rufous hummingbird	Moderate	Moderate
Allen's hummingbird	Moderate	Moderate
California tiger salamander	Moderate	Unlikely
Northern California legless lizard	High	High
Coast horned lizard	High	High
California red-legged frog[9]	Unlikely	Unlikely
Obscure bumble bee	Moderate	Low
Western bumble bee	Moderate	Low
Bold indicates a Fort Ord HMP Species.		

Special-Status Bat Species

Special-status bat species, including Townsend's big-eared bat and hoary bat, have the potential to occur within the project site. These species may utilize some of the coast live oak trees within both the 2015 Master Plan and Phase 2 sites for night roosts and may forage over all undeveloped areas of the project site.

Townsend's Big-Eared Bat

Townsend's big-eared bat is a CDFW species of special concern. This bat is a year-round resident in California occurring from low desert to mid-elevation montane habitats. It is found primarily in rural settings from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra foothills, and low to mid-elevation mixed coniferous-deciduous forests. Townsend's big-eared bats typically roost during the day in caves and mines, but can roost in buildings that offer suitable conditions. Night roosts are in more open settings and include bridges, rock crevices, and trees. This species hibernates in mixed sex aggregations of a few to several hundred individuals. Hibernation is more prolonged in colder areas. This species arouses periodically and moves to alternative roosts and actively forages and drinks throughout the winter. A single young is born per year between May and July.

The CNDDB reports one occurrence of Townsend's big-eared bat within the seven quadrangles reviewed, located approximately 5.7 km from the project site. Suitable foraging and night roost habitat for this species is present within both the 2015 Master Plan and Phase 2 sites; however, suitable habitat for day, colonial, or maternal roots is not available.

Hoary Bat

The hoary bat is included on CDFW's CNDDB "Special Animals" list. This species has the broadest range of any North American bat, occurring from Northern Canada to South America, and may be found anywhere

[9] Although CRLF is unlikely to occur within the project site, a discussion of this species is included because of its prevalence within the former Fort Ord and its status as a federally Threatened species.

in California. This species winters in California and Mexico and often migrates towards summer quarters in the north and east during the spring (Cryan, 2003). Spring migration is typically February to May, while fall migration typically occurs September through November. Hoary bats are a solitary species except during migration when larger groups are often formed or when mothers are rearing their young (Tuttle, 1995); however, unlike other bat species, hoary bats do not form maternity colonies. Hoary bats mate in fall or winter and sperm is stored over winter. Fertilization occurs in early spring and gestation is 80 to 90 days. One to four young are born in late May to late June. As such, parturition occurs at summer quarters and there is little evidence that females give birth and raise young in California (Cryan, 2003; Findley and Jones, 1964). Unlike many other bat species that often roost in buildings, hoary bats are seldom found in urban settings (Tuttle, 1995). The hoary bat typically roosts 10-15 feet above ground in the branches/foliage of medium to large deciduous and coniferous trees. Individuals wintering in cold climates hibernate, but may be active on warm winter days. This species is nocturnal, emerging late in the evening with peak activity varying with season and location, but usually three to five hours after sunset. The hoary bat hunts above canopy level, in clearings, and over water. This species has also been known to set up foraging territories at bright lights where insects congregate.

The CNDDB reports two occurrences of hoary bat within the seven quadrangles reviewed, the nearest reported approximately 8.3 km from the project site. Suitable foraging and day and night roost habitat for this species is present within the both the 2015 Master Plan and Phase 2 sites; however, the project site is outside the known breeding range of this species.

Monterey Dusky-Footed Woodrat

The Monterey dusky-footed woodrat is a CDFW species of special concern. This is a subspecies of the dusky-footed woodrat *(Neotoma macrotis)*, which is common to oak woodlands and other forest types throughout California. Dusky-footed woodrats are frequently found in forest habitats with moderate canopy cover and a moderate to dense understory, including riparian forests; however, they may also be found in chaparral communities. Relatively large nests are constructed of grass, leaves, sticks, and feathers and are built in protected spots, such as rocky outcrops or dense brambles of blackberry and/or poison oak. Typical food sources for this species include leaves, flowers, nuts, berries, and truffles. Dusky-footed woodrats may be a significant food source for small- to medium-sized predators. Populations of this species may be limited by the availability of nest material. Within suitable habitat, nests are often found in close proximity to each other.

The CNDDB does not report any occurrences of Monterey dusky-footed woodrat within the seven quadrangles reviewed. However, this species is known to occur throughout the former Fort Ord and woodrat nests were observed within both the 2015 Master Plan and Phase 2 sites during field surveys. The Monterey dusky-footed woodrat is therefore assumed present within both sites.

Monterey Ornate Shrew

The Monterey ornate shrew, also known as the Salinas ornate shrew, is a CDFW species of special concern and HMP species. In general, this shrew is common in the southern two-thirds of California west of the Sierra Nevada, from Mendocino to Butte counties, south to the Mexican border. It occupies a variety of mostly moist or riparian woodland habitats and also occurs within chaparral, grassland, and emergent wetland habitats where there is thick duff or downed logs. The breeding season is long; while most

pregnancies occur in March and April, they may occur from February through October. The litter size is about six and females may have more than one litter per year. Most individuals do not live to breed a second year. Foraging occurs under logs rocks and leaf litter, and prey items are mostly insects and some other invertebrates.

The CNDDB does not report any occurrences of the Monterey ornate shrew within the seven quadrangles reviewed; however, the HMP identifies the project site as containing potential habitat for this species. As with most shrews, little is known about their ecology since they are hard to locate and do not survive well in traps due to very high metabolic rates. However, recent field surveys on the UC Fort Ord Natural Reserve found that vegetation types within the project site (e.g., non-native grassland, coast live oak woodland, central coastal scrub, and central maritime chaparral) are likely considered suitable habitat for the shrew. Therefore, there is a moderate potential for the Monterey ornate shrew to occur within these vegetation types in both the 2015 Master Plan and Phase 2 sites.

California Tiger Salamander

The California tiger salamander was listed as a federally threatened species on August 4, 2004 (69 FR 47211-47248). Critical habitat was designated for CTS on August 23, 2005 (70 FR 49379-49458), and went into effect on September 22, 2005. Additionally, CTS was listed as a state threatened species on March 3, 2010.

The CTS is a large, stocky salamander most commonly found in annual grassland habitat, but also occurring in the grassy understory of valley-foothill hardwood and chaparral habitats, and uncommonly along stream courses in valley-foothill riparian habitats (USFWS, 2004). Adults spend most of their lives underground, typically in burrows of ground squirrels and other animals (USFWS, 2004). The California tiger salamander has been eliminated from an estimated 55 percent of its documented historic breeding sites. Currently, about 150 known populations of California tiger salamanders remain. The CTS persists in disjunct remnant vernal pool complexes in Sonoma County and Santa Barbara County, in vernal pool complexes and isolated stockponds scattered along a narrow strip of rangeland on the fringes of the Central Valley from southern Colusa County south to northern Kern County, and in sag ponds and human-maintained stockponds in the coast ranges from the San Francisco Bay Area south to the Temblor Range, including within the Fort Ord National Monument.

Above-ground migratory and breeding activity may occur under suitable environmental conditions from mid-October through May. Adults may travel long distances between upland and breeding sites; adults have been found more than two kilometers (1.24 miles) from breeding sites (USFWS, 2004). Breeding occurs from November to February, following relatively warm rains (Stebbins, 2003). The CTS breeds and lays eggs primarily in vernal pools and other temporary rainwater ponds. Permanent human-made ponds are sometimes utilized if predatory fishes are absent; streams are rarely used for reproduction. Eggs are laid singly or in clumps on both submerged and emergent vegetation and on submerged debris in shallow water (Stebbins, 1972; Jennings and Hayes, 1994). Males typically spend six to eight weeks at breeding ponds, while females typically spend only one to two weeks (Loredo et al., 1996). Eggs hatch within 10 to 14 days (USFWS, 2004) and a minimum of 10 weeks is required to complete development through metamorphosis (Jennings and Hayes, 1994); however, the larval stage may last up to six months and some larvae in Contra Costa and Alameda Counties may remain in their breeding sites over the summer (USFWS, 2004).

The CNDDB reports 51 occurrences of CTS within the seven quadrangles evaluated, 22 of which occur within the former Fort Ord. Extensive surveys have been conducted within the former Fort Ord to determine the aquatic resources that are known or have the potential to be occupied by CTS (**Figure 11**). The nearest known CTS-occupied pond, Pond 41, is located approximately 2.02 km from the 2015 Master Plan site (Burleson Consulting and DD&A, 2017).

USFWS considers suitable upland aestivation habitat within two kilometers of known or potential breeding locations for CTS as occupied habitat unless protocol-level surveys pursuant to the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* are conducted with negative results (USFWS and CDFW, 2003). The project site (i.e., 2015 Master Plan or Phase 2) is not located within two kilometers of any aquatic resources known or with the potential to be occupied by CTS (**Figure 12**).

In some instances, CDFW applies a four-zone methodology to in considering the relative impact of a project to CTS and suitable upland habitat, as follows:

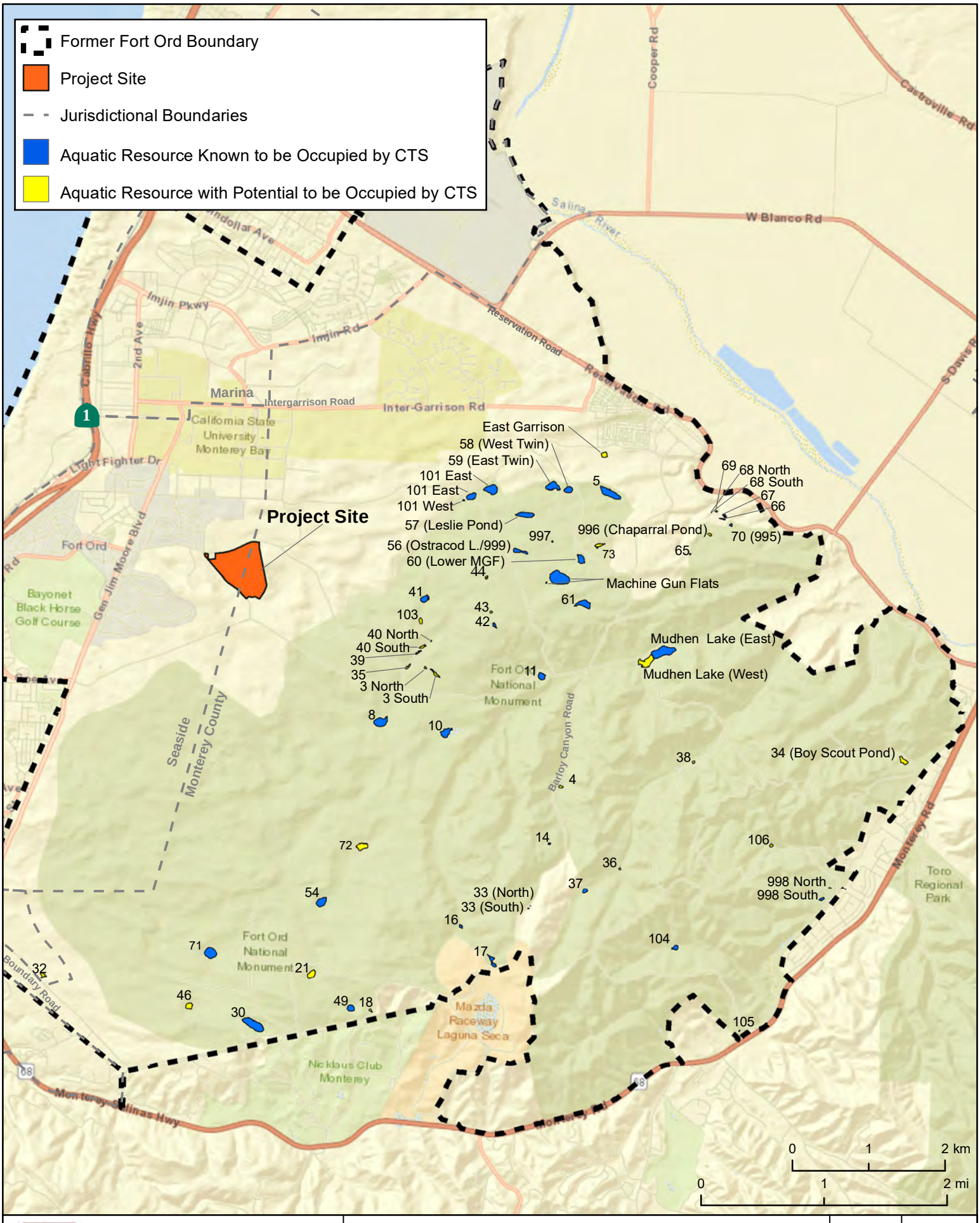
- Zone 1: 380 meters (0.24 mile) – the distance that greater than 50% of dispersing CTS adults and approximately 50% of dispersing CTS sub-adults will travel from the breeding pond;
- Zone 2: 630 meters (0.39 mile) – the distance within which greater than 95% of dispersing CTS are found;
- Zone 3: 1 km (0.62 mile) – the distance that ongoing studies have shown a that adults and juveniles routinely move; and
- Zone 4: 2.2 km (1.3 miles) – the greatest distance adults have been found to move from a breeding site.

A portion of the 2015 Master Plan is located within 2.2 kilometers of known and potential CTS breeding ponds, specifically within Zone 4 (**Figure 12**). **Figure 12** and **Table 4-4** present the area of vegetation types within the site that fall within this zone. The Phase 2 site is outside the 2.2 km known dispersal range of CTS and this species is therefore unlikely to occur within this site.

Based on this analysis, CTS is unlikely to occur within the Phase 2 site and has a low potential to occur within the 2015 Master Plan site.

Table 4-4. Area of Potential CTS Habitat within the 2015 Master Plan Site

Vegetation Type	2015 Master Plan (Acres)		
	Buildout Area	**Preserved Area**	**Total**
Coast Live Oak Woodland	3.43	3.69	**7.12**
Central Maritime Chaparral	0.86	8.79	**9.65**
Central Coastal Scrub	0	0.01	**0.01**
Total	**4.29**	**12.49**	**16.78**



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Former Fort Ord CTS Aquatic Resources

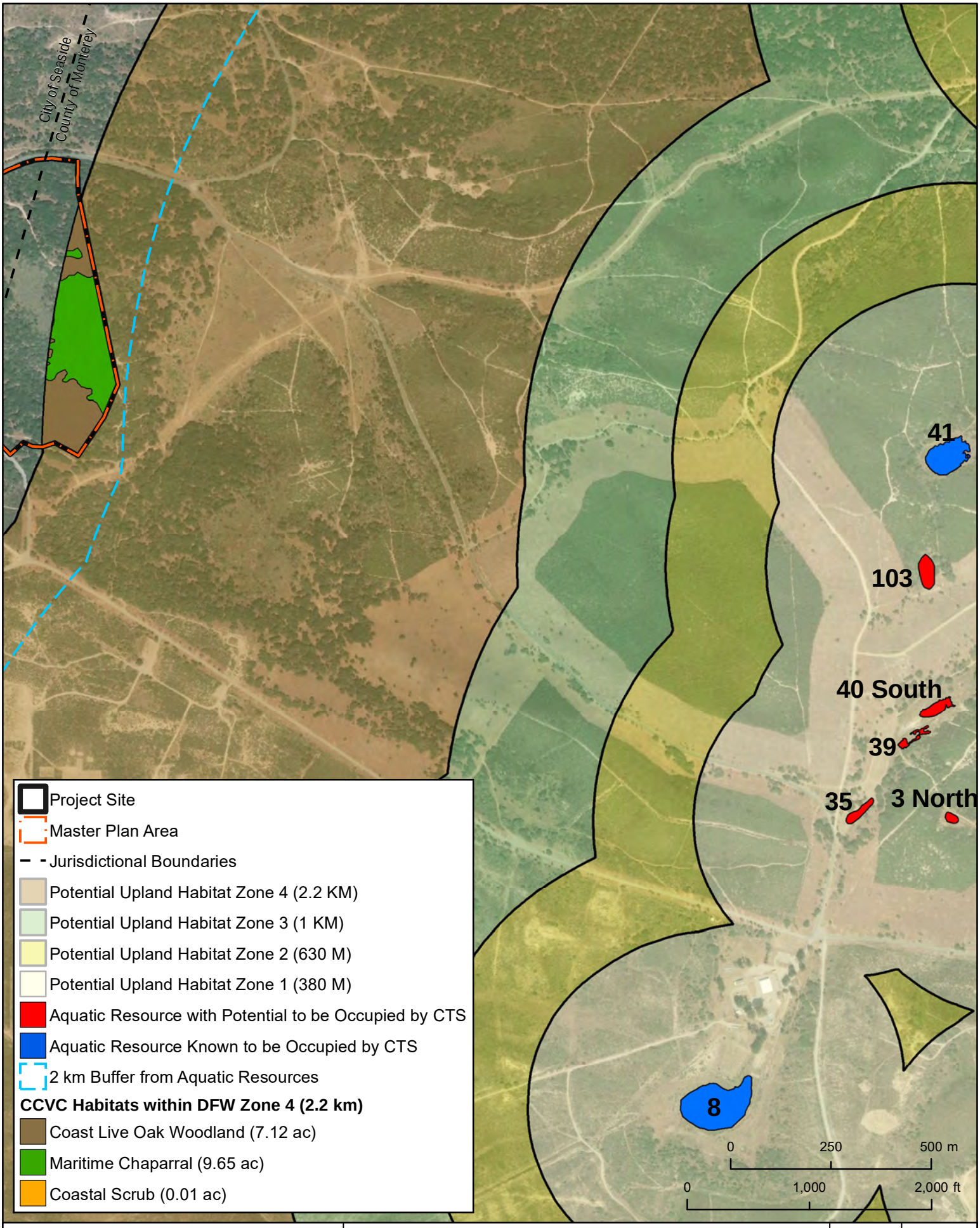
N

Date 01-07-2019

Scale 1 in = 1 mi

Figure 11

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 6 - CTS on Fort Ord.mxd



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Potential and Known CTS Upland and Aquatic Habitat

Date 03-01-2019

Scale 1 in = 0.2 mi

Figure 12

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 7 - CTS Habitat Map_CDFW.mxd

Northern California Legless Lizard

The Northern California legless lizard is a CDFW species of special concern, as well as a HMP species.[10] This fossorial (burrowing) species typically inhabits sandy or loose (friable) soils. Habitats known to support Northern California legless lizard include (but are not limited to) coastal dunes, valley and foothill grasslands, chaparral, and coastal scrub at elevations from near sea level to approximately 1800 meters (6000 feet). The Northern California legless lizard forages on invertebrates beneath the leaf litter or duff layer at the base of bushes and trees or under wood, rocks, and slash in appropriate habitats. The diet of this species likely overlaps to some extent with that of juvenile alligator lizards and perhaps some other salamanders. This species may be preyed upon by alligator lizards, snakes, birds, and small mammals. Little is known about the specific habitat requirements for courtship and breeding; however, the mating season for this species is believed to begin late spring or early summer, with one to four live young born between September and November.

The CNDDB reports 50 occurrences of Northern California legless lizard within the seven quadrangles reviewed, and this species has been observed in several areas of Fort Ord. Suitable habitat for Northern California legless lizard is present throughout all undeveloped areas of the project site where appropriate soil conditions occur. Therefore, there is a high potential for the Northern California legless lizard to occur within both the 2015 Master Plan and Phase 2 sites.

Coast Horned Lizard

The coast horned lizard is a CDFW species of special concern. Horned lizards occur in valley-foothill hardwood, conifer, and riparian habitats, as well as in pine-cypress, juniper, chaparral, and annual grass habitats. This species generally inhabits open country, especially sandy areas, washes, flood plains, and wind-blown deposits in a wide variety of habitats. Coast horned lizards rely on camouflage for protection and will often lay motionless when approached. Horned lizards often bask in the early morning on the ground or on elevated objects such as low boulders or rocks. Predators and extreme heat are avoided by burrowing into loose soil. Periods of inactivity and winter hibernation are spent burrowed into the soil or under surface objects. Little is known about the habitat requirements for breeding and egg-laying of this species. Prey species include ants, beetles, wasps, grasshoppers, flies, and caterpillars.

The CNDDB reports five occurrences of the coast horned lizard within the seven quadrangles reviewed, the nearest of which is approximately 3.2 km from the project site. Additionally, this species has been observed throughout Fort Ord by DD&A biologists. Suitable habitat for this species is present within the project site within central maritime chaparral and central coastal scrub habitats and within open, sandy areas

[10] The HMP identifies this species as black-legless lizard (*Anniella pulchra* ssp. *nigra*) in order to differentiate it from the previously identified silvery-legless lizard (*A. p.* ssp. *pulchra*). These subspecies are based primarily on phenotypic differences (black-legless lizard being much darker, having fewer scales on the back, and a relatively shorter tail) and very limited genetic work. Further, the range of the black-legless lizard has historically been classified as "restricted to coastal and interior dune sand other areas of sandy soils in the vicinity of Monterey Bay and the Monterey Peninsula" (USFWS, 1998), while the range of silvery-legless lizard has been classified as widespread throughout central California (Parham and Papenfuss, 2008). However, recent genetic studies have revealed five lineages of this species that correspond with different geographic areas of California (Parham and Papenfuss, 2008). These studies do not, however, identify the legless lizards occurring on the coast of Monterey Bay (i.e. the currently designated black-legless lizard) as a separate lineage. Currently, CDFW identifies both subspecies as the Northern California legless lizard and this document, therefore, follows the current regulatory identification.

of the non-native grassland and ruderal habitats. Therefore, there is a high potential for the coast horned lizard to occur within both the 2015 Master Plan and Phase 2 sites.

California Red-Legged Frog

The California red-legged frog (CRLF) was listed as a federally threatened species on June 24, 1996 (61 FR 25813-25833) and is also a CDFW species of special concern. Critical habitat was designated for CRLF on April 13, 2006 (71 FR 19244-19346) and revised on March 17, 2010 (75 FR 12816-12959). The revised critical habitat went into effect on April 16, 2010.

The CRLF is the largest native frog in California (44-131 mm snout-vent length) and was historically widely distributed in the central and southern portions of the state (Jennings & Hayes, 1994). Adults generally inhabit aquatic habitats with riparian vegetation, overhanging banks, or plunge pools for cover, especially during the breeding season (Jennings and Hayes, 1988). They may take refuge in small mammal burrows, leaf litter, or other moist areas during periods of inactivity or to avoid desiccation (Rathbun, et al., 1993; Jennings and Hayes, 1994). Radio telemetry data indicates that adults engage in straight-line breeding season movements irrespective of riparian corridors or topography and they may move up to two miles between non-breeding and breeding sites (Bulger et. al., 2003). During the non-breeding season, a wider variety of aquatic habitats are used including small pools in coastal streams, springs, water traps, and other ephemeral water bodies (USFWS, 1996). CRLF may also move up to 300 feet from aquatic habitats into surrounding uplands, especially following rains, where individuals may spend days or weeks (Bulger et al., 2003).

This species requires still or slow-moving water during the breeding season where it can deposit large egg masses, which are most often attached to submergent or emergent vegetation. Breeding typically occurs between December and April depending on annual environmental conditions and locality. Eggs require six to 12 days to hatch and metamorphosis generally occurs after 3.5 to seven months, although larvae are also capable of over-wintering. Following metamorphosis, generally between July and September, juveniles are 25-35 mm in size. Juvenile CRLF appear to have different habitat needs than adults. Jennings and Hayes (1988) recorded juvenile frogs mostly from sites with shallow water and limited shoreline or emergent vegetation. Additionally, it was important that there be small one-meter breaks in the vegetation or clearings in the dense riparian cover to allow juveniles to sun themselves and forage, but to also have close escape cover from predators. Jennings and Hayes also noted that tadpoles have different habitat needs and that in addition to vegetation cover, tadpoles use mud. It is speculated that CRLF larvae are algae grazers, however, foraging larval ecology remains unknown (Jennings, et. al., 1993).

It has been shown that occurrences of CRLF are negatively correlated with presence of non-native bullfrogs (Moyle, 1973; Jennings and Hayes, 1986 and 1988), although both species are able to persist at certain locations, particularly in the coastal zone. It is estimated that CRLF has disappeared from approximately 75% of its former range and has been nearly extirpated from the Sierra Nevada, Central Valley, and much of southern California (USFWS, 1996).

The CNDDB reports 53 occurrences of CRLF within the seven quadrangles reviewed, the nearest reported approximately 8.5 km north of the project site, within the Salinas River riparian corridor. As noted above, CRLF may move up to 300 feet from aquatic habitats into surrounding uplands (Bulger et al., 2003); however, no aquatic breeding, aquatic non-breeding, or optimal dispersal habitat is present within the

project site, and no aquatic resources are present within 300 feet of the project site (**Figure 13**). The nearest known breeding pond on former Fort Ord is approximately 8.3 km from the project site, and the nearest potential breeding pond is approximately 2.02 km from the site, beyond the general distance provided by USFWS for CRLF site assessments (USFWS and CDFW, 2005; **Figure 13**). This species is therefore unlikely to occur within the project site.

Obscure and Western Bumble Bees

The obscure bumble bee is on the CNDDB list of "special animals." Native to the west coast of the United States, this species occurs primarily along the coast in grassy prairies and meadows within the Coast Ranges. It can nest both under and above ground, and is found in areas which are relatively humid or frequently foggy. Recent data suggest that the obscure bumble bee is currently experiencing very high population decline throughout its entire range (Hatfield et al, 2014). However, this species can be easily overlooked because of its close resemblance to other common bees, which may be a factor in its apparent decline. Therefore, there is uncertainty if the species is truly experiencing a population decline.

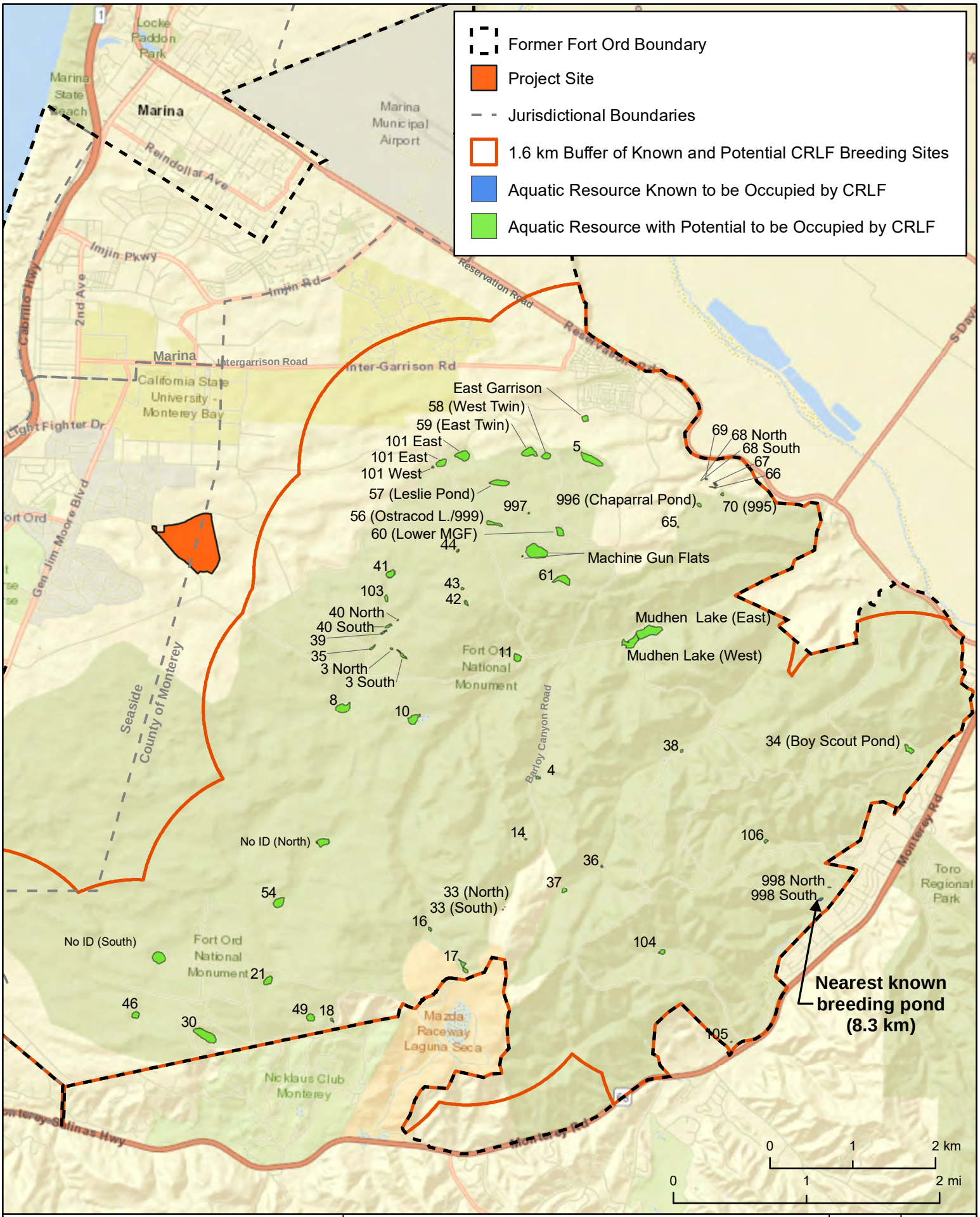
The western bumble bee is on the CNDDB list of "special animals." This species occurs in open grassy areas, urban parks, urban gardens, chaparral, and meadows, and it generally nests underground. Like the obscure bumble bee, it has been experiencing recent population decline throughout most of its range, much of it caused by pathogens and parasites. Other stressors include habitat loss and alteration due to agricultural intensification, urban development, conifer encroachment, grazing, logging, and climate change.

Suitable habitat for these species is present within the non-native grassland in the 2015 Master Plan site. Only low-quality habitat for these species is present within the Phase 2 site where ruderal areas are dominated by non-native grasses and forbs. The CNDDB reports four occurrences of the obscure bumble bee and six occurrences of the western bumble bee within the quadrangles reviewed, the nearest occurrences approximately 10 km and 8.3 km from the project site, respectively. Therefore, these species have a low potential to occur within the Phase 2 site and a moderate potential to occur within the 2015 Master Plan site.

Nesting Raptors and Other Protected Avian Species

Raptors, their nests, and other nesting birds are protected under the MBTA and California Fish and Game Code. While the life histories of these species vary, overlapping nesting (approximately February through August) and foraging similarities allow for their concurrent discussion. Most raptors are breeding residents throughout most of the wooded portions of the state. Stands of live oak, riparian deciduous, or other forest habitats, as well as open grasslands, are used most frequently for nesting. Breeding occurs February through August, with peak activity May through July. Prey for these species includes small birds, small mammals, and some reptiles and amphibians. Many raptor species hunt in open woodland and habitat edges.

Various species of raptors, such as red-tailed hawk, red-shouldered hawk, great horned owl, American kestrel, and turkey vulture, have a potential to nest within any of the large coast live oak trees present within the project site.



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CRLF Aquatic Resources

N

Date 03-01-2019

Scale 1 in = 0.9 mi

Figure 13

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Several special-status avian species are known or have the potential to occur within the project site. Cooper's hawk has been observed on the project site and has the potential to nest within the coast live oak woodland (eBird, 2019). In addition, suitable nesting and foraging habitat is present for the white-tailed kite, oak titmouse, Nuttall's woodpecker, Lawrence's goldfinch, wrentit, Allen's hummingbird, spotted towhee, and California horned lark. The rufous hummingbird may also forage over any of the undeveloped areas within the site; however, this species does not nest in California.

4.2.2 Special-Status Plant Species

As identified in Section 3.0 "Methods," focused botanical surveys for special-status plant species were conducted within the entire project site in 2010 and 2011 and within the Phase 1 site (including a portion that overlaps with the Phase 2 site) in 2013 and 2014. Give the resources agencies' survey protocols and that Phase 1 was constructed in 2015, the results of biological surveys prior to 2015 do not reflect current conditions. The analysis of special-status plant species within the Phase 2 site and 2015 Master Plan area is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. To provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results. As phases are proposed approximately every 10 years, future phases of the 2015 Master Plan will be required to conduct biological surveys and analyses.

Table 4-5 outlines the special-status plant species that were observed within the proposed project site during the previous survey efforts. In addition, **Table 4-5** identifies species with a high to moderate potential to occur within the project site that were not considered special-status by CNPS, CDFW, or USFWS at the time of the previous surveys (i.e., Fort Ord spineflower and northern curly-leaved monardella). A discussion of each of these species is also provided below. Suitable habitat for several other special-status plant species is present within the project site; however, because these species were not found within the project site during previous surveys, their potential to occur is low and they are not discussed within this section (**Appendix C**).

Table 4-5. Potential for Special-Status Plant Species Presence within the Project Site

Species	2015 Master Plan	Phase 2
Hooker's manzanita	Present	Low
Sandmat manzanita	Present	Low
Monterey ceanothus	Present	Low
Fort Ord spineflower	High	High
Monterey spineflower	Present	Present
Virgate eriastrum	High	High
Northern curly-leaved monardella	Moderate	Low
Bold indicates Fort Ord HMP Species.		

Hooker's Manzanita

Hooker's manzanita is a CNPS CRPR 1B and HMP species in the Ericaceae family. This evergreen shrub blooms from January to June and is associated with closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub habitats on sandy soils at a range of 85-536 meters in elevation.

Two Hooker's manzanita individuals were identified within the 2015 Master Plan site during focused botanical surveys in 2010 and 2011 (DD&A, 2013; **Figure 9**). One individual was identified within the maritime chaparral while the other was observed within the non-native grassland on the margin of coast live oak woodland. This species was not observed within the Phase 2 site during the surveys. Suitable habitat for Hooker's manzanita is present within the 2015 Master Plan and Phase 2 sites.

Sandmat Manzanita

Sandmat manzanita is a CNPS CRPR 1B and HMP species in the Ericaceae family. This evergreen shrub blooms from February to May and is associated with openings in chaparral, coastal scrub, closed cone coniferous forest, coastal dunes, and cismontane woodland habitats on sandy soils at elevations between 3-205 meters.

A CNDDB occurrence of sandmat manzanita includes most of the project site. One individual sandmat manzanita was identified within the non-native grassland on the margin of coast live oak woodland in the 2015 Master Plan site during focused botanical surveys in 2010 and 2011 (DD&A, 2013; **Figure 9**). This species was not observed within the Phase 2 site during the surveys. Suitable habitat for sandmat manzanita is present within the 2015 Master Plan and Phase 2 sites.

Monterey Ceanothus

Monterey ceanothus is a CNPS CRPR 4 and HMP species in the Rhamnaceae family. This evergreen shrub blooms from February to April (sometimes through June) and is associated with closed-cone coniferous forests, chaparral, and coastal scrub on sandy soils at elevations between 3-550 meters.

The CNDDB does not report any occurrences of this species within the quadrangles reviewed; however, it is known to occur throughout the former Fort Ord. Monterey ceanothus was not identified within the project site during focused botanical surveys in 2010 or 2011 (DD&A, 2013); however, suitable habitat for Monterey ceanothus is present within the 2015 Master Plan and Phase 2 sites.

Fort Ord Spineflower

Fort Ord spineflower is a CNPS CRPR 1B species in the Polygonaceae family. This annual herb blooms from April to July and is associated with sandy openings of maritime chaparral and coastal scrub at elevations of 55-150 meters.

The CNDDB reports five occurrences of this species within the quadrangles evaluated, the nearest occurrence reported approximately 1.4 km from the project site. This species was first described in 2014 (Jepson Flora Project, 2019) and was added as a CRPR species in 2017 (CNPS, 2019). Therefore, it was not included in 2010 or 2011 surveys. However, Fort Ord spineflower is known to occur in other areas of the former Fort Ord and suitable habitat for this species is present within the maritime chaparral and central coastal scrub within the 2015 Master Plan and Phase 2 sites.

Monterey Spineflower

Monterey spineflower and is a federally threatened, CNPS CRPR 1B, and HMP species. It is a small, prostrate annual herb in the Polygonaceae family that blooms from April to June. Monterey spineflower typically occurs on open sandy or gravelly soils on relic dunes in coastal dune, coastal scrub, and maritime

chaparral habitats, though it can also be associated with cismontane woodlands and valley and foothill grasslands, within a range of 3-450 meters in elevation.

The CNDDB reports an occurrence of this species that includes most of the project site. Monterey spineflower was identified within the non-native grassland and central coastal scrub in the Phase 2 and 2015 Master Plan sites during the 2011 and 2014 botanical surveys (DD&A, 2013; ECORP, 2014; **Figures 9** and **10**). Suitable habitat for Monterey spineflower is present within the 2015 Master Plan and Phase 2 sites.

Virgate Eriastrum

Virgate eriastrum is a CNPS CRPR 4 species in the Polemoniaceae family. This annual herb blooms from May to July and is associated with chaparral, coastal scrub, and coastal dunes on sandy soils at elevations of 45-700 meters.

The CNDDB does not report any occurrences of this species; however, virgate eriastrum was observed within the Phase 1 site during 2014 botanical surveys, including a portion of the area that overlaps with the Phase 2 site (ECORP, 2014). The Phase 1 IS/EA identifies the location of only the densest portion of the population but notes that this species was observed throughout the Phase 1 site as individuals. Suitable habitat for virgate eriastrum is present within the maritime chaparral and central coastal scrub habitats within the 2015 Master Plan and Phase 2 sites.

Northern Curly-leaved Monardella

Northern curly-leaved monardella is a CNPS CRPR 1B species in the Lamiaceae family. It is an annual herb which blooms from April to September and is associated with chaparral, coastal dunes, coastal scrub, and lower montane coniferous forests on sandy soils at elevations of zero to 300 meters.

The CNDDB reports a 2013 occurrence of northern curly-leaved monardella adjacent to the project site. This species was added as a CRPR species in 2013 (CNPS, 2019) and therefore was not included in the focused botanical surveys in 2010 or 2011. However, it was included in the ECORP surveys in 2014. Suitable habitat suitable habitat for this species is present within the maritime chaparral and central coastal scrub within the 2015 Master Plan and Phase 2 sites.

4.3 Sensitive Habitats

The project site was evaluated for the presence of sensitive habitat. One sensitive habitat, central maritime chaparral, was identified within the 2015 Master Plan site (**Figure 8**). No sensitive habitats were identified within the Phase 2 site.

4.3.1 Central Maritime Chaparral

Central maritime chaparral habitat is identified as a sensitive habitat on the CDFW's *California Natural Communities List* (CDFW, 2018b) and in the HMP. Approximately 11 acres of central maritime chaparral occurs within the 2015 Master Plan site, but this habitat does not occur within the Phase 2 site (**Figure 8; Tables 4-1 and 4-2**).

5.0 IMPACTS AND MITIGATION MEASURES

5.1 Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS;
c. Have a substantial adverse effect on State or Federally protected wetlands (including, but not limited to, march, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means;
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites;
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.2 Approach to Analysis

The following impact analysis addresses direct and indirect impacts that may result from the construction and operation of the proposed project (i.e., 2015 Master Plan and Phase 2). Direct impacts are those effects of a project that occur at the same time and place of project implementation, such as removal of habitat from ground disturbance. Indirect impacts are those effects of a project that occur either later in time or at a distance from the project location but are reasonably foreseeable, such as loss of aquatic species from upstream effects on water quality. Direct and indirect impacts can also vary in duration and result in temporary, short-term, and long-term effects on biological resources. A temporary effect would occur only during the activity. A short-term effect would last from the time an activity ceases to some intermediate period of approximately one to five years (i.e., repopulation of habitat following restoration). A long-term or permanent effect would last longer than five years after an activity ceases. Long-term effects may include the ongoing maintenance and operation of a project, or may result in a permanent change in the condition of a resource, in which case it could be considered a permanent impact.

The biological analysis herein includes a comprehensive, detailed analysis of the biological resources present, or with the potential to occur, within the proposed project. As described in the "Project Description" section, the proposed project is anticipated to be constructed in multiple phases. Phase 2 of the 2015 Master Plan is currently under design and construction is anticipated to commence in late 2019 or early 2020. Therefore, the potential impacts to biological resources are analyzed at a programmatic level for the build-out of the 2015 Master Plan, and at a project level for the implementation of Phase 2.

The project site is located within parcels designated by the HMP as "development." Through implementation of the HMP, impacts to HMP species and habitats occurring within the designated development parcels were anticipated and mitigated through the establishment of habitat reserves and corridors and the implementation of habitat management requirements within habitat reserve parcels on former Fort Ord. As described above, parcels designated as "development" have no management restrictions. However, the 2017 Programmatic BO and HMP require the identification of sensitive biological resources within these parcels that may be salvaged for use in restoration activities in reserve areas (USFWS, 2017b and ACOE, 1997).

The HMP species that are known or have a moderate to high potential to occur within the proposed project site include Hooker's manzanita, sandmat manzanita, Monterey ceanothus, Monterey spineflower, CTS, Northern California legless lizard, and Monterey ornate shrew. With the designated habitat reserves and corridors and habitat management requirements of the HMP in place, the loss of these species is not expected to jeopardize the long-term viability of these species and their populations on the former Fort Ord (USFWS, 1993). This is such because the recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and deed covenants. In addition to the HMP species identified, impacts to sensitive central maritime chaparral habitat are also addressed in the HMP and, therefore, impacts to this habitat are also considered mitigated through the implementation of the HMP based on the same conclusions. The proposed project is:

1. Only proposing development activities within designated development parcels;
2. Required to comply with the habitat management restrictions identified in the HMP; and
3. Would not result in any additional impacts to HMP species and habitats beyond those anticipated in the HMP.

Therefore, no additional mitigation measures for these HMP species or central maritime chaparral habitat are required. Impacts to these special-status species and central maritime chaparral are considered less-than-significant. The HMP and 2017 Programmatic BO require the identification of sensitive biological resources within development parcels that may be salvaged for use in restoration activities in habitat reserve areas. CalVet is required to implement HMP requirements in accordance with the deed covenants, which apply to both parcels within the project site. Therefore, this analysis assumes that salvage of HMP species will be conducted in accordance with this requirement.

However, as described above, the HMP does not exempt existing or future land recipients, including CalVet, from the federal and state requirements of ESA and CESA. Of the eight HMP species known or with a moderate to high potential to occur within the project site, one federal and state listed wildlife species, CTS, has a moderate potential to be impacted by the 2015 Master Plan and may require take authorization from USFWS and CDFW. Additionally, Monterey spineflower, a federally listed plant species, is known to occur within the Phase 2 and 2015 Master Plan sites. As described in Section 3.6 "Regulatory Setting", if there is the potential for incidental take of a federally listed fish or wildlife species, take of listed species can be authorized through either the Section 7 consultation process for federal actions, or a Section 10 incidental take permit process for non-federal actions. Federal agency actions include activities that are on federal land, conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits). This analysis assumes that Phase 2 and future phases of the CCCVC would receive federal funding, and, therefore, would be required to comply with Section 7 of the ESA. The

ESA does not prohibit incidental take of federally listed plant species. Authorization for the incidental take of state listed wildlife and plant species can be obtained through the Section 2018 permit process of CESA.

It is also important to note that CTS is a covered species in the Draft Fort Ord HCP. When the HCP is approved and the ESA and CESA incidental take permits are issued, the incidental take of this species for projects within development parcels would be authorized base-wide, and project-specific permits would not be required. It is anticipated that these base-wide federal and state permits will be issued in late 2019 or early 2020, prior to the construction of Phases 3-11 of the 2015 Master Plan. In the event that base-wide permits are not issued, impacts resulting in take of CTS in future phases would need to be authorized by the USFWS and CDFW through the issuance of an incidental take permit from CDFW and Section 7 consultation with the USFWS to avoid violation of the ESA and CESA.

CRLF, a federally listed HMP species, was also evaluated within this report; however, as described in the "Results" section, this species is unlikely to occur within the project site. As such, no impacts to CRLF are expected to occur as a result of the proposed project and this species is not discussed further.

Where suitable habitat exists within the project site, the proposed project has the potential to impact special-status species that were not addressed in the HMP. The non-HMP species that are known or have a moderate to high potential to occur within and be impacted by the project include Fort Ord spineflower, virgate eriastrum, northern curly-leaved monardella, special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, obscure bumble bee, western bumble bee, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird).

Seaside Municipal Code and Monterey County Code regulate impacts to protected trees, including coast live oak trees. The project site is located with the limits of the Seaside and the County; however, the property is owned by the State of California. Although the State is not required to comply with local ordinances and policies, it will do so when feasible. The State has decided to use a combination of local ordinances (i.e., Seaside and County) to reduce impacts associated with the loss of coast live oaks trees within the project site.

The 2015 Master Plan identifies guidelines that would reduce impacts to sensitive biological resources (see below). The impact analysis assumes that these guidelines will be implemented; however, additional mitigation measures may be required to reduce impacts to sensitive biological resources to a less-than-significant level and are identified herein where necessary. The 2015 Master Plan proposes the following guidelines related to biological resources:

> The landscape design incorporates the USDVA mission of sustainability by using drought tolerant native plantings and incorporating the natural oak woodlands and coastal scrub. The design strategy includes primarily California coastal native plants, as well as some adapted non-invasive trees, shrubs, groundcovers, and perennials, that require no irrigation once established (**Figure 5**). These plants reflect the character of Seaside and the surrounding region of the County and meet the necessary demand of low water usage. The cemetery has minimal water allocation that would not support the traditional lawns of most cemeteries. The landscape is designed to maximize the

diversity of plant species and to provide year-round interest and season variation. Hardscape complements plant materials in areas where vehicular or heavy foot traffic is anticipated.

5.3 Areas of No Impact

Criterion "c" is not evaluated for construction or operational impacts to State or Federally protected wetlands as there are none present within or adjacent the project site, and thus, would not be impacted by the proposed project.

5.4 Impacts and Mitigation Measures

Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

2015 Master Plan

As described in the "Approach to Analysis", the 2015 Master Plan is evaluated at a programmatic level in this report. Implementation of the 2015 Master Plan would result in direct and indirect impacts to special-status plant and wildlife species and their habitat, including special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, Monterey ornate shrew, California tiger salamander, Northern California legless lizard, coast horned lizard, obscure bumble bee, western bumble bee, nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird), Hooker's manzanita, sandmat manzanita, Fort Ord spineflower, Monterey spineflower, virgate eriastrum, and northern curly-leaved monardella.

Impacts to special-status species could include direct and indirect impacts associated with heavy equipment and construction activities and operation and maintenance activities that could result in the loss of individuals, soil compaction, dust, vegetation removal/loss of habitat, wildlife harassment or mortality, root damage, erosion, destruction or disturbance of nests, and introduction and spread of non-native, invasive species. These are potentially significant impacts that can be reduced to a less-than-significant level with implementation of the mitigation measures identified in below.

HMP Special-Status Species

Implementation of the 2015 Master Plan could result in impacts to the following HMP species: Hooker's manzanita, sandmat manzanita, Monterey spineflower, Monterey ornate shrew (i.e., within coast live oak woodland, central maritime chaparral, central coastal scrub, and non-native grassland habitats), CTS (i.e., within portions of the coast live oak woodland, central maritime chaparral, and central coastal scrub habitats), and Northern California legless lizard (i.e., within coast live oak woodland, central maritime chaparral, central coastal scrub, non-native grassland, and ruderal habitats). Because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional HMP species could disperse and colonize the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. As described in the "Approach to Analysis", impacts to special-status plant and wildlife species addressed in the HMP are considered less-than-significant.

While not required to reduce a significant impact, **Mitigation Measures BIO-1** and **BIO-2** will be implemented to further reduce this less-than-significant impact. These measures would require that sensitive biological resources are identified in future phases of the CCCVC in advance of construction (**Mitigation Measure BIO-1**) and that compliance with the ESA and/or CESA occurs when necessary and in advance of construction of future phases of the CCCVC (**Mitigation Measure BIO-2**). Per the HMP and the 2017 Programmatic BO requirements in deed covenants**, Mitigation BIO-1** acknowledges that CalVet will identify sensitive biological resources within all future phases prior to any construction to determine whether salvage is feasible and if so, seed and topsoil salvage would occur to support reseeding and restoration efforts on- or off-site. Additionally, in the absence of an approved based-wide incidental take permit, impacts resulting from future phases to species listed as threatened or endangered by CDFW and/or the USFWS may also require agency consultation and/or incidental take permits. Therefore, although these species are HMP species, **Mitigation Measures BIO-2** acknowledges that the take of these species is prohibited under the ESA and/or CESA and may require Section 7 consultation or other authorization. Impacts resulting in take of these species would need to be authorized by the USFWS and/or CDFW through the issuance of incidental take permits or Biological Opinions from the applicable agency to avoid violation of the ESA and/or CESA.

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat; HMP special-status species and habitats would also benefit from the implementation of these measures. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Please see the "Non-HMP Special-Status Species" discussion below for details regarding these measures.

Therefore, potential impacts to HMP special-status species and habitat resulting from implementation of the 2015 Master Plan are less than significant. Implementation of **Mitigation Measures BIO-1** through **BIO-5** would further reduce impacts to these species.

Non-HMP Special-Status Plant Species

Suitable habitat is present for several non-HMP special-status plant species within the 2015 Master Plan site (**Table 4-5**). The non-HMP plant species that are known or have a moderate to high potential to occur within and be impacted by future phases of the CCCVC include Fort Ord spineflower, virgate eriastrum, and northern curly-leaved monardella. However, because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional special-status plant species, including plants that are not currently designated as special-status, could disperse and colonize the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. It would be speculative to determine which special-status plant species may occupy the 2015 Master Plan site in the next 100 years. Therefore, programmatic mitigation measures have been identified to reduce potentially significant impacts to special-status species during the build-out of the 2015 Master Plan to a less-than-significant level. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, includes project-specific biological assessments for future development to determine

presence/absence of special-status species and identification of measures necessary to avoid, minimize, and/or compensate for any identified impacts. Implementation of **Mitigation Measures BIO-3** through **BIO-6** would reduce impacts to non-HMP special-status plant species to a less-than-significant level.

Virgate eriastrum is designated as a CRPR 4 species. As described in the "Methods" section, CRPR 3 and 4 were not included within the analysis as they did not strictly meet the definitions of Section 2062 and 2067 of CESA. Therefore, potential impacts to virgate eriastrum from implementation of the 2015 Master Plan are less than significant.

Non-HMP Special-Status Wildlife Species

Suitable habitat is present for several non-HMP special-status wildlife species within the 2015 Master Plan site (**Table 4-3**). The non-HMP wildlife species that are known or have a moderate to high potential to occur within and be impacted by future phases of the CCCVC include special-status bat species (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, obscure bumble bee, western bumble bee, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird). However, because the 2015 Master Plan would be implemented in several phases over an approximate 100-year period, additional special-status wildlife species, including wildlife that are not currently designated as special-status, could occupy and use the 2015 Master Plan site and, therefore, could be impacted by future phases of the proposed project. It would be speculative to determine which special-status wildlife species may occupy the 2015 Master Plan site in the next 100 years. Therefore, programmatic mitigation measures have been identified to reduce potentially significant impacts to special-status species during the build-out of the 2015 Master Plan to a less-than-significant level. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. Measures to avoid, minimize, and compensate for potential impacts will be recommended. Implementation of **Mitigation Measures BIO-3** through **BIO-6** would reduce impacts to non-HMP special-status wildlife species to a less-than-significant level.

The oak woodland within the 2015 Master Plan site provides suitable nesting habitat for tree-nesting raptors, including the special-status white-tailed kite and Cooper's hawk, and other nesting birds. In addition, several special-status avian species may nest or forage within the site, including coast horned lark (i.e., within non-native grassland, central coastal scrub, and central maritime chaparral habitats), oak titmouse and Nuttall's woodpecker (coast live oak woodland), Lawrence's goldfinch (coast live oak woodland, central coastal scrub, and central maritime chaparral), wrentit (central coastal scrub and central maritime chaparral), spotted towhee (all undeveloped areas of the site), and Allen's hummingbird (coast live oak woodland and central coastal scrub). In addition, rufous hummingbird may forage within undeveloped areas of the site; however, this species does not nest in California. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest would be a significant impact.

Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law and would be a significant impact under CEQA.

The MBTA protects the majority of migrating birds breeding in the U.S., regardless of their official Federal or State listing status under the ESA or CESA. The law applies to the disturbance or removal of active nests occupied by migratory birds during their breeding season. It is specifically a violation of the MBTA to directly kill or destroy an occupied nest of any bird species covered by the MBTA. Fish and Game Code Section 3503 protects the nest and eggs of native non-game birds. Under this law, it is unlawful to take, possess, or destroy any such birds or to take, possess, or destroy the nests or eggs of any such bird. Fish and Game Code Section 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Most of the birds observed or with the potential to occur within the project site are protected under both the MBTA and Fish and Game Code Section 3503, and, in addition, birds may be designated as California species of special concern. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-7**, which includes surveys to identify the presence of active nests prior to construction and measures to avoid active nests if found.

Special-Status Species Habitat

Implementation of the 2015 Master Plan would result in impacts to approximately 37.3 acres of potential habitat for special-status species (**Table 4-2** and **Figure 8**). As discussed in the "Regulatory Setting" section, the Fort Ord HMP establishes guidelines for the conservation and management of species and habitats on former Fort Ord lands by identifying lands that are available for development, lands that have some restrictions with development, and habitat reserve areas. The intent of the plan is to establish large, contiguous habitat conservation areas and wildlife corridors to compensate for future development in other areas of the former base. The HMP identifies what type of activities can occur on each parcel at former Fort Ord and parcels are designated as "development with no restrictions," "habitat reserves with management requirement," or "habitat reserves with development restrictions." The HMP sets the standards to assure the long-term viability of former Fort Ord's biological resources in the context of base reuse so that no further mitigation should be necessary for impacts to species and habitats considered in the HMP. This plan has been approved by USFWS; the HMP, deed restrictions, and Memoranda of Agreement between the Army and various land recipients provide the legal mechanism to assure HMP implementation. It is a legally binding document, and all recipients of former Fort Ord lands are required to abide by its management requirements and procedures.

The HMP anticipates some losses to special-status species and sensitive habitats as a result of redevelopment of the former Fort Ord. With the designated reserves and corridors and habitat management requirements in place, the losses of individuals of species and sensitive habitats considered in the HMP are not expected to jeopardize the long-term viability of those species, their populations, or sensitive habitats on former Fort Ord. Recipients of disposed land with restrictions or management guidelines designated by the HMP will be obligated to implement those specific measures through the HMP and through deed covenants. Approximately 18,500 acres of the former Fort Ord will be preserved in permanent open space through implementation of the HMP.

In addition, the proposed project includes the preservation of approximately 31.7 acres of habitat within the 2015 Master Plan site, which accounts for almost half of the 2015 Master Plan site.

The project is proposed within designated development parcels. Therefore, implementation of the 2015 Master Plan would not have a significant impact on special-status species habitat, particularly when taken into context with the over 18,500 acres of preserved habitat for special-status species within the former Fort Ord and approximately 31.7 acres of habitat being preserved within the CCCVC site. This is a less-than-significant impact. No mitigation is required.

Phase 2

As described in the "Approach to Analysis", Phase 2 is evaluated at a project level in this report. Implementation of Phase 2 would result in direct and indirect impacts to special-status plant and wildlife species and their habitat, including special-status bats (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, Monterey ornate shrew, Northern California legless lizard, coast horned lizard, nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird), Fort Ord spineflower, Monterey spineflower, and virgate eriastrum.

HMP Special-Status Species

Implementation of Phase 2 could result in impacts to the following HMP species: Monterey ornate shrew, Northern California legless lizard, and Monterey spineflower. As described in the **Approach to Analysis**, impacts to special-status plant and wildlife species addressed in the HMP are considered less-than-significant. While not required to reduce a significant impact, **Mitigation Measures BIO-1** and **BIO-2** described above will be implemented to further reduce this less-than-significant impact per HMP and the 2017 Programmatic BO requirements in deed covenants. These measures would require that sensitive biological resources are identified in future phases of the CCCVC, including Phase 2, in advance of construction (**Mitigation Measure BIO-1**), and that compliance with the ESA and/or CESA occurs when necessary and in advance of construction of future phases of the CCCVC, including Phase 2 (**Mitigation Measure BIO-2**).

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat; HMP special-status species and habitats would also benefit from the implementation of these measures. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Please see the **Non-HMP Special-Status Species** discussion below for details regarding these measures.

Therefore, potential impacts to HMP special-status species and habitat resulting from implementation of Phase 2 are less than significant. Implementation of **Mitigation Measures BIO-1** through **BIO-5** would further reduce impacts to these species.

Non-HMP Special-Status Plant Species

Suitable habitat is present for several non-HMP special-status plant species within the Phase 2 site (**Table 4-5**). The non-HMP plant species that are known or have a moderate to high potential to occur within and

be impacted by Phase 2 include Fort Ord spineflower and virgate eriastrum. This is a potentially significant impact. As identified in the "Methods" section, focused surveys for special-status plants have not been conducted within the Phase 2 site since 2014. The analysis of special-status plant species within the Phase 2 site is based on previous surveys and existing habitat conditions documented during the 2016 and 2019 survey efforts. However, given the resource agencies' protocols, and to provide the most accurate analysis of the sensitive plant resources that may occur on the project site, additional special-status plant surveys will be conducted within the Phase 2 site in spring and summer of 2019 to determine current site conditions, and an addendum to this report will be prepared to reflect the survey results. **Mitigation Measure BIO-8** requires special-status plant survey(s) be conducted during the appropriate identification period(s), identify potential impacts and appropriate mitigation, and prepare a report describing the results of the survey(s). This measure also requires the implementation of **Mitigation Measures BIO-1** and **BIO-2** if HMP plant species are observed and have the potential to be impacted by Phase 2. **Mitigation Measures BIO-3, BIO-4,** and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat and would apply to Phase 2. While programmatic in nature, these measures will be applied at the project-level to reduce potential impacts to non-HMP special-status plant species. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls. Therefore, potentially significant impacts to non-HMP special-status plant species would be reduced to a less-than-significant level with implementation of **Mitigation Measures BIO-3** through **BIO-5** and **BIO-8**.

Virgate eriastrum is designated as a CRPR 4 species. As described in the "Methods" section, CRPR 3 and 4 were not included within the analysis as they did not strictly meet the definitions of Section 2062 and 2067 of CESA. Therefore, potential impacts to virgate eriastrum from implementation of Phase 2 are less than significant.

Non-HMP Special-Status Wildlife Species

Suitable habitat for several non-HMP special-status wildlife species is present within the Phase 2 site (**Table 4-3**). The non-HMP wildlife species that are known or have a moderate to high potential to occur within and be impacted by Phase 2 include special-status bat species (including Townsend's big-eared bat and hoary bat), Monterey dusky-footed woodrat, coast horned lizard, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, California horned lark, oak titmouse, Lawrence's goldfinch, wrentit, Nuttall's woodpecker, spotted towhee, rufous hummingbird, and Allen's hummingbird).

Mitigation Measures BIO-3, BIO-4, and **BIO-5** have been identified to reduce potentially significant impacts to non-HMP special-status species and habitat and would apply to Phase 2. While programmatic in nature, these measures will be applied at the project-level to reduce potential impacts to non-HMP special-status wildlife species. These measures would reduce construction-related impacts through a combination of protective measures during all phases of construction, education, monitoring, and invasive species controls.

The Phase 2 site contains coast live oak woodland habitat that may provide roosting habitat for special-status species bats, such as the Townsend's big-eared bat and hoary bat. Removal of mature oak trees may result in direct impacts to special-status bats, if present at the time of removal. Construction noise, dust, and vibration adjacent to large trees could cause indirect impacts to special-status bats, including roost

abandonment and death of young. It is unlikely that hoary bats birth and rear young in California. As a result, this species will not be breeding within the vicinity of the project site. Impacts to individuals and roosting habitat would be a potentially significant impact. **Mitigation Measure BIO-9** would reduce potential impacts to special-status bat species by requiring avoidance, preservation, and protection of bat species as feasible by requiring pre-construction surveys for potential roost sites and replacement of roost sites if avoidance is not feasible. Implementation of **Mitigation Measures BIO-3** through **BIO-5** and species-specific **Mitigation Measure BIO-9** will reduce potentially significant impacts to special-status bat species to a less-than-significant level through a combination of implementing protective measures during all phases of construction; education; monitoring; avoidance, preservation, and protection of bat species, as identified during pre-construction surveys for potential roost sites, if feasible; and replacement of roost sites if avoidance is not feasible.

The Phase 2 site contains suitable habitat for the Monterey dusky-footed woodrat (i.e., within coast live oak woodland and central coastal scrub habitats) and project implementation could result in direct impacts to individuals and loss of habitat. Construction noise, dust, and vibration adjacent to large trees could cause indirect impacts to Monterey dusky-footed woodrat such as nest abandonment and death of young. This is a potentially significant impact. **Mitigation Measure BIO-10** would reduce potentially significant impacts to Monterey dusky-footed woodrat through avoidance, preservation, and protection of nests, as identified during pre-construction surveys, if feasible; and/or dismantling of nests by qualified biologists if avoidance is not feasible. Implementation of **Mitigation Measures BIO-3** through **BIO-5** and species-specific **Mitigation Measure BIO-10** will reduce potentially significant impacts to Monterey dusky-footed woodrat to a less-than-significant level through a combination of implementing protective measures during all phases of construction; education; monitoring; and avoidance, preservation, and protection of active nests, as identified during pre-construction woodrat nest surveys.

The Phase 2 site contains suitable habitat for the coast horned lizard (i.e., within central coastal scrub and ruderal habitats). Phase 2 implementation could result in direct impacts to individuals and loss of habitat. This is a potentially significant impact. Implementation of **Mitigation Measures BIO-1**, **BIO-2, BIO-3**, which avoid and minimize impacts through implementing construction best management practices, monitoring, and invasive species controls, would reduce potentially significant impacts to the coast horned lizard to a less-than-significant level.

The oak woodland within the Phase 2 site provides suitable nesting habitat for tree-nesting raptors, including the special-status white-tailed kite and Cooper's hawk, and other nesting birds. In addition, several special-status avian species may nest or forage within the site, including coast horned lark (i.e., within central coastal scrub and ruderal), oak titmouse and Nuttall's woodpecker (coast live oak woodland), Lawrence's goldfinch (coast live oak woodland and central coastal scrub), wrentit (central coastal scrub), spotted towhee (all undeveloped areas of the site), and Allen's hummingbird (coast live oak woodland and central coastal scrub). In addition, rufous hummingbird may forage within undeveloped areas of the site; however, this species does not nest in California. Construction-related activities (e.g., trimming and removal of vegetation, and equipment noise, vibration, and lighting) that result in harm, injury, or death of individuals, or abandonment of an active nest would be a significant impact. Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law and would be a significant impact under CEQA. As discussed above, the MBTA protects the majority of migrating birds breeding in the U.S., regardless of their official Federal or State listing status

under the ESA or CESA. The law applies to the disturbance or removal of active nests occupied by migratory birds during their breeding season. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-7**, which includes surveys to identify the presence of active nests prior to construction and measures to avoid active nests if found.

Therefore, potentially significant impacts to non-HMP special-status wildlife species would be reduced to a less-than-significant level with implementation of **Mitigation Measures BIO-3** through **BIO-5, BIO-9**, and **BIO-10**.

Special-Status Species Habitat

Please refer to the discussion under "2015 Master Plan" above. In addition to the preservation areas on the former Fort Ord, Phase 2 would preserve approximately 1 acre of coast live oak woodland on-site.

Phase 2 is proposed within a designated development parcel under the HMP. Therefore, the implementation of Phase 2 would not have a significant impact on special-status species habitat, particularly when taken into context with the over 18,500 acres of preserved habitat for special-status species within the former Fort Ord and approximately 1 acre of habitat being preserved on-site. This is a less-than-significant impact. No mitigation is required.

Mitigation Measure BIO-1: HMP Species Salvage

Prior to each future phase of the 2015 Master Plan, including Phase 2, CalVet shall require that a biological survey of development sites be conducted by a qualified biologist to determine if the development could potentially impact HMP species or potential habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to:

- A description of the biological conditions at the site;
- Identification of the potential for HMP species to occur or HMP species observed, if any; and
- Maps of the locations of HMP species or potential habitat, if observed.

If HMP species that do not require take authorization from the USFWS or CDFW are identified within the development site, salvage efforts for these species will be evaluated by a qualified biologist in coordination with CalVet to further reduce impacts per the requirements of the HMP and Programmatic BO. Where salvage is determined feasible and proposed, seed collection should occur from plants within the development site and/or topsoil should be salvaged within occupied areas to be disturbed. Seeds should be collected during the appropriate time of year for each species by qualified biologists. The collected seeds and topsoil should be used to revegetate temporarily disturbed construction areas and reseeding and restoration efforts on- or off-site, as determined appropriate by the qualified biologist CalVet. For HMP species that require take authorization from the USFWS or CDFW, any additional salvage measures identified in the take authorization(s) shall be followed.

Mitigation Measure BIO-2: ESA and CESA Compliance

If HMP or other species that require take authorization from the USFWS and/or CDFW are identified within the development site, CalVet will comply with the ESA and CESA and obtain necessary authorizations prior to construction of each phase of the 2015 Master Plan, including Phase 2.

Due to the presence and potential presence of Federally listed species on the 2015 Master Plan site and Federal nexus (i.e., Federal funding), the USDVA, acting as the NEPA lead agency for the proposed project, shall be required to initiate a Section 7 consultation with the USFWS and prepare a written analysis in the form of a Biological Assessment (BA) to determine whether their actions may affect a listed or proposed species and designated and proposed critical habitat for each future phase. Based on the BA, the USFWS will issue a Biological Opinion (BO) regarding likely impacts as a result of implementing the proposed future phase. Any further avoidance and minimization measures that may be required as a component of the BA will be implemented.

For potential impacts to State listed species, CalVet will comply with the CESA and consult with the CDFW to determine whether authorization for the incidental take of the species is required prior to construction. If it is determined that authorization for incidental take is required from the CDFW, CalVet will obtain an incidental take permit at the project-level prior to ground-disturbing activities. Permit requirements typically involve preparation and implementation of a mitigation plan and mitigating impacted habitat at a 3:1 ratio through preservation and/or restoration, as described above. CalVet would be required to retain a qualified biologist to prepare a mitigation plan, which will include, but is not limited to, identifying avoidance and minimization measures; mitigation strategy, including a take assessment, compensatory mitigation lands, and success criteria; and funding assurances. CalVet would be required to implement the approved plan and any additional permit requirements.

Alternatively, if the State listed species is covered under the Fort Ord HCP, CalVet can wait to implement the phase, including any ground-disturbing activities, until the Fort Ord HCP is approved and base-wide state incidental take permits are issued. If CalVet chooses the base-wide permit alternative, project-specific, project-specific incidental take permits will not be necessary; however, all applicable requirements of the HCP will be implemented.

Mitigation Measure BIO-3: Construction Best Management Practices

The following best management practices will be implemented during all identified phases of construction (i.e., pre-, during, and post-) to reduce impacts to special-status plant and wildlife species for each phase of the 2015 Master Plan, including Phase 2:

- A qualified biologist will conduct an Employee Education Program for the construction crew prior to any construction activities. The qualified biologist will meet with the construction crew at the onset of construction at the project site to educate the construction crew on the following: 1) the appropriate access route(s) in and out of the construction area and review project boundaries; 2) how a biological monitor will examine the area and agree upon a method which will ensure the safety of the monitor during such activities, 3) the special-status species that may be present; 4) the specific mitigation measures that will

be incorporated into the construction effort; 5) the general provisions and protections afforded by USFWS and CDFW; and 6) the proper procedures if a special-status species is encountered within the project site.

- Trees and vegetation not planned for removal or trimming will be protected prior to and during construction to the maximum possible through the use of exclusionary fencing, such as hay bales for herbaceous and shrubby vegetation, and protective wood barriers for trees. Only certified weed-free straw will be used to avoid the introduction of non-native, invasive species. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact.
- Protective fencing will be placed prior to and during construction to stop construction equipment and personnel from impacting vegetation outside of work limits. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact.
- Following construction, disturbed areas will be restored to pre-project contours to the maximum extent possible and revegetated using locally-occurring native species and native erosion control seed mix, per the recommendations of a qualified biologist.
- Grading, excavating, and other activities that involve substantial soil disturbance will be planned and implemented in consultation with a qualified hydrologist, engineer, or erosion control specialist, and will utilize standard erosion control techniques to minimize erosion and sedimentation to native vegetation (pre-, during, and post-construction).
- No firearms will be allowed on the project site at any time.
- All food-related and other trash will be disposed of in closed containers and removed from the project area at least once a week during the construction period, or more often if trash is attracting avian or mammalian predators. Construction personnel will not feed or otherwise attract wildlife to the area.

Mitigation Measure BIO-4: Construction-Phase Monitoring

The applicant will retain a qualified biologist to monitor all ground disturbing construction activities (i.e., vegetation removal, grading, excavation, or similar activities) to protect any special-status species encountered for each phase of the 2015 Master Plan, including Phase 2. Any handling and relocation protocols of special-status wildlife species will be determined in coordination with CDFW prior to any ground disturbing activities, and will be conducted by a qualified biologist with appropriate scientific collection permit. After ground disturbing project activities are complete, the qualified biologist will train an individual from the construction crew to act as the on-site construction biological monitor. The construction biological monitor will be the contact for any special-status wildlife species encounters, will conduct daily inspections of equipment and materials stored on site and any holes or trenches prior to the commencement of work, and will ensure that all installed fencing stays in place throughout the construction period. The qualified biologist will then conduct regular scheduled and unscheduled visits to ensure the construction biological monitor is satisfactorily implementing all appropriate mitigation protocols. Both the qualified biologist and the construction biological monitor must work through the State Inspector

to cease construction contractor work and/or redirect project activities to ensure protection of resources and compliance with all environmental permits and conditions of the project. The qualified biologist and the construction monitor shall complete a daily log summarizing activities and environmental compliance throughout the duration of the project. The log will also include any special-status wildlife species observed and relocated.

Mitigation Measure BIO-5: Non-Native, Invasive Species Controls

The following measures will be implemented for each phase of the 2015 Master Plan, including Phase 2, to reduce the introduction and spread of non-native, invasive species:

- Any landscaping or replanting required for the project will not use species listed as noxious by the California Department of Food and Agriculture (CDFA) or invasive by the California Invasive Plant Council (Cal-IPC).
- Bare and disturbed soil will be landscaped with CDFA recommended seed mix or plantings from locally adopted species to preclude the invasion on noxious weeds in the project site.
- Construction equipment will be cleaned of mud or other debris that may contain invasive plants and/or seeds and inspected to reduce the potential of spreading noxious weeds, before mobilizing to arrive at the construction site and before leaving the construction site.
- All non-native, invasive plant species will be removed from disturbed areas prior to replanting.

Mitigation Measure BIO-6: Project-Specific Biological Resources Studies (Non-HMP Species)

CalVet shall require that a biological survey of each future phase of the 2015 Master Plan be conducted by a qualified biologist to determine if the development could potentially impact a special-status species or their habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to: 1) a description of the biological conditions at the site; 2) identification of the potential for special-status species to occur or special-status species observed, if any; 3) maps of the locations of special-status species or potential habitat, if observed; and 4) recommended mitigation measures, if applicable.

- If special-status species are determined not to occur at the development site, no additional mitigation is necessary.
- If special-status species are observed or determined to have the potential to occur, the project biologist shall recommend measures necessary to avoid, minimize, and/or compensate for identified impacts. Measures may include, but are not limited to, revisions to the project design and project modifications, pre-construction surveys, construction buffers, construction best management practices, monitoring, non-native species control, restoration and preservation, and salvage and relocation.

Mitigation Measure BIO-7: Pre-Construction Surveys for Protected Avian Species

Construction activities that may directly (e.g., vegetation removal) or indirectly (e.g., noise/ground disturbance) affect protected nesting avian species will be timed to avoid the breeding and nesting season. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Specifically, vegetation and/or tree removal can be scheduled after September 16 and before January 31. Alternatively, a qualified biologist will be retained by the project applicant to conduct pre-construction surveys for nesting raptors and other protected avian species within 500 feet of proposed construction activities if construction occurs between February 1 and September 15. Pre-construction surveys will be conducted no more than 14 days prior to the start of construction activities during the early part of the breeding season (February through April) and no more than 30 days prior to the initiation of these activities during the late part of the breeding season (May through August). Because some bird species nest early in spring and others nest later in summer, surveys for nesting birds may be required to continue during construction to address new arrivals, and because some species breed multiple times in a season. The necessity and timing of these continued surveys will be determined by the qualified biologist based on review of the final construction plans and in coordination with the CDFW, as needed.

If raptors or other protected avian species nests are identified during the pre-construction surveys, the qualified biologist will notify the project applicant and an appropriate no-disturbance buffer will be imposed within which no construction activities or disturbance should take place (generally 500 feet in all directions for raptors; other avian species may have species-specific requirements) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist.

Mitigation Measure BIO-8: Pre-Construction Special-Status Plant Surveys

A qualified biologist shall be retained to conduct special-status plant survey(s) according to USFWS, CDFW, and CNPS protocol for during the appropriate identification period(s) to determine their presence within the Phase 2 site. The biologist shall prepare a report that provides the results of the survey, and, if found the number and locations of individuals/populations identified within the site. If no special-status plant species are found, no further mitigation is necessary. If special-status plant species are found, the following measures shall be implemented:

- Individuals shall be avoided to the maximum extent possible.
- For impacts to the HMP species within the development site that do not require take authorization from USFWS or CDFW, salvage efforts for these species will be evaluated by a qualified biologist in coordination with the contractor to further reduce impacts per the requirements of the HMP and BO, in accordance with **Mitigation Measure BIO-1**.
- If non-HMP special-status plant species are observed and if avoidance is not feasible, species shall be replaced at a 1:1 success ratio for the acreage or individuals impacted (depending on species impacted) and a Rare Plant Restoration Plan shall be prepared by a qualified biologist and implemented. The plan shall include, but is not limited to, the following:

- A description of the baseline conditions of the habitats within the work site, including the presence of any special-status species, their locations, and densities;
- Procedures to control and/or eliminate non-native invasive species within the work site;
- Provisions for ongoing training of facility maintenance personnel to ensure compliance with the requirements of the plan;
- A detailed description of on-site and/or off-site restoration areas, salvage of seed and/or soil bank, plant salvage, seeding and planting specifications, including, if required by the CDFW, increased planting ratio to ensure the 1:1 success ratio; and
- A monitoring program that describes annual monitoring efforts which incorporate success criteria and contingency plans if success criteria are not met.

Mitigation Measure BIO-9: Pre-Construction Surveys for Special-Status Bats

To avoid and reduce impacts to hoary bat and Townsend's big-eared bat, CalVet will retain a qualified bat specialist or wildlife biologist to conduct site surveys during the reproductive season (May 1 through September 15) to characterize bat utilization of the site and potential species present (techniques utilized to be determined by the biologist) prior to any vegetation removal. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Based on the results of these initial surveys, one or more of the following will occur:

- If it is determined that bats are not present at the site, no additional mitigation is required.
- If it is determined that bats are utilizing the site and may be impacted by the proposed project, pre-construction surveys will be conducted within 100 feet of construction limits no more than 30 days prior to any tree removal. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, tree removal may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night).
- If a single bat and/or only adult bats are roosting, removal of trees may proceed after the bats have been safely excluded from the roost. Exclusion techniques will be determined by the biologist and depend on the roost type; the biologist will prepare a mitigation plan for provision of alternative habitat to be approved by CDFW.
- If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) will be postponed until the biologist monitoring the roost(s) determines that the young have fledged and are no longer dependent on the roost. The monitor will ensure that all bats have left the area of disturbance prior to initiation of limbing and/or removal of trees. If avoidance is not possible and a maternity roost must be disrupted, a depredation permit would be required prior to removal of the roost.

Mitigation Measure BIO-10: Pre-Construction Surveys for Monterey Dusky-Footed Woodrat

Not more than thirty (30) days prior to the start of construction (including vegetation removal), a qualified biologist shall conduct a survey of the project sites to locate existing Monterey dusky-footed woodrat nests. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. All Monterey dusky-footed woodrat nests shall be mapped and flagged for avoidance. Graphics depicting all Monterey dusky-footed woodrat nests shall be provided to the construction contractor. Any Monterey dusky-footed woodrat nests that cannot be avoided shall be relocated according to the following procedures:

Each active nest shall be disturbed by the qualified biologist to the degree that the woodrats leave the nest and seek refuge elsewhere. After the nests have been disturbed, the nest sticks shall be removed from the impact areas and placed outside of areas planned for impacts. Nests shall be dismantled during the non-breeding season (between October 1 and December 31), if possible. If a litter of young is found or suspected, nest material shall be replaced and the nest left alone for 2-3 weeks, after this time the nest will be rechecked to verify that young are capable of independent survival before proceeding with nest dismantling.

Impact BIO-2: Substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.

2015 Master Plan

Habitats occurring within the 2015 Master Plan site that are listed as sensitive on the CDFW's *California Natural Communities List* include central maritime chaparral. Within the site, up to 1.3 acres of central maritime chaparral would be permanently removed as a result of project implementation and approximately 10 acres would be preserved.

As stated in the "Approach to Analysis", the implementation of the HMP mitigates for the loss of central maritime chaparral by preserving this habitat within the habitat reserve areas on the former Fort Ord. Therefore, impacts to central maritime chaparral are considered less than significant with the implementation of the HMP. No additional mitigation is required.

Phase 2

No sensitive habitats occur within the Phase 2 site; the project would have no impact on sensitive habitats, and no mitigation is required.

Impact BIO-3: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites.

Wildlife movement corridors are pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or man-made factors, such as urbanization. The fragmentation of natural habitat creates isolated "islands" of vegetation that may not provide sufficient area or resources to accommodate sustainable populations for a number of species, and, therefore, adversely affect both genetic and species diversity. Corridors often

partially or largely mitigate the adverse effects of fragmentation by 1) allowing animals to move between remaining habitats to replenish depleted populations and increase the gene pool available; 2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (e.g., fire and disease) will result in population or species extinction; and 3) serving as travel paths for individual animals moving throughout their home range in search of food, water, mates, and other needs, or for dispersing juveniles in search of new home ranges.

The 2010 Monterey County General Plan EIR identified a number of significant wildlife movement corridors and linkages within the vicinity of the former Fort Ord, including Linkage 308: Fort Ord – Ventana; Linkage 322: Highway 68 Western Crossing; Linkage 350: Sierra de Salinas – Toro Peak; Linkage 339: Salinas Valley Floor; and Linkage 378: Salinas River – Pinnacles National Monument (County, 2010). Of particular importance for wildlife movement from the former Fort Ord lands to outlying areas are Linkages 308 and 322. Specifically, Linkage 322 runs along El Toro Creek in the southeastern portion of former Fort Ord and through a large, bridge undercrossing Highway 68. This corridor has been identified as a significant wildlife corridor for mammals, amphibians, and reptiles moving between former Fort Ord lands and connecting to the Sierra de Salinas and Santa Lucia Ranges.

The HMP considered conservation area connectivity as an essential component of the design of the conservation areas and corridors within the former Fort Ord. The HMP created conservation areas and corridors with the purpose of linking the plant and animal populations in the northern portion of the former base at the Marina Municipal Airport to the populations in the south to the Fort Ord National Monument and the El Toro Creek undercrossing of Highway 68. The implementation of the HMP preserves over 18,500 acres of a variety of habitats supporting a variety of common and special-status plant species, and maintains a north-south wildlife corridor across the former Fort Ord lands to connect with the primary, significant wildlife linkages.

The project site is located in the western portion of the former Fort Ord, adjacent to existing developed areas to the northwest and undeveloped land to the north, east, and south. These undeveloped areas are proposed for future development; however, the parcel to the southwest may be preserved as open space (see **Impact BIO-4** for more details). As discussed in the "Results" section, the project site is in undeveloped land that is comprised of five vegetation units: coast live oak woodland, central maritime chaparral, central coast scrub, non-native grassland, and ruderal/disturbed/landscaped. In addition, the Phase 2 site consists of developed areas. The implementation of the proposed project would involve impacts to these habitat types; however, this location supports wildlife movement, as there are various vegetative communities, vegetative cover, and the adjacency of open space areas with high quality wildlife habitat (ECORP, 2014). The presence of adjacent habitat would likely deter wildlife from concentrating in this area, as they are likely to utilize the adjacent quality habitat.

Barbed-wire fencing is currently in place in some locations around the perimeter of the project site. Vinyl fencing currently surrounds the existing retention basin. Deer were observed within the project site during the 2019 biological survey. Future phases of the 2015 Master Plan, including Phase 2, would include perimeter fencing to match existing fencing; however, the existing fencing is not considered a significant structure that would impede wildlife movement. In addition, the site is surrounded by mostly undeveloped lands, which can be utilized by wildlife. Therefore, habitat within the project site supports species movement on-site and would not substantially interfere with wildlife movement across the site. The

proposed project would impact only a small percentage of wildlife habitat within the former Fort Ord. The HMP preserves approximately 18,500 acres of large, contiguous areas of wildlife habitat that will remain on the former Fort Ord and will be preserved in perpetuity. As a result, the development of the 2015 Master Plan, including Phase 2, would not disconnect, fragment, or otherwise impeded wildlife movement in the primary, significant wildlife movement corridors between the former Fort Ord lands and other lands. This is a less-than-significant impact. No mitigation is required.

Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

The project site is located with the limits of the City and County; however, the property is owned by the State of California. In most situations, the State is not subject to local ordinances, and, therefore, is not required to obtain permits from the County or Seaside. However, the State will comply with local ordinances when feasible. As a result, protected trees within City and County limits were inventoried in accordance with their respective codes in the effort to comply with local ordinances. Staub Forestry & Environmental prepared a Forest Resource Evaluation of the project site in November 2010 (2010 Staub Evaluation) (Staub, 2010). DD&A conducted a Supplemental Forest Resource Evaluation of the 2015 Master Plan area in January 2019 to verify and update the data provided in the 2010 Forest Resource Evaluation (**Appendix E)**.

The Supplemental Forest Resource Evaluation found that the oak woodland within the 2015 Master Plan area is limited in height both by heavy wind pressure and excessive soil drainage. The oak woodlands appear to be young but slowly maturing. Few or no oak seedlings or saplings were observed. The absence of oak regeneration is a statewide problem due to a variety of factors such as grazing, wildlife browsing, avian and rodent predation, and competition for moisture with annual grasses. All these abiotic stressors are consistent with the 2010 Staub Evaluation. The biotic stressors identified during the 2010 Staub Evaluation included California oak worm (*Phryganidia californica*) and pitch canker (*Fusarium circinatum*). Biotic stressors identified during the 2010 Staub Evaluation are still present within the 2015 Master Plan area; however, additional symptoms of biotic stressors were identified during the 2019 survey, including oak branch canker (*Diplodia quercina*), Phytophthora root/crown rot, oak ambrosia beetles (*Monarthrum species*) and oak bark beetles (*Pseudopityophthorus species*). No indicators or symptoms for sudden oak death (SOD) (*Phytophthora ramorum*) were observed. According to the California Oak Mortality Task Force (a task force under the California Forest Pest Council) (2019), the closest mapped SOD site is in Carmel Valley somewhere in the Quail Meadows area. As identified in the 2010 Staub Evaluation, dieback from California oak worm was the main stressor defoliating coast live oak trees in the area; however, many of the trees appear to be fully or partially recovered. Recovery from the defoliation is affected by minimal moisture on the site due to wind pressure and excessively drained sandy soils. The predominance of trees in fair or better condition is characteristic of native, unmanaged oak woodlands. In general, the trees appear to have recovered well from the oak worm defoliation of the past several years. Currently, most of the oak dieback observed appears to be from Phytophthora root/crown rot in combination with bark beetles. Overall, the oak woodland conditions are generally consistent with the findings of the 2010 Staub Evaluation.

The build-out of the 2015 Master Plan, including Phase 2, could result in permanent impacts to approximately 32.2 acres of coast live oak woodland. However, oak trees would be preserved wherever

possible, including locating columbaria within the oak woodland and preserving oak woodland between burial sections to reduce potential impacts. Where major grading is proposed, new oaks would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. In meeting with the project objective to "incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs," the layouts for Phase 2 and the 2015 Master Plan have been designed and sited to minimize impacts to oak woodland and the topography.

For Phase 2, the in-ground cremains and crypts are proposed in terraces to minimize grading, vegetation removal, and disturbance to the adjacent hillside. Site preparation for Phase 2 would primarily consist of improvements to the existing retention basin and vegetation removal, including approximately 1.3 acres of disturbed habitat associated with the existing retention basin and approximately 3.1 acres of native and non-native groundcover, shrubs, and trees. It is estimated that approximately 1.1 acres of coast live oak woodland would be impacted for the development of Phase 2 (**Figure 8**). Approximately 410 coast live oak trees occur within this development footprint (**Figure 8**).[11] The 1.2-acre preservation area associated with Phase 2 would be located along Parker Flats Road and contains 1 acre of coast live oak woodland. The ground disturbance associated with construction activities for Phase 2 would be temporary and the Planting Plan includes the planting of 111 coast live oak trees as well as other trees, shrubs, and groundcover plantings, within disturbed areas. With 111 coast live oak trees proposed for planting on-site and an additional 1 acre of coast live oak woodland preserved on-site (**Figure 2**), the impacted acreage would be mitigated at a 1:1 ratio within the Phase 2 site. This is consistent with the 1:1 mitigation ratio outlined in the Seaside and County Code to mitigate for tree removal. This is considered a less-than-significant impact and no mitigation is required. However, construction activities could result in impacts to preserved coast live oak trees on-site as a result of equipment strike, soil compaction, and root exposure and damage. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-11**. With Phase 2 on-site preservation, replacement of oak trees on-site, and the implementation of the tree protection and replacement measures required in **Mitigation Measure BIO-11**, impacts to coast live oak trees and woodland as a result of implementation of Phase 2 of the CCCVC are less-than-significant.[12]

For the remaining phases of the 2015 Master Plan, each phase would also be designed and sited to minimize impacts to the native landscape. Future phases would be designed to achieve several goals, including, but not limited to, respecting the natural drainage pattern, vegetation, and contours of the site to the extent feasible. In addition, approximately 17.1 acres of coast live oak woodland would be protected within the proposed preservation area and available as a mitigation area for future phases (**Figure 2**). Future phases would also include implementation of phase-specific planting plans with a focus of planting coast live oak trees and other native vegetation. Where major grading is proposed, new oak trees would be planted to maintain the sense of immersion in an oak woodland throughout the cemetery. The design of the crypts

[11] Please note that the 1.1 acres of oak woodland do not exclusively contain the 410 coast live oak trees that may be removed; the individual trees occur within the oak woodland and within the remaining development area.

[12] The Phase 1 IS/EA required the establishment of an off-site oak restoration area to further mitigate less-than-significant impacts to oak trees. CalVet has identified a potential off-site restoration area on County property and is currently negotiating the use of the area with the County to implement this mitigation measure. The State anticipates the restoration efforts to commence at the proposed site in Fall 2019. Due to the complexities experienced with off-site restoration efforts, on-site preservation is the preferred mitigation strategy for the proposed project. If on-site preservation is not feasible, off-site preservation would be established, as outlined in **Mitigation Measure BIO-13**.

and columbarium would be similar to Phases 1 and 2 where the columbaria are set back within the existing oak woodland and preserving oak woodland between burial sections, and the crypts would be placed on terraces, minimizing impacts to the natural landscape.

The republished (however, never officially adopted by FORA) 2001 Reuse Plan Land Use Concept designates a 178-acre area in support of the construction of a CCCVC. The 2008 Master Plan proposed five land use areas within the 178-acre area, including the Development Area with Habitat Restoration Opportunity (DAHRO) site. The DAHRO site consists of approximately 26 acres of coast live oak woodland within a 45-acre site located southeast of the 84.4-acre CCCVC site. The DAHRO parcel is currently proposed for inclusion in the Working Draft of the Fort Ord Oak Woodland Conservation Area (OWCA), which has not yet been approved. As discussed in the "Regulatory Setting" of this document, the establishment and management of the Fort Ord OWCA is required by the policies and programs in the Reuse Plan, which are considered a component of the mitigation strategy for impacts to coast live oak trees in the Reuse Plan EIR.

The Reuse Plan EIR identified that the implementation of the Reuse Plan would result in the loss of coast live oak woodland within an area of approximately 1,584 acres, due to new construction and development, which includes the CCCVC site (DD&A, 2018). The EIR identified applicable policies and programs that would establish the oak woodland conservation area and preserve oak woodland elements. The EIR found that large contiguous areas of oak woodland habitat would be retained through implementation of the Reuse Plan policies and programs that require the establishment of an oak woodland conservation area, and the preservation of oak woodland within the HMAs established by the HMP. The EIR further concluded that the BRP policies and programs would minimize loss of oak trees through careful site design in development areas and effectively requiring a 1:1 replacement for all trees removed (as called for in the Monterey County and Seaside ordinances, see Biological Resources Policy C-2.2 below). Therefore, with the establishment of an oak woodland conservation area, preservation of oak woodlands within the HMAs, and implementation of the policies and programs related to site design and tree replacement, potential impacts to oak woodlands resulting from implementation of the Reuse Plan were found to be less-than-significant.

The Reuse Plan Biological Resource Policy B-2 (for both the County and Seaside) states that as site-specific development plans for Polygon 21a and a portion of Polygon 20c are formulated and planning proceeds, the City and County shall coordinate with each other, CSUMB, FORA, and other interested entities in the designation of an oak woodland conservation area. The DAHRO and CCCVC sites fall within both of these polygons. As discussed above, the DAHRO site is proposed for inclusion in the Working Draft of the Fort Ord OWCA. As planning proceeds for the CCCVC, it is important to note that the establishment of the OWCA is in progress and the DAHRO site is being proposed for conservation consistent with the historic planning efforts for the CCCVC outlined in the 2008 Master Plan. Further, impacts to coast live oak trees on the CCCVC site were considered in the BRP EIR analysis.

The 2015 Master Plan would be implemented in several phases over an approximate 100-year period and the design of future phases. CalVet and USDVA do not anticipate proceeding with the development of Phase 3 through 11 of the 2015 Master Plan in the immediate future, nor does it have sufficient construction-level detail available to enable an analysis of phase-specific impacts at this time. Further, due to the long-term nature of the 2015 Master Plan, it is preferable not to speculate as to specific site plans or facilities at this time because these phases likely will evolve over the next 100 years, based on demand and funding

availability. Additional environmental review under CEQA and NEPA for these phases will be undertaken, as appropriate, during subsequent implementation of the 2015 Master Plan.

There are approximately 31.1 acres of coast live oak woodland within the development areas of Phases 3-11. The 2015 Master Plan includes the preservation of approximately 17.1 acres of oak woodland within its 31.7-acre preservation area. In addition, it is reasonable to assume that future phases of the 2015 Master Plan (Phases 3-11) could avoid and minimize impacts to coast live oak trees through site design and replacement, and that future phases could mitigate at a 1:1 ratio within each phase footprint, similar to existing Phase 1 and proposed Phase 2. However, without detailed site plans for each future phase, coast live oak mitigation may not be feasible within the footprint of each phase. Alternatively, some future phases may be significantly reduced in size or possibly not be built, resulting in more oak woodland preservation on-site. Therefore, a programmatic mitigation measure has been identified to reduce potentially significant impacts to coast live oak trees and woodland during the build-out of the 2015 Master Plan to a less-than-significant level.

Mitigation Measure BIO-6, Project-Specific Biological Resources Studies, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. **Mitigation Measure BIO-12** requires that, as a component of the project-specific biological resources studies required for each future phase in **Mitigation Measure BIO-6**, potential impacts to coast live oak trees and woodland will be quantified to verify that the oak mitigation continues to meet a 1:1 mitigation ratio. If a future phase would exceed the 1:1 ratio of acreage preserved on-site, additional mitigation would be required. Construction activities in future phases could result in impacts to preserved coast live oak trees on-site as a result of equipment strike, soil compaction, and root exposure and damage. This is a potentially significant impact that would be reduced to a less-than-significant level with implementation of **Mitigation Measure BIO-11**. Therefore, with implementation of **Mitigation Measures BIO-6, BIO-11,** and **BIO-12**, impacts to coast live oak trees and woodland would be reduced to a less-than-significant level.

> ***Mitigation Measure BIO-11: Oak Tree Protection and Replacement Measures***
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> For each phase of the 2015 Master Plan, including Phase 2, impacts to coast live oak trees shall be avoided and minimized through site design and protection during construction. To maximize tree retention and protection, a forester, arborist, or other tree care professional shall be involved with early planning and design of each phase and shall be involved in the review and development of final grading and construction plans wherever trees occur within the site or at the grading margins. To avoid unintended impacts to trees outside the construction area, the following tree protection measures shall be implemented:*:*
>
> - Temporary construction fencing shall be placed at approximately 10 feet from the trunk and no grading, trenching, or vegetative alteration shall occur within this environmental exclusion zone. Grading, vegetation removal, and other ground disturbing construction activities may not commence until the project forester has inspected and approved the protective fencing installed by the contractor. No equipment or materials, including soil, shall be stored within the established environmental exclusion zone. Prior to grading within 25 feet of retained trees, the project forester, arborist or other tree care professional shall be consulted to determine whether pruning is necessary to protect limbs from grading equipment.

- To avoid soil compaction from damaging the roots, heavy equipment shall not be allowed to drive over the root area. If deemed necessary and approved by the forester, equipment may drive across one side of the tree. To reduce soil compaction, wood chips shall be spread 6-12 inches deep to disperse the weight of equipment and plywood sheets shall be placed over the wood chips for added protection.
- Roots exposed by excavation must be pruned and recovered as quickly as possible to promote callusing, closure, and healthy regrowth.
- Retained trees shall be watered periodically in accordance with species need to promote tree health. Transplanted trees and their intended planting areas shall be pre-watered. Post planting watering shall be done as needed to assure establishment.
- When phase design is completed, an estimate of the appropriate number of replacement trees shall be made based on available planting space. These replacement trees (minimum five-gallon specimens) shall be planted along boundaries and within landscape areas. Planting density for replacement trees shall be accurately detailed to allow for some unavoidable mortality over time.
- Transplants are encouraged and shall be credited on a 3:1 basis. Final replanting numbers may be modified by additional tree retention and should be made part of the final landscaping plan.

Mitigation Measure BIO-12: Coast Live Oak Tree and Woodland Protection

Mitigation Measure BIO-6, Project-Specific Biological Resources Studies, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. During the implementation of **Mitigation Measure BIO-6**, a qualified biologist shall determine whether coast live oak trees/woodland would be impacted by each proposed phase. If coast live oak trees/woodland have the potential to be impacted, a qualified biologist will provide a description of the conditions of the trees and habitat that may be impacted and quantify the individuals and/or acreage that may be impacted for inclusion in the Project-Specific Biological Resources Study required by **Mitigation Measure BIO-6**. The impact analysis shall take into consideration tree retention, relocation, and replacement proposed for each phase. A qualified biologist will include a summary of coast live oak trees/woodland impacted by phase to date in the study and verify that the impacts that the oak mitigation continues to meet a 1:1 mitigation ratio. If impacts to coast live oak trees/woodland in a future phase would exceed a 1:1 mitigation ratio based on the available oak woodland that would be preserved on-site, the phase may either be redesigned to avoid or reduce impacts to meet a 1:1 mitigation ratio, or additional mitigation (e.g., including off-site preservation, on-site or off-site restoration, or payment of in-lieu fees) would be required. A qualified biologist will identify potential mitigation strategies to meet a 1:1 mitigation ratio in the study, and the appropriate mitigation strategy shall be determined and initiated prior to construction of the subject phase. Potential mitigation strategies may include, but are not limited to:

1. Off-site oak woodland preservation areas: opportunities may include coast live oak woodland habitat within or adjacent to the former Fort Ord. However, off-site preservation areas shall not include any lands conserved as part of the Fort Ord Oak Woodland Conservation Area, once approved. In addition, authorization to utilize the site by the land owner would be required

and the mitigation area must be preserved in perpetuity through a conservation easement or other appropriate land use restriction.

2. On-site or off-site restoration: opportunities may include restoration of coast live oak woodland habitat within or adjacent to the former Fort Ord. Off-site mitigation areas would be subject to the same conditions listed in mitigation strategy #1.
3. Payment of in-lieu fees to the County and/or Seaside to fund a "fair share" of the cost to manage and monitor the Fort Ord Oak Woodland Conservation Area, once approved. The fair share cost shall be based on the acreage required to meet the 1:1 mitigation ratio exceeded in the phase.

Impact BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The project site is not located within an approved HCP or NCCP area. However, it is located within the Fort Ord HMP boundaries and the plan area associated with the Draft HCP. The project site is designated for development (with no restrictions) in the HMP for Fort Ord and is located within a designated development area in the Draft HCP. As described in the "Approach to Analysis", the proposed project is consistent with the approved HMP. This is a less-than-significant impact. No mitigation is required.

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APPENDIX A

CNDDB Rare Plant Report
(Marina, Monterey, Moss Landing, Prunedale, Salinas, Seaside, and Spreckels Quadrangles)

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Marina (3612167) OR Monterey (3612158) OR Moss Landing (3612177) OR Prunedale (3612176) OR Salinas (3612166) OR Seaside (3612157) OR Spreckels (3612156))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
Agrostis lacuna-vernalis vernal pool bent grass	PMPOA041N0	None	None	G1	S1	1B.1
Allium hickmanii Hickman's onion	PMLIL02140	None	None	G2	S2	1B.2
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	AAAAA01082	Endangered	Endangered	G5T1T2	S1S2	FP
Anniella pulchra northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Arctostaphylos hookeri ssp. hookeri Hooker's manzanita	PDERI040J1	None	None	G3T2	S2	1B.2
Arctostaphylos montereyensis Toro manzanita	PDERI040R0	None	None	G2?	S2?	1B.2
Arctostaphylos pajaroensis Pajaro manzanita	PDERI04100	None	None	G1	S1	1B.1
Arctostaphylos pumila sandmat manzanita	PDERI04180	None	None	G1	S1	1B.2
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Astragalus tener var. titi coastal dunes milk-vetch	PDFAB0F8R2	Endangered	Endangered	G2T1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Bryoria spiralifera twisted horsehair lichen	NLTEST5460	None	None	G3	S1S2	1B.1
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Castilleja ambigua var. insalutata pink Johnny-nip	PDSCR0D403	None	None	G4T2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Central Dune Scrub	CTT21320CA	None	None	G2	S2.2	
Central Dune Scrub						
Central Maritime Chaparral	CTT37C20CA	None	None	G2	S2.2	
Central Maritime Chaparral						
Centromadia parryi ssp. congdonii	PDAST4R0P1	None	None	G3T2	S2	1B.1
Congdon's tarplant						
Charadrius alexandrinus nivosus	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
western snowy plover						
Chorizanthe minutiflora	PDPGN04100	None	None	G1	S1	1B.2
Fort Ord spineflower						
Chorizanthe pungens var. pungens	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
Monterey spineflower						
Chorizanthe robusta var. robusta	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
robust spineflower						
Clarkia jolonensis	PDONA050L0	None	None	G2	S2	1B.2
Jolon clarkia						
Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coastal and Valley Freshwater Marsh						
Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coastal Brackish Marsh						
Coelus globosus	IICOL4A010	None	None	G1G2	S1S2	
globose dune beetle						
Collinsia multicolor	PDSCR0H0B0	None	None	G2	S2	1B.2
San Francisco collinsia						
Cordylanthus rigidus ssp. littoralis	PDSCR0J0P2	None	Endangered	G5T2	S2	1B.1
seaside bird's-beak						
Corynorhinus townsendii	AMACC08010	None	None	G3G4	S2	SSC
Townsend's big-eared bat						
Coturnicops noveboracensis	ABNME01010	None	None	G4	S1S2	SSC
yellow rail						
Cypseloides niger	ABNUA01010	None	None	G4	S2	SSC
black swift						
Danaus plexippus pop. 1	IILEPP2012	None	None	G4T2T3	S2S3	
monarch - California overwintering population						
Delphinium californicum ssp. interius	PDRAN0B0A2	None	None	G3T3	S3	1B.2
Hospital Canyon larkspur						
Delphinium hutchinsoniae	PDRAN0B0V0	None	None	G2	S2	1B.2
Hutchinson's larkspur						
Delphinium umbraculorum	PDRAN0B1W0	None	None	G3	S3	1B.3
umbrella larkspur						
Elanus leucurus	ABNKC06010	None	None	G5	S3S4	FP
white-tailed kite						

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL
Ericameria fasciculata Eastwood's goldenbush	PDAST3L080	None	None	G2	S2	1B.1
Eriogonum nortonii Pinnacles buckwheat	PDPGN08470	None	None	G2	S2	1B.3
Erysimum ammophilum sand-loving wallflower	PDBRA16010	None	None	G2	S2	1B.2
Erysimum menziesii Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1	S1	1B.1
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Euphilotes enoptes smithi Smith's blue butterfly	IILEPG2026	Endangered	None	G5T1T2	S1S2	
Falco mexicanus prairie falcon	ABNKD06090	None	None	G5	S4	WL
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Gilia tenuiflora ssp. arenaria Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2	S2	1B.2
Hesperocyparis goveniana Gowen cypress	PGCUP04031	Threatened	None	G1	S1	1B.2
Hesperocyparis macrocarpa Monterey cypress	PGCUP04060	None	None	G1	S1	1B.2
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Layia carnosa beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lupinus tidestromii Tidestrom's lupine	PDFAB2B3Y0	Endangered	Endangered	G1	S1	1B.1
Malacothamnus palmeri var. involucratus Carmel Valley bush-mallow	PDMAL0Q0B1	None	None	G3T2Q	S2	1B.2
Malacothrix saxatilis var. arachnoidea Carmel Valley malacothrix	PDAST660C2	None	None	G5T2	S2	1B.2
Meconella oregana Oregon meconella	PDPAP0G030	None	None	G2G3	S2	1B.1
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	PDLAM18162	None	None	G3T2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Monterey Cypress Forest Monterey Cypress Forest	CTT83150CA	None	None	G1	S1.2	
Monterey Pine Forest Monterey Pine Forest	CTT83130CA	None	None	G1	S1.1	
Monterey Pygmy Cypress Forest Monterey Pygmy Cypress Forest	CTT83162CA	None	None	G1	S1.1	
Northern Bishop Pine Forest Northern Bishop Pine Forest	CTT83121CA	None	None	G2	S2.2	
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Oncorhynchus mykiss irideus pop. 9 steelhead - south-central California coast DPS	AFCHA0209H	Threatened	None	G5T2Q	S2	
Pelecanus occidentalis californicus California brown pelican	ABNFC01021	Delisted	Delisted	G4T3T4	S3	FP
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Pinus radiata Monterey pine	PGPIN040V0	None	None	G1	S1	1B.1
Piperia yadonii Yadon's rein orchid	PMORC1X070	Endangered	None	G1	S1	1B.1
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q	S1	1B.2
Potentilla hickmanii Hickman's cinquefoil	PDROS1B0U0	Endangered	Endangered	G1	S1	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G5T1	S1	FP
Ramalina thrausta angel's hair lichen	NLLEC3S340	None	None	G5	S2?	2B.1
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys megalotis distichlis Salinas harvest mouse	AMAFF02032	None	None	G5T1	S1	
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Rosa pinetorum pine rose	PDROS1J0W0	None	None	G2	S2	1B.2
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Stebbinsoseris decipiens Santa Cruz microseris	PDAST6E050	None	None	G2	S2	1B.2
Taricha torosa Coast Range newt	AAAAF02032	None	None	G4	S4	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thamnophis hammondii two-striped gartersnake	ARADB36160	None	None	G4	S3S4	SSC
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1
Trifolium trichocalyx Monterey clover	PDFAB402J0	Endangered	Endangered	G1	S1	1B.1
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	

Record Count: 101

APPENDIX B

IPaC Resource List

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

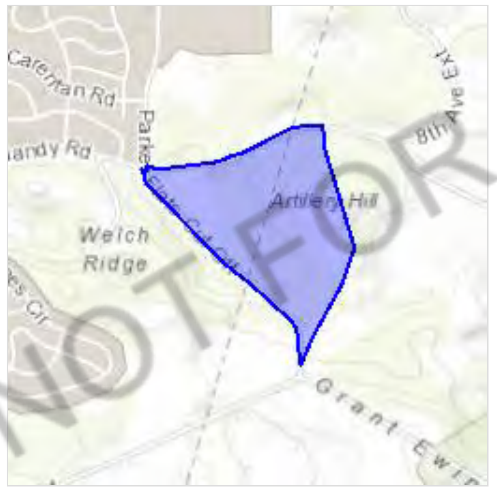
This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

Monterey County, California



Local office

Ventura Fish And Wildlife Office

(805) 644-1766
(805) 644-3958

2493 Portola Road, Suite B
Ventura, CA 93003-7726

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

NOT FOR CONSULTATION

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

California Condor Gymnogyps californianus — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/8193

California Least Tern Sterna antillarum browni — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8104

Least Bell's Vireo Vireo bellii pusillus — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5945

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/4467

Southwestern Willow Flycatcher Empidonax traillii extimus — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/6749

Western Snowy Plover Charadrius nivosus nivosus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/8035

Amphibians

NAME	STATUS

California Red-legged Frog Rana draytonii — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/2891

California Tiger Salamander Ambystoma californiense — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/2076

Santa Cruz Long-toed Salamander Ambystoma macrodactylum croceum — Endangered
There is **proposed** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7405

NOT FOR CONSULTATION

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Smith's Blue Butterfly Euphilotes enoptes smithi There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4418	Endangered

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened

Flowering Plants

NAME	STATUS
Contra Costa Goldfields Lasthenia conjugens There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7058	Endangered
Marsh Sandwort Arenaria paludicola No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2229	Endangered
Menzies' Wallflower Erysimum menziesii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2935	Endangered
Monterey Gilia Gilia tenuiflora ssp. arenaria No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/856	Endangered

NOT FOR CONSULTATION

Monterey Spineflower Chorizanthe pungens var. pungens — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/396

Yadon's Piperia Piperia yadonii — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/4205

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip:

enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Black Oystercatcher Haematopus bachmani This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31
Clark's Grebe Aechmophorus clarkii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Dec 31
Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31

NOT FOR CONSULTATION

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Long-billed Curlew Numenius americanus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Song Sparrow Melospiza melodia — Breeds Feb 20 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

NOT FOR CONSULTATION

Spotted Towhee Pipilo maculatus clementae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Tricolored Blackbird Agelaius tricolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Whimbrel Numenius phaeopus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wrentit Chamaea fasciata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10
Yellow-billed Magpie Pica nuttalli This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that

week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▬)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

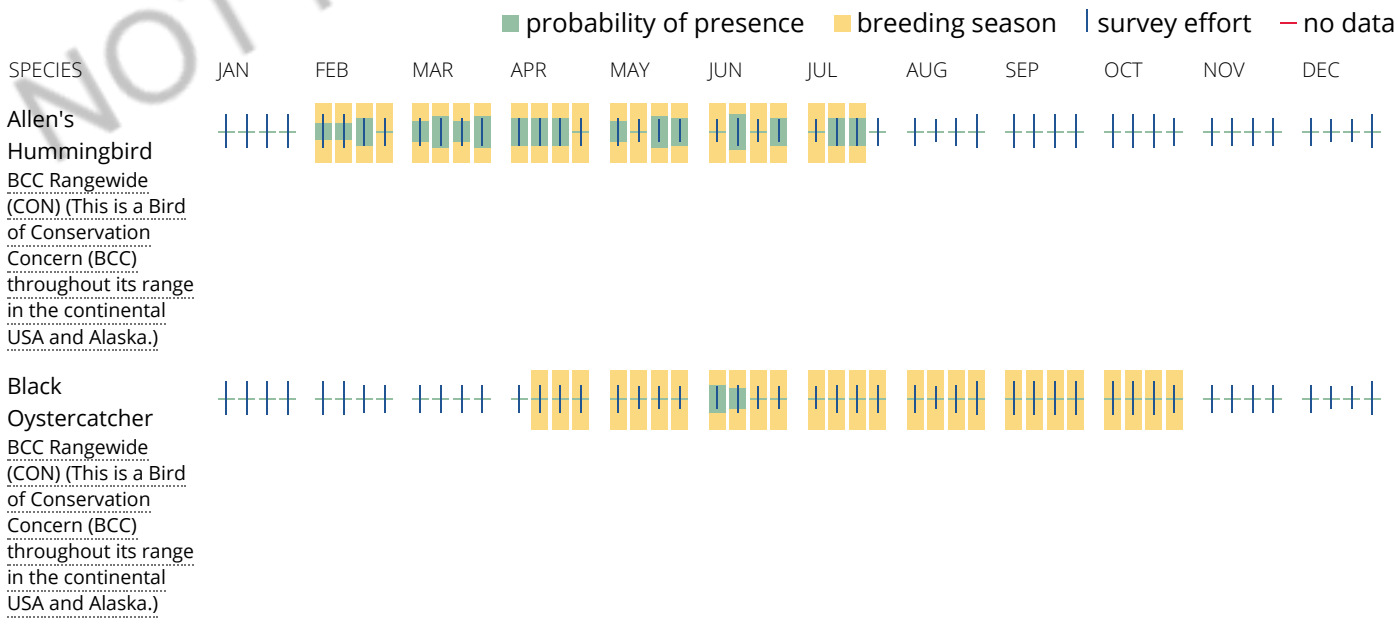
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

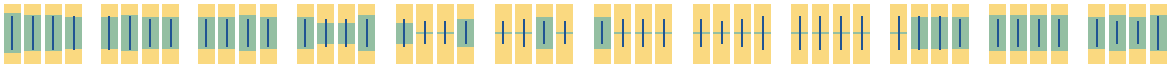
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

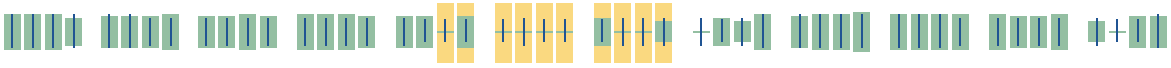
NOT FOR CONSULTATION



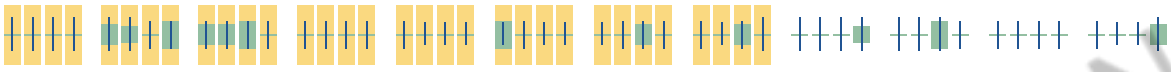
Clark's Grebe
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



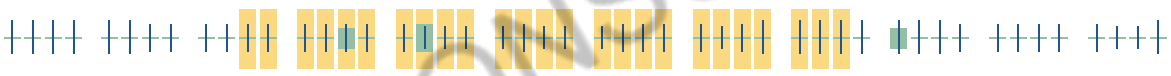
Common Yellowthroat
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Golden Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Lawrence's Goldfinch
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Long-billed Curlew
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

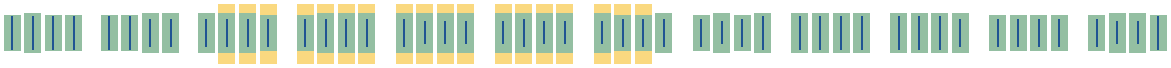


Nuttall's Woodpecker
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



NOT FOR CONSULTATION

Oak Titmouse
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rufous Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Song Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Spotted Towhee
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Tricolored Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Whimbrel
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

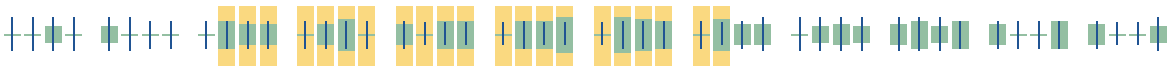


NOT FOR CONSULTATION

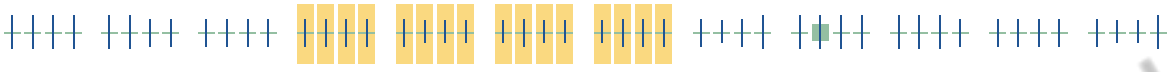
Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Wrentit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Yellow-billed Magpie
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



NOT FOR CONSULTATION

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look

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carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

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The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX C

Special-Status Species Table

California Central Coast Veterans Cemetery
Special-Status Species Table
Marina, Monterey, Moss Landing, Prunedale, Salinas, Seaside, and Spreckels Quadrangles.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
		MAMMALS		
Antrozous pallidus Pallid bat	-- / CSC / --	Occurs in a wide variety of habitats including grasslands, shrublands, arid desert areas, oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California. Most common in open, dry habitats with rocky areas for roosting. Day roosts include caves, crevices, mines, and occasionally hollow trees and buildings. Seems to prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Similar structures are used for night roosting and will also use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts.	**Low** May use some of the trees within the oak woodland habitat for night roosts and may forage over all undeveloped areas of the Master Plan site. However, no suitable day, colonial, or maternity roost habitat is present. The CNDDB does not report any occurrences within the seven quadrangles evaluated.	**Low** May use some of the trees within the oak woodland habitat for night roosts and may forage over all undeveloped areas of the Phase 2 site. However, no suitable day, colonial, or maternity roost habitat is present. The CNDDB does not report any occurrences within the seven quadrangles evaluated.
Corynorhinus townsendii Townsend's big-eared bat	-- / CSC / --	Found primarily in rural settings from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra foothills, and low to mid-elevation mixed coniferous-deciduous forests. Typically roost during the day in limestone caves, lava tubes, and mines, but can roost in buildings that offer suitable conditions. Night roosts are in more open settings and include bridges, rock crevices, and trees.	**Moderate** May use some of the trees within the oak woodland habitat for night roosts and may forage over all undeveloped areas of the Master Plan site. However, no suitable day, colonial, or maternity roost habitat is present. The nearest CNDDB occurrence is approximately 5.7 km from the Master Plan site.	**Moderate** May use some of the trees within the oak woodland habitat for night roosts and may forage over all undeveloped areas of the Phase 2 site. However, no suitable day, colonial, or maternity roost habitat is present. The nearest CNDDB occurrence is approximately 6 km from the Phase 2 site.
Lasiurus cinereus Hoary bat	-- / CNDDB / --	Prefers open habitats or habitat mosaics with access to trees for cover and open areas or edge for feeding. Generally roosts in dense foliage of trees; does not use buildings for roosting. Winters in California and Mexico and often migrates towards summer quarters in the north and east during the spring. Young are born and reared in summer grounds, which is unlikely to occur in California.	**Moderate** May roost (day and night) within some of the trees within the oak woodland habitat and may forage over all undeveloped areas of the Master Plan site. However, while the species may utilize the Master Plan site as winter grounds, they are unlikely to occur during the summer months and it is unlikely that birth and rearing occur in California. The nearest CNDDB occurrence is approximately 8.3 km from the Master Plan site.	**Moderate** May roost (day and night) within some of the trees within the oak woodland habitat and may forage over all undeveloped areas of the Phase 2 site. However, while the species may utilize the Phase 2 site as winter grounds, they are unlikely to occur during the summer months and it is unlikely that birth and rearing occur in California. The nearest CNDDB occurrence is approximately 8.3 km from the Phase 2 site.
Neotoma macrotis luciana Monterey dusky-footed woodrat	-- / CSC / --	Forest and oak woodland habitats of moderate canopy with moderate to dense understory. Also occurs in chaparral habitats.	**Present** Suitable habitat is present within the Master Plan site. The CNDDB does not report any occurrences of this species; however, numerous woodrat nests were observed throughout the Master Plan site, and this species is known to occur throughout the former Fort Ord. Therefore, this species is assumed present within the Master Plan site.	**Present** Suitable habitat is present within the Phase 2 site. The CNDDB does not report any occurrences of this species; however, numerous woodrat nests were observed throughout the Phase 2 site, and this species is known to occur throughout the former Fort Ord. Therefore, this species is assumed present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Reithrodontomys megalotis distichlis Salinas harvest mouse	-- / CNDDB / --	Known only to occur from the Monterey Bay region. Occurs in fresh and brackish water wetlands and probably in the adjacent uplands around the mouth of the Salinas River.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within Phase 2 site.
Sorex ornatus salarius **Monterey ornate shrew**	-- / CSC / --	Mostly moist or riparian woodland habitats, and within chaparral, grassland, and emergent wetland habitats where there is a thick duff or downed logs.	**Moderate** Suitable habitat is present within the Master Plan site. The CNDDB does not report any occurrences of this species; however, Figure B-18 in the HMP identifies the Master Plan site as containing potential habitat for this species and studies on the Fort Ord Natural Reserve have identified Monterey ornate shrew in the same habitat types on the former Fort Ord.	**Moderate** Suitable habitat is present within the Phase 2 site. The CNDDB does not report any occurrences of this species; however, Figure B-18 in the HMP identifies the Phase 2 site as containing potential habitat for this species and studies on the Fort Ord Natural Reserve have identified Monterey ornate shrew in the same habitat types on the former Fort Ord.
Taxidea taxus American badger	-- / CSC / --	Dry, open grasslands, fields, pastures savannas, and mountain meadows near timberline are preferred. May also frequent brushland with little ground cover. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated grounds.	**Low** Only low-quality habitat present within the Master Plan site. The nearest CNDDB occurrence is approximately 2.2 km from the Master Plan site. This species is known to occur within grasslands on the former Fort Ord.	**Unlikely** No suitable habitat present within the Phase 2 site.
BIRDS				
Accipiter cooperii Cooper's hawk (nesting)	-- / CNDDB / --	Resident throughout most of the wooded portion of the state. Dense stands of live oak, riparian deciduous, or other forest habitats near water used most frequently. Seldom found in areas without dense tree stands, or patchy woodland habitats.	**Present** Suitable nesting habitat is present within the oak woodland habitat on the Master Plan sites. The nearest CNDDB occurrence of this species is an occurrence approximately 18 km from the site; however, several occurrences of this species are reported on the former Fort Ord, including one occurrence of an adult male within the project site in November 2018 (ebird, 2019).	**Present** Suitable nesting habitat is present within the oak woodland habitat on the Phase 2 site. The nearest CNDDB occurrence of this species is an occurrence approximately 18 km from the site; however, several occurrences of this species are reported on the former Fort Ord, including one occurrence of an adult male within the project site in November 2018 (ebird, 2019).
Aechmophorus clarkia Clark's grebe	BCC / -- / --	Common to abundant from October to May along the coast south of San Francisco Bay in marine subtidal and estuarine waters; uncommon to the north. Uncommon to fairly common on large lakes near coast and inland at low elevations. Breed on large, marshy lakes in extensive beds of tall, emergent vegetation, mostly in northeastern California.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within Phase 2 site.
Agelaius tricolor Tricolored blackbird (nesting colony)	BCC / CE&CSC / --	Nest in colonies in dense riparian vegetation, along rivers, lagoons, lakes, and ponds. Forages over grassland or aquatic habitats.	**Unlikely** No suitable nesting habitat present within the Master Plan site.	**Unlikely** No suitable nesting habitat present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Aquila chrysaetos Golden eagle (nesting & wintering)	BCC / CFP / --	Use rolling foot-hills, mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, cliffs, and rocky outcrops. Nest in secluded cliffs with overhanging ledges as well as large trees.	**Unlikely** No suitable nesting habitat present within the Master Plan site.	**Unlikely** No suitable nesting habitat present within the Phase 2 site.
Asio flammeus Short-eared owl (nesting)	-- / CSC / --	Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, meadows, dunes, irrigated lands, and saline and freshwater emergent marshes. Dense vegetation is required for roosting and nesting cover. This includes tall grasses, brush, ditches, and wetlands. Open, treeless areas containing elevated sites for perching, such as fence posts or small mounds, are also needed. Some individuals breed in northern California.	**Unlikely** No suitable nesting habitat present within the Master Plan site.	**Unlikely** No suitable nesting habitat present within the Phase 2 site.
Athene cunicularia Burrowing owl (burrow sites & some wintering sites)	-- / CSC / --	Year-round resident of open, dry grassland and desert habitats, and in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. Frequent open grasslands and shrublands with perches and burrows. Use rodent burrows (often California ground squirrel) for roosting and nesting cover. Pipes, culverts, and nest boxes may be substituted for burrows in areas where burrows are not available.	**Low** Only low-quality habitat is present within the Master Plan site. The nearest CNDDB occurrence is approximately 3.3 km from the Master Plan site.	**Unlikely** No suitable habitat is present within the Phase 2 site.
Baeolophus inornatus Oak titmouse	BCC / -- / --	Primarily associated with oak habitats, but also occurs in montane hardwood-conifer, montane hardwood, and montane and valley foothill riparian habitats in cismontane California from the Mexican border to Humboldt County and from the coast to the western slope of the Sierra Nevada Mountains. Roosts and nests in woodpecker holes, natural cavities, snags, or nest boxes.	**High** Suitable habitat present within the Master Plan site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).	**High** Suitable habitat present within the Phase 2 site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).
Brachyramphus marmoratus Marbled murrelet (nesting)	FT / SE / --	Occur year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal. Partial to coastlines with stands of mature redwood and Douglas-fir. Requires dense mature forests of redwood and/or Douglas-fir for breeding and nesting.	**Unlikely** No suitable habitat present within the Master Plan site. Not reported in the CNDDB quads evaluated.	**Unlikely** No suitable habitat present within the Phase 2 site. Not reported in the CNDDB quads evaluated.
Buteo regalis Ferruginous hawk (wintering)	-- / WL / --	An uncommon winter resident and migrant at lower elevations and open grasslands in the Modoc Plateau, Central Valley, and Coast Ranges and a common winter resident of grassland and agricultural areas in southwestern California. Frequent open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys, and fringes of pinyon-juniper habitats. Does not breed in California.	**Low** Only poor-quality wintering habitat present within the Master Plan site. No breeding habitat present within the Master Plan site. The nearest CNDDB occurrence is approximately 5.4 km from the Master Plan site.	**Unlikely** No suitable nesting habitat present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Carduelis lawrencei Lawrence's goldfinch	BCC / -- / --	Typical habitats include valley hardwood, valley foothill hardwood-conifer, and in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. Requires open woodland or shrubland with a nearby water source. Common along western edge of southern deserts and fairly common in Santa Clara County and on coastal slopes from Monterey County south. Uncommon in the foothills surrounding the Central Valley.	**Moderate** Marginal habitat present within the Master Plan site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the eastern side of the former Fort Ord (ebird, 2019).	**Moderate** Marginal habitat present within the Phase 2 site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the eastern side of the former Fort Ord (ebird, 2019).
Chamaea fasciata Wrentit	BCC / -- / --	Common resident of California chaparral habitat. Also other shrub habitats, such as coastal scrub, from the coast throughout cismontane regions.	**High** Suitable habitat present within the Master Plan site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).	**High** Suitable habitat present within the Phase 2 site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).
Charadrius nivosus **Western snowy plover (nesting)**	FT / CSC / --	Sandy beaches on marine and estuarine shores, also salt pond levees and the shores of large alkali lakes. Requires sandy, gravelly or friable soil substrate for nesting.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Coturnicops noveboracensis Yellow rail	-- / CSC / --	Wet meadows and coastal tidal marshes. Occurs year round in California, but in two primary seasonal roles: as a very local breeder in the northeastern interior and as a winter visitor (early Oct to mid-Apr) on the coast and in the Suisun Marsh region	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Cypseloides niger Black swift (nesting)	-- / CSC / --	Regularly nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Elanus leucurus White-tailed kite (nesting)	-- / CFP / --	Open groves, river valleys, marshes, and grasslands. Prefer such area with low roosts (fences etc.). Nest in shrubs and trees adjacent to grasslands.	**High** **S**uitable nesting and foraging habitat present within the Master Plan site. The nearest CNDDB occurrence is approximately 20 km from the Master Plan site; however, this species has been observed by DD&A biologists 1.5 km from the Master Plan site, north of Reservation Road.	**High** **S**uitable nesting and foraging habitat present within the Phase 2 site. The nearest CNDDB occurrence is approximately 20 km from the Phase 2 site; however, this species has been observed by DD&A biologists 1.5 km from the Phase 2 site, north of Reservation Road.
Eremophila alpestris actia California horned lark	-- / WL / --	Variety of open habitats, usually where large trees and/or shrubs are absent. Found from grasslands along the coast to deserts at sea-level and alpine dwarf-shrub habitats are higher elevations. Builds open cup-like nests on the ground.	**Moderate** Marginal habitat is present within the Master Plan site. The nearest CNDDB occurrence is approximately 5.2 km from the Master Plan site and this species has been observed by DD&A biologist approximately 4.0 kilometers from the site within the former Fort Ord inland ranges.	**Unlikely** No suitable habitat present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Falco mexicanus Prairie falcon (nesting)	-- / WL / --	Associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Uses open terrain for foraging; nests in open terrain with canyons, cliffs, escarpments, and rock outcrops.	**Low** Although this species may forage within the Master Plan site, no suitable nesting habitat present. The CNDDB reports one non-specific occurrence of the species approximately 3.6 km from the Master Plan site in the Spreckels quadrangle.	**Unlikely** No suitable habitat present within the Phase 2 site.
Falco peregrinus anatum American peregrine falcon (nesting)	-- / CFP / --	Forages for other birds over a variety of habitats. Breeds primarily on rocky cliffs.	**Unlikely** Although this species may forage within the Master Plan site, no suitable nesting habitat present. The CNDDB reports one non-specific occurrence of the species approximately 12 km from the Master Plan site in the Moss Landing quadrangle.	**Unlikely** Although this species may forage within the Phase 2 site, no suitable nesting habitat present. The CNDDB reports one non-specific occurrence of the species approximately 12 km from the Phase 2 site in the Moss Landing quadrangle.
Geothlypis trichas Common yellowthroat	BCC / -- / --	Mostly seeks cover in thick tangles in fresh and brackish wetlands, especially in summer and winter. A common resident on the central and southern coast, less common on the north coast. Less common as a breeder in interior California. Mostly breeds and winters in wet meadow, and fresh and saline emergent wetland, but will also use valley foothill and desert riparian and occasionally grassland habitats.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Gymnogyps californianus California condor	FE / SE /--	Roosting sites in isolated rocky cliffs, rugged chaparral, and pine covered mountains 2000-6000 feet above sea level. Foraging area removed from nesting/roosting site (includes rangeland and coastal area – up to 19 mile commute one way). Nest sites in cliffs, crevices, potholes.	**Unlikely** Suitable roosting habitat present within the Master Plan site; however, no nesting habitat occurs within the site, and species is not reported within the CNDDDB quads evaluated.	**Unlikely** No suitable habitat present within the Phase 2 site. Not reported within the CNDDB quads evaluated.
Haematopus bachmani Black oystercatcher	BCC / -- / --	Permanent resident on rocky shores of marine habitats along almost the entire California coast and adjacent islands. Breeds on undisturbed, rocky, open ocean shores.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Laterallus jamaicensis coturniculus California black rail	-- / ST&CFP / --	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that does not fluctuate during the year & dense vegetation for nesting habitat.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Limnodromus griseus Short-billed dowitcher	BCC / -- / --	Common to abundant during spring and fall migration along the entire California coast. Typically occurs in intertidal mudflats of estuarine habitats. Rare to uncommon during winter. Does not breed in California.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Limosa fedoa Marbled godwit	BCC / -- / --	Common in winter and as a migrant along the California coast from the San Francisco Bay south to the Mexican border. In winter, requires undisturbed areas above high water for roosting, typically saline emergent wetland upland fields, and salt ponds. Does not breed in California.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Melospiza melodia Song sparrow	BCC / -- / --	A common resident of most of California, except in higher mountains and southern deserts. Prefers riparian, fresh or saline emergent wetland, and wet meadows at all seasons. Breeds in riparian thickets of willows, other shrubs, vines, and tall herbs, and in fresh or saline emergent vegetation. In northern California also breeds in damp thickets and coastal scrub where fog drip and a moist climate compensate for a lack of surface water. Usually avoids densely wooded habitats, except along edges.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Numenius americanus Long-billed curlew	BCC / -- / --	Common breeder in wet meadow habitats in northeastern California. Common in winter along most of the California coast and in the Central and Imperial Valleys. Preferred winter habitats include large coastal estuaries, upland herbaceous areas and croplands. Breeds on grazed, mixed-grass and shortgrass prairies.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Numenius phaeopus Whimbrel	BCC / -- / --	Common spring migrant and less common fall migrant along the entire California coast. Rare in winter on the central coast, but fairly common in Southern California. Forages on rocky intertidal and sandy beach marine habitats, on the intertidal mudflats of estuarine habitats, and on wet meadows and pastures adjacent to the immediate coast. Does not breed in California.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Pelecanus occidentalis californicus California brown pelican (nesting colony & communal roosts)	-- / CFP / --	Found in estuarine, marine subtidal, and marine pelagic waters along the California coast. Usually rests on water or inaccessible rocks, but also uses mudflats, sandy beaches, wharfs, and jetties.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Pica nuttallii Yellow-billed magpie	BCC / -- / --	Common resident of the Central Valley and coastal mountain ranges south of San Francisco Bay to Santa Barbara County. Also breeds along the coast in Monterey County. Prefers open oak and riparian woodland, and farm and ranchland with tall trees in the vicinity of grassland, pasture, and cropland.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Picoides nuttallii Nuttall's woodpecker	BCC / -- / --	Common resident of low-elevation riparian deciduous and oak habitats. Occurs in the Central Valley, Transverse and Peninsular Ranges, in the Coast Ranges north of Sonoma County, and in lower portions of the Cascade Range and Sierra Nevada. Requires snags and dead limbs for nest excavation.	**Moderate** Marginal habitat present within the Master Plan site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the eastern side of the former Fort Ord (ebird, 2019).	**Moderate** Marginal habitat present within the Phase 2 site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the eastern side of the former Fort Ord (ebird, 2019).

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Pipilo maculatus clementae Spotted towhee	BCC / -- / --	Common resident throughout California except at high elevations in the Sierra Nevada Mountains and lowlands of southern deserts. Found in chaparral and other shrub habitats and in open stands of riparian, hardwood, hardwood-conifer, and lower-elevation conifer habitats. Nests on the ground with dense surrounding vegetation.	**High** Suitable habitat present within the Master Plan site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).	**High** Suitable habitat present within the Phase 2 site. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this is a common species on the former Fort Ord (ebird, 2019).
Rallus obsoletus obsoletus California Ridgeway's rail	FE / SE&CFP /- -	Occur within a range of salt and brackish marshes.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Riparia riparia Bank swallow (nesting)	-- / ST / --	Nest colonially in sand banks. Found near water; fields, marshes, streams, and lakes.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Selasphorus rufus Rufous hummingbird	BCC / -- / --	Common summer migrant in California and a rare winter resident in southern California. Breeds mostly in Oregon and Washington, but breeding has been reported in the Trinity Mountains. Trees and shrubs in many habitats provide cover, including lowland riparian, open woodland, scrub, chaparral, and mountain meadows.	**Moderate** Marginal habitat present within the Master Plan site; however, the site is outside of the breeding range for this species. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the Monterey Peninsula (ebird, 2019).	**Moderate** Marginal habitat present within the Phase 2 site; however, the is outside of the breeding range for this species. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the Monterey Peninsula (ebird, 2019).
Selasphorus sasin Allen's hummingbird	BCC / -- / --	Common summer resident and migrant along most of the California coast. Most commonly breeds in coastal scrub, valley foothill hardwood and valley foothill riparian habitats, but also in close-cone pine-cypress, urban, and redwood habitats.	**Moderate** Suitable habitat present within the Master Plan site; however, the site is outside of the breeding range for this species. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the Monterey Peninsula (ebird, 2019).	**Moderate** Suitable habitat present within the Phase 2 site; however, the is outside of the breeding range for this species. The CNDDB does not include any occurrence of this species within the quadrangles evaluated; however, this species has been observed on the Monterey Peninsula (ebird, 2019).
Sterna antillarum browni California least tern (nesting colony)	FE / SE&CFP /- -	Sea beaches, bays; large rivers, bars.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Tringa semipalmata Willet	BCC / -- / --	Abundant in the non-breeding season in estuarine habitats, saline emergent wetlands, and salt ponds along the entire California coast. Breeds in northeastern California and along the coast south of Monterey County. Intertidal mudflats provide important winter feeding habitat. Nests in wet meadows, usually close to open water.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Vireo bellii pusillus Least Bell's vireo (nesting)	FE / SE / --	Riparian areas and drainages. Breed in willow riparian forest supporting a dense, shrubby understory. Oak woodland with a willow riparian understory is also used in some areas, and individuals sometimes enter adjacent chaparral, coastal sage scrub, or desert scrub habitats to forage.	**Unlikely** No suitable habitat present within the Master Plan site. Not reported in the CNDDB quads evaluated.	**Unlikely** No suitable habitat present within the Phase 2 site. Not reported in the CNDDB quads evaluated.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
REPTILES AND AMPHIBIANS				
Ambystoma californiense **California tiger salamander**	FT / ST&WL /--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Need underground refuges and vernal pools or other seasonal water sources.	**Moderate** No aquatic breeding habitat is present within the Master Plan site; however, a small portion of the site contains potential upland habitat (i.e., suitable habitat within 2.2 km of known and potential breeding ponds). The nearest documented CNDDB occurrence is 1.2 km from the Master Plan site; however, this occurrence is mapped incorrectly and actually corresponds to Pond 8, which is 2.1 km from the Master Plan site. Additionally, CTS were observed to be breeding within Pond 41 by DD&A biologists in 2016, located approximately 2.02 km from the Master Plan site (Burleson Consulting and DD&A, 2017).	**Unlikely** Suitable upland habitat present within the Phase 2 site; however, the site is outside the 2.2 km dispersal range from a known or potential breeding site.
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	FE / SE&CFP /--	Preferred habitats include ponderosa pine, montane hardwood-conifer, mixed conifer, montane riparian, red fir and wet meadows. Occurs in a small number of localities in Santa Cruz and Monterey Counties. Adults spend the majority of the time in underground burrows and beneath objects. Larvae prefer shallow water with clumps of vegetation.	**Unlikely** No suitable habitat within the Master Plan site. The Master Plan site is outside of the known range for this species.	**Unlikely** No suitable habitat within the Phase 2 site. The Phase 2 site is outside of the known range for this species.
Anniella pulchra **Northern California legless lizard**	-- / CSC / --	Requires moist, warm habitats with loose soil for burrowing and prostrate plant cover, often forages in leaf litter at plant bases; may be found on beaches, sandy washes, and in woodland, chaparral, and riparian areas.	**High** Suitable habitat is present within the Master Plan site. The CNDDB reports 50 occurrences of this species within the quads analyzed, and this species has been observed in several areas of the former Fort Ord.	**High** Suitable habitat is present within the Phase 2 site. The CNDDB reports 50 occurrences of this species within the quads analyzed, and this species has been observed in several areas of the former Fort Ord.
Emys marmorata Western pond turtle	-- / CSC / --	Associated with permanent or nearly permanent water in a wide variety of habitats including streams, lakes, ponds, irrigation ditches, etc. Require basking sites such as partially submerged logs, rocks, mats of vegetation, or open banks.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Phrynosoma blainvillii Coast horned lizard	-- / CSC / --	Associated with open patches of sandy soils in washes, chaparral, scrub, and grasslands.	**High** Suitable habitat is present within the Master Plan site. This species is known to occur and has been observed by DD&A biologists throughout the former Fort Ord. The nearest CNDDB occurrence is approximately 3.2 km from the Master Plan site.	**High** Suitable habitat is present within Phase 2 site. This species is known to occur and has been observed by DD&A biologists throughout the former Fort Ord. The nearest CNDDB occurrence is approximately 3.5 km from the Phase 2 site.

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			Master Plan	Phase 2
Rana boylii Foothill yellow-legged frog	-- / SC&CSC / --	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats, including hardwood, pine, and riparian forests, scrub, chaparral, and wet meadows. Rarely encountered far from permanent water.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Rana draytonii **California red-legged frog**	FT / CSC / --	Lowlands and foothills in or near permanent or late-season sources of deep water with dense, shrubby, or emergent riparian vegetation. During late summer or fall adults are known to utilize a variety of upland habitats with leaf litter or mammal burrows.	**Unlikely** No breeding habitat is present within the Master Plan site and the Master Plan site is not within 1.6 km of potential breeding ponds. The nearest CNDDB occurrence is approximately 8.5 km from the Master Plan site. The nearest known breeding pond on Fort Ord is 8.3 km (breeding only observed in 2011), and the nearest potential breeding pond is 2.02 km from the Master Plan site. Although the species has the potential to spread to the ponds near the Master Plan site, the potential for CRLF to occur within the Master Plan site at this time is unlikely based on the proximity to the known breeding locations.	**Unlikely** No breeding habitat is present within the Phase 2 site and the Phase 2 site is not within 1.6 km of potential breeding ponds. The nearest CNDDB occurrence is approximately 8.7 km from the Phase 2 site. The nearest known breeding pond on Fort Ord is 8.8 km (breeding only observed in 2011), and the nearest potential breeding pond is 2.5 km from the Phase 2 site. Although the species has the potential to spread to the ponds near the Phase 2 site, the potential for CRLF to occur within the Phase 2 site at this time is unlikely based on the proximity to the known breeding locations.
Taricha torosa Coast Range newt	-- / CSC / --	Occurs mainly in valley-foothill hardwood, valley-foothill hardwood-conifer, coastal scrub, and mixed chaparral but is known to occur in grasslands and mixed conifer types. Seek cover under rocks and logs, in mammal burrows, rock fissures, or man-made structures such as wells. Breed in intermittent ponds, streams, lakes, and reservoir.	**Unlikely** No suitable breeding habitat within the Master Plan site. Although suitable upland habitat for this species is present within the Master Plan site, this species has not been documented on the former Fort Ord. The nearest CNDDB occurrence is approximately 16 km from the Master Plan site.	**Unlikely** No suitable breeding habitat within the Phase 2 site. Although suitable upland habitat for this species is present within the Phase 2 site, this species has not been documented on the former Fort Ord. The nearest CNDDB occurrence is approximately 16 km from the Phase 2 site.
Thamnophis hammondii Two-striped garter snake	-- / CSC / --	Associated with permanent or semi-permanent bodies of water bordered by dense vegetation in a variety of habitats from sea level to 2400m elevation.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
FISH				
Eucyclogobius newberryi Tidewater goby	FE / CSC / --	Brackish water habitats, found in shallow lagoons and lower stream reaches.	**Not Present** No suitable habitat present within the Master Plan site.	**Not Present** No suitable habitat present within the Phase 2 site.
Oncorhynchus mykiss irideus Steelhead (South-central California coast DPS)	FT / -- / --	Coastal perennial and near perennial streams, with suitable spawning and rearing habitat and no major barriers.	**Not Present** No suitable habitat present within the Master Plan site.	**Not Present** No suitable habitat present within the Phase 2 site.
Spirinchus thaleichthys Longfin smelt	FC / ST&CSC / --	Euryhaline, nektonic & anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefers salinities of 15-30 PPT but can be found in completely freshwater to almost pure seawater.	**Not Present** No suitable habitat present within the Master Plan site.	**Not Present** No suitable habitat present within the Phase 2 site.

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INVERTEBRATES				
Bombus caliginosus Obscure bumble bee	-- / CNDDB / --	Native to the West Coast of the United States. Occurs primarily along the coast in grassy prairies and meadows within the Coast Range. This species can nest both under and above ground. When nesting above ground the species may utilize abandoned bird nests. Found in areas that are relatively humid including areas that are frequently foggy.	**Moderate** Suitable habitat present within the non-native grassland areas in the Master Plan site. The nearest CNDDB occurrence is approximately 10 km from the Master Plan site.	**Low** Only low-quality habitat present within Phase 2 site. The nearest CNDDB occurrence is approximately 10 km from the Phase 2 site.
Bombus occidentalis Western bumble bee	-- / CNDDB / --	Occurs in open grassy areas, urban parks, urban gardens, chaparral, and meadows. This species generally nests underground.	**Moderate** Suitable habitat present within the Master Plan site. The nearest CNDDB occurrence is approximately 8.3 km from the Master Plan site.	**Low** Only low-quality habitat present within Phase 2 site. The nearest CNDDB occurrence is approximately 8.4 km from the Phase 2 site.
Branchinecta lynchi Vernal pool fairy shrimp	FT / -- / --	Require ephemeral pools with no flow. Associated with vernal pool/grasslands from near Red Bluff (Shasta County), through the central valley, and into the South Coast Mountains Region. Require ephemeral pools with no flow.	**Unlikely** No suitable habitat present within the Master Plan site. Not reported in the CNDDB quads evaluated.	**Unlikely** No suitable habitat present within the Phase 2 site. Not reported in the CNDDB quads evaluated.
Coelus globosus Globose dune beetle	-- / CNDDB / --	Coastal dunes. These beetles are primarily subterranean, tunneling through sand underneath dune vegetation.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Danaus plexippus Monarch butterfly (California overwintering population)	-- / CNDDB / --	Overwinters in coastal California using colonial roosts generally found in Eucalyptus, pine and acacia trees. Overwintering habitat for this species within the Coastal Zone represents ESHA. Local ordinances often protect this species as well.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Euphilotes enoptes smithi **Smith's blue butterfly**	FE / -- / --	Most commonly associated with coastal dunes and coastal sage scrub plant communities in Monterey and Santa Cruz Counties. Plant hosts are *Eriogonum latifolium* and *E. parvifolium*.	**Unlikely** No suitable habitat present within the Master Plan site. Plant host species were not identified within the Master Plan site during surveys.	**Unlikely** No suitable habitat present within the Phase 2 site. Plant host species were not identified within the Phase 2 site during surveys.
Linderiella occidentalis **California linderiella**	-- / CNDDB / --	Ephemeral ponds with no flow. Generally associated with hardpans.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Tryonia imitator Mimic tryonia (California brackishwater snail)	-- / CNDDB / --	Inhabits coastal lagoons, estuaries and salt marshes. Found only in permanently submerged areas in a variety of sediment types. Tolerant of a wide range of salinities.	**Not Present** No suitable habitat present within the Master Plan site.	**Not Present** No suitable habitat present within the Phase 2 site.
PLANTS				
Agrostis lacuna-vernalis Vernal pool bent grass	-- / -- / 1B	Vernal pools (mima mounds) at elevations of 115-145 meters. Annual herb in the Poaceae family; blooms April-May.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Allium hickmanii Hickman's onion	-- / -- / 1B	Mesic areas of Closed-cone coniferous forests, maritime chaparral, coastal prairie, coastal scrub, and valley and foothill grasslands at elevations of 5-200 meters. Bulbiferous perennial herb in the Alliaceae family; blooms March-May.	**Unlikely** No suitable habitat is present within the Master Plan site.	**Unlikely** No suitable habitat is present within the Phase 2 site.

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Arctostaphylos hookeri* ssp. *hookeri **Hooker's manzanita**	-- / -- / 1B	Closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub on sandy soils at elevations of 85-536 meters. Evergreen shrub in the Ericaceae family; blooms January-June.	**Present** Two individuals were identified within the Master Plan site during surveys in Spring 2011. Suitable habitat present throughout the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site. Identified in the adjacent Master Plan site during surveys in Spring 2011. The nearest CNDDB occurrence is approximately 0.7 km from the Phase 2 site.
Arctostaphylos montereyensis **Toro manzanita**	-- / -- / 1B	Maritime chaparral, cismontane woodland, and coastal scrub on sandy soils at elevations of 30-730 meters. Evergreen shrub in the Ericaceae family; blooms February-March.	**Low** Suitable habitat is present within the Master Plan site; however, species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 0.3 km from the Master Plan site.	**Low** Suitable habitat is present within the Phase 2 site; however, species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 0.7 km from the Phase 2 site.
Arctostaphylos pajaroensis Pajaro manzanita	-- / -- / 1B	Chaparral on sandy soils at elevations of 30-760 meters. Evergreen shrub in the Ericaceae family; blooms December-March.	**Low** Suitable habitat is present within the Master Plan site; however, species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 1.7 km from the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Arctostaphylos pumila **Sandmat manzanita**	-- / -- / 1B	Openings of closed-cone coniferous forests, maritime chaparral, cismontane woodland, coastal dunes, and coastal scrub on sandy soils at elevations of 3-205 meters. Evergreen shrub in the Ericaceae family; blooms February-May.	**Present** One individual identified within the Master Plan site during surveys in Spring 2011. Suitable habitat present throughout the Master Plan site.	**Low** Suitable habitat present within Phase 2 site; however, species was not identified during 2011 botanical surveys. A broad 2015 CNDDB occurrence of this species encompasses most of the Phase 2 site.
Arenaria paludicola Marsh sandwort	FE / SE / 1B	Known from only two natural occurrences in Black Lake Canyon and at Oso Flaco Lake. Sandy openings of freshwater of brackish marshes and swamps at elevations of 3-170 meters. Stoloniferous perennial herb in the Caryophyllaceae family; blooms May-August.	**Unlikely** No suitable habitat present within the Master Plan site. Not reported in the CNDDB quads evaluated. Site outside the known range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Not reported in the CNDDB quads evaluated. Site outside the known range for this species.
Astragalus tener var. *tener* Alkali milk-vetch	-- / -- / 1B	Playas, valley and foothill grassland on adobe clay, and vernal pools on alkaline soils at elevations of 1-60 meters. Annual herb in the Fabaceae family; blooms March-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Astragalus tener var. *titi* Coastal dunes milk-vetch	FE / SE / 1B	Often found in vernally mesic, sandy areas of coastal bluff scrub, coastal dunes, and coastal prairie at elevations of 1-50 meters. Annual herb in the Fabaceae family; blooms March-May.	**Unlikely** No suitable habitat present within the Master Plan site. Site is outside the known elevation range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known elevation range for this species.
Bryoria spiralifera Twisted horsehair lichen	-- / -- / 1B	California North Coast coniferous forest at elevations of 0–30 meters. Often found on conifers, including *Picea sitchensis*, *Pinus contorta* var. *contorta*, *Pseudotsuga menziesii*, *Abies grandis*, and *Tsuga heterophylla*. Fruticose lichen in the Parmeliaceae family.	**Unlikely** No suitable habitat present within the Master Plan site. Site is outside the known elevation range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known elevation range for this species.

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Castilleja ambigua ssp. insalutata Pink Johnny-nip	-- / -- / 1B	Coastal prairie and coastal scrub at elevations of 0-100 meters. Annual herb in the Orobanchaceae family; blooms May-August.	**Low** Suitable habitat is present within Master plan site; however, species was not identified during the 2010 or 2011 botanical surveys. The nearest CNDDB occurrence is approximately 1.6 km from the Master Plan site.	**Low** Suitable habitat is present within Phase 2 site; however, species was not identified during the 2010 or 2011 botanical surveys. The nearest CNDDB occurrence is approximately 2 km from the Phase 2 site.
Ceanothus rigidus **Monterey ceanothus**	-- / -- / List 4	Closed cone coniferous forest, chaparral, and coastal scrub on sandy soils at elevations of 3-550 meters. Evergreen shrub in the Rhamnaceae family, blooms February-June.	**Present** Suitable habitat present within the Master Plan site. Identified within the Master Plan site during surveys in Spring 2011.	**Low** Suitable habitat present within the Phase 2 site. Not identified during 2011 botanical surveys, but species was identified in the adjacent Master Plan area. The CNDDB does not report an occurrence of this species within the seven quadrangles reviewed.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	-- / -- / 1B	Valley and foothill grassland on alkaline soils at elevations of 0-230 meters. Annual herb in the Asteraceae family; blooms May-November.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Chorizanthe minutiflora Fort Ord spineflower	-- / -- / 1B	Sandy openings of maritime chaparral and coastal scrub at elevations of 55-150 meters. Only known occurrences on Fort Ord National Monument. Annual herb in the Polygonaceae family; blooms April-July.	**High** Suitable habitat is present within the Master Plan site. The nearest CNDDB occurrence is reported approximately 1.4 km from the Master Plan site.	**High** Suitable habitat is present within the Phase 2 site. The nearest CNDDB occurrence is reported approximately 1.7 km from the Phase 2 site.
Chorizanthe pungens* var. *pungens **Monterey spineflower**	FT / -- / 1B	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland on sandy soils at elevations of 3-450 meters. Annual herb in the Polygonaceae family; blooms April-July.	**Present** Identified within the Master Plan site during surveys in 2011. The CNDDB reports an occurrence of this species that includes most of the Master Plan site	**Present** Identified within the Phase 2 site during surveys in 2011. The CNDDB reports an occurrence of this species that encompasses the Phase 2 site.
Chorizanthe robusta* var. *robusta **Robust spineflower**	FE / -- / 1B	Openings in cismontane woodland, coastal dunes, maritime chaparral, and coastal scrub on sandy or gravelly soils at elevations of 3-300 meters. Annual herb in the Polygonaceae family; blooms April-September.	**Unlikely** Suitable habitat is present within the Master Plan site; however, the nearest CNDDB occurrence is reported 26 km from the Master Plan site, and species was not identified on the site during 2011 botanical surveys.	**Unlikely** Suitable habitat is present within the Phase 2 site; however, the nearest CNDDB occurrence is reported 26 km from the Phase 2 site, and species was not identified on the site during 2011 botanical surveys.
Clarkia jolonensis Jolon clarkia	-- / -- / 1B	Cismontane woodland, chaparral, riparian woodland, and coastal scrub at elevations of 20-660 meters. Annual herb in the Onagraceae family; blooms April-June.	**Low** Suitable habitat is present within the Master Plan site; however, species was not identified on the site during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 4.5 km from the Master Plan site.	**Low** Suitable habitat is present within the Phase 2 site; however, species was not identified on the site during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 4.5 km from the Phase 2 site.
Collinsia multicolor San Francisco collinsia	-- / -- / 1B	Closed-cone coniferous forest and coastal scrub, sometimes on serpentinite soils, at elevations of 30-250 meters. Annual herb in the Plantaginaceae family; blooms March-May.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.

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Cordylanthus rigidus* ssp. *littoralis **Seaside bird's-beak**	-- / SE / 1B	Closed-cone coniferous forests, maritime chaparral, cismontane woodlands, coastal dunes, and coastal scrub on sandy soils, often on disturbed sites, at elevations of 0-425 meters. Annual hemi-parasitic herb in the Orobanchaceae family; blooms April-October.	**Low** Suitable habitat is present within the Master Plan site; however, species was not identified on the site during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 1.6 km from the Master Plan site.	**Low** Suitable habitat is present within the Phase 2 site; however, species was not identified on the site during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 2 km from the Phase 2 site.
Delphinium californicum ssp. interius Hospital Canyon larkspur	-- / -- / 1B	Openings in chaparral, coastal scrub, and mesic areas of cismontane woodland at elevations of 230-1095 meters. Perennial herb in the Ranunculaceae family; blooms April-June.	**Unlikely** Suitable habitat is present within the Master Plan site; however, site is outside the known elevation range for this species.	**Unlikely** Suitable habitat is present within the Phase 2 site; however, site is outside the known elevation range for this species.
Delphinium hutchinsoniae Hutchinson's larkspur	-- / -- / 1B	Broadleaved upland forest, chaparral, coastal scrub, and coastal prairie at elevations of 0-427 meters. Perennial herb in the Ranunculaceae family; blooms March-June.	**Unlikely** Suitable habitat is present within the Master Plan site; however, this species typically occurs within canyons.	**Unlikely** Suitable habitat is present within the Phase 2 site; however, species this species typically occurs within canyons.
Delphinium umbraculorum Umbrella larkspur	-- / -- / 1B	Cismontane woodland at elevations of 400-1600 meters. Perennial herb in the Ranunculaceae family; blooms April-June.	**Unlikely** Suitable habitat present within the Master Plan site; however, site is outside the known elevation range for this species.	**Unlikely** Suitable habitat present within the Phase 2 site; however, site is outside the known elevation range for this species.
Eriastrum virgatum Virgate eriastrum	-- / -- / List 4	Coastal bluff scrub, chaparral, coastal dunes, and coastal scrub on sandy soils at elevations of 45 – 700 meters. Annual herb in the Polemoniaceae family; blooms May – July.	**High** Suitable habitat present within the site, and this species has been observed within the adjacent Phase 1 site.	**High** Suitable habitat present within the site, and this species has been observed within the adjacent Phase 1 site.
Ericameria fasciculata **Eastwood's goldenbush**	-- / -- / 1B	Openings in closed-cone coniferous forest, maritime chaparral, coastal dunes, and coastal scrub on sandy soils at elevations of 30-275 meters. Evergreen shrub in the Asteraceae family; blooms July-October.	**Low** Suitable habitat is present within the Master Plan site, and the CNDDB reports a broad 2015 occurrence of this species directly adjacent to the site; however, species not identified on the Master Plan site during 2011 surveys.	**Low** Marginal habitat present within the Phase 2 site, and the CNDDB reports a broad 2015 occurrence of this species adjacent to the site; however, species not identified on the Phase 2 site during 2011 surveys.
Eriogonum nortonii Pinnacles buckwheat	-- / -- / 1B	Chaparral and valley and foothill grassland on sandy soils, often on recent burns, at elevations of 300-975 meters. Annual herb in the Polygonaceae family; blooms May-September.	**Unlikely** Marginal habitat present within the Master Plan site; however, site is outside the known elevation range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known elevation range for this species.
Erysimum ammophilum **Sand-loving wallflower**	-- / -- / 1B	Openings in maritime chaparral, coastal dunes, and coastal scrub on sandy soils at elevations of 0-60 meters. Perennial herb in the Brassicaceae family; blooms February-June.	**Low** Suitable habitat present within the Master Plan site; however, site marginally is outside the known elevation range for this species, and species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 0.7 km from the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site; however, site marginally is outside the known elevation range for this species, and species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 1 km from the Phase 2 site.

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Erysimum menziesii Menzies' wallflower	FE / SE / 1B	Coastal dunes at elevations of 0-35 meters. Perennial herb in the Brassicaceae family; blooms March-June.	**Unlikely** No suitable habitat present within the Master Plan site. Site is outside the known elevation range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known elevation range for this species.
Fritillaria liliacea Fragrant fritillaria	-- / -- / 1B	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often serpentinite, at elevations of 3-410 meters. Bulbiferous perennial herb in the Liliaceae family; blooms February-April.	**Unlikely** Suitable habitat present within the Master Plan site; however, soils within the Master Plan site are unlikely to support this species.	**Unlikely** Suitable habitat present within the Phase 2 site; however, soils within the Phase 2 site are unlikely to support this species.
Gilia tenuiflora* ssp. *arenaria **Sand gilia**	FE / ST / 1B	Openings in maritime chaparral, cismontane woodland, coastal dunes, and coastal scrub on sandy soils at elevations of 0-45 meters. Annual herb in the Polemoniaceae family; blooms April-June.	**Low** Suitable habitat present within the Master Plan site; however, site marginally is outside the known elevation range for this species, and species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 0.5 km from the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site; however, site is marginally outside the known elevation range for this species, and species was not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 1 km from the Phase 2 site.
Hesperocyparis goveniana Gowen cypress	FT / -- / 1B	Closed-cone coniferous forest and maritime chaparral at elevations of 30-300 meters. Evergreen tree in the Cupressaceae family. Natively occurring only at Point Lobos near Gibson Creek and the Huckleberry Hill Nature Preserve near Highway 68.	**Unlikely** Suitable habitat present within the Master Plan site; however, site is outside the known distribution range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known distribution range for this species.
Hesperocyparis macrocarpa Monterey cypress	-- / -- / 1B	Closed-cone coniferous forest at elevations of 10-30 meters. Evergreen tree in the Cupressaceae family. Natively occurring only at Cypress Point in Pebble Beach and Point Lobos State Park; widely planted and naturalized elsewhere.	**Unlikely** No suitable habitat present within the Master Plan site. Site is outside the known elevation and distribution range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site. Site is outside the known elevation and distribution range for this species.
Holocarpha macradenia Santa Cruz tarplant	FT / SE / 1B	Coastal prairies and valley foothill grasslands, often clay or sandy soils, at elevations of 10-220 meters. Annual herb in the Asteraceae family; blooms June-October.	**Unlikely** Suitable habitat present within Master Plan site; however, the site is outside of the known distribution range for this species.	**Unlikely** No suitable habitat present within Phase 2 site. Site is outside of the known distribution range for this species.
Horkelia cuneata ssp. sericea Kellogg's horkelia	-- / -- / 1B	Closed-cone coniferous forests, maritime chaparral, and openings in coastal scrub on sandy or gravelly soils at elevations of 10-200 meters. Perennial herb in the Rosaceae family; blooms April-September.	**Low** Suitable habitat present within the Master Plan site. The CNDDB reports a 1992 occurrence within the site; however, species was not identified during 2010 or 2011 botanical surveys.	**Low** Suitable habitat present within the Phase 2 site. The CNDDB reports a 1992 occurrence of this species within the site; however, species was not identified during 2010 or 2011 botanical surveys.
Horkelia marinensis Point Reyes horkelia	-- / -- / 1B	Coastal dunes, coastal prairie, and coastal scrub on sandy soils at elevations of 5-350 meters. Perennial herb in the Rosaceae family; blooms May-September.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Lasthenia conjugens Contra Costa goldfields	FE / -- / 1B	Mesic areas of valley and foothill grassland, alkaline playas, cismontane woodland, and vernal pools at elevations of 0-470 meters. Annual herb in the Asteraceae family; blooms March-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Layia carnosa Beach layia	FE / SE / 1B	Coastal dunes and coastal scrub on sandy soils at elevations of 0-60 meters. Annual herb in the Asteraceae family; blooms March-July.	**Unlikely** Marginal habitat present within Master Plan site; however, site is outside the known elevation range for this species.	**Unlikely** Marginal habitat present within Phase 2 site; however, the site is outside the known elevation range for this species.
Legenere limosa Legenere	-- / -- / 1B	Vernal pools at elevations of 1-880 meters. Annual herb in the Campanulaceae family; blooms April-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Lupinus tidestromii Tidestrom's lupine	FE / SE / 1B	Coastal dunes at elevations of 0-100 meters. Perennial rhizomatous herb in the Fabaceae family; blooms April-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Malacothamnus palmeri var. *involucratus* Carmel Valley bush-mallow	-- / -- / 1B	Chaparral, cismontane woodland, and coastal scrub at elevations of 30-1100 meters. Deciduous shrub in the Malvaceae family; blooms May-August.	**Low** Suitable habitat present within the Master Plan site. Not identified during the 2010 or 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 6.8 km from the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site. Not identified during the 2010 or 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 7 km from the Phase 2 site.
Malacothrix saxatilis var. *arachnoidea* Carmel Valley malacothrix	-- / -- / 1B	Chaparral and coastal scrub on rocky soils at elevations of 25-1036 meters. Perennial rhizomatous herb in the Asteraceae family; blooms June-December.	**Unlikely** Suitable habitat present within Master Plan site; however, soils within the site are unlikely to support this species.	**Unlikely** Suitable habitat present within Phase 2 site; however, soils within the site are unlikely to support this species.
Meconella oregana Oregon meconella	-- / -- / 1B	Coastal prairie and coastal scrub at elevations of 250-620 meters. Annual herb in the Papaveraceae Family; blooms March-April.	**Unlikely** Suitable habitat present within the Master Plan site; however, site is outside the known elevation range for this species.	**Unlikely** Marginal habitat present within the Phase 2 site; however, and site is outside the known elevation range for this species.
Microseris paludosa Marsh microseris	-- / -- /1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grasslands at elevations of 3-300 meters. Perennial herb in the Asteraceae family; blooms April-June (July).	**Low** Marginal habitat present within the Master Plan site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 2.3 km from the Master Plan site.	**Low** Marginal habitat present within the Phase 2 site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is reported approximately 2.8 km from the Phase 2 site.
Monardella sinuata ssp. *nigrescens* Northern curly-leaved monardella	-- / -- /1B	Chaparral, coastal dunes, coastal scrub, and lower montane coniferous forest (ponderosa pine sandhills) on sandy soils at elevations of 0-300 meters. Annual herb in the Lamiaceae family; blooms April-September.	**Moderate** Suitable habitat present within the Master Plan site. The CNDDB reports a 2013 occurrence of this species adjacent to the Master Plan site.	**Low** Marginal habitat present within the Phase 2 site. The CNDDB reports a 2013 occurrence of this species 0.6 km from the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Monolopia gracilens Woodland woollythreads	-- / -- / 1B	Chenopod scrub and valley and foothill grassland on sandy soils at elevations of 60-800 meters. Annual herb in the Asteraceae family; blooms: February-May.	**Low** Low quality habitat present within the Master Plan site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 8.3 km from the Master Plan site.	**Low** Low-quality habitat present within Phase 2 site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 8.4 km from the Phase 2 site.
Pinus radiata Monterey pine	-- / -- / 1B	Closed-cone coniferous forest at elevations of 25-185 meters. Evergreen tree in the Pinaceae family. Only three native stands in CA, at Ano Nuevo, Cambria, and the Monterey Peninsula; introduced in many areas.	**Unlikely** No suitable habitat present within the Master Plan site, and site is outside the known native range for this species.	**Unlikely** No suitable habitat present within the Phase 2 site, and site is outside the known native range for this species.
Piperia yadonii **Yadon's rein orchid**	FE / -- / 1B	Sandy soils in coastal bluff scrub, closed-cone coniferous forest, and maritime chaparral at elevations of 10-510 meters. Annual herb in the Orchidaceae family; blooms May-August.	**Low** Suitable habitat present within the Master Plan site. Not identified during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is approximately 2.5 km from the Master Plan site.	**Low** Marginal habitat present within the Phase 2 site. Not identified during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is approximately 3 km from the Phase 2 site.
Plagiobothrys chorisianus var. *chorisianus* Choris' popcorn-flower	-- / -- / 1B	Mesic areas of chaparral, coastal prairie, and coastal scrub at elevations of 15-160 meters. Annual herb in the Boraginaceae family; blooms March-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Potentilla hickmanii Hickman's cinquefoil	FE / SE / 1B	Coastal bluff scrub, closed-cone coniferous forests, vernally mesic meadows, and freshwater marshes and swamps at elevations of 10-149 meters. Perennial herb in the Rosaceae family; blooms April-August.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Ramalina thrausta Angel's hair lichen	-- / -- / 2B	North coast coniferous forest on dead twigs and other lichens. Epiphytic fructose lichen in the Ramalinaceae family. In northern CA it is usually found on dead twigs, and has been found on *Alnus rubra, Calocedrus decurrens, Pseudotsuga menziesii, Quercus garryana*, and *Rubus spectabilis*. In Sonoma County it grows on and among dangling mats of *R. menziesii* and *Usnea* spp.	**Unlikely** No suitable habitat present within the Master Plan site	**Unlikely** No suitable habitat present within the Phase 2 site.
Rosa pinetorum Pine rose	-- / -- / 1B	Closed-cone coniferous forest at elevations of 2-300 meters. Shrub in the Rosaceae family; blooms May-July. Possible hybrid of *R. spithamea, R. gymnocarpa*, or others; further study needed.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Sidalcea malachroides Maple-leaved checkerbloom	-- / -- / List 4	Broadleaved upland forest, coastal prairie, coastal scrub, north coast coniferous forest, and riparian woodlands, often in disturbed areas, at elevations of 2-700 meters. Perennial herb in the Malvaceae family; blooms April-August.	**Low** Suitable habitat present within the Master Plan site. Not identified during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is approximately 10 km from the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site. Not identified during 2010 and 2011 botanical surveys. The nearest CNDDB occurrence is approximately 10 km from the Phase 2 site.

Species	Status (USFWS/ CDFW/CNPS)	General Habitat	Potential Occurrence Within Project Site	
			Master Plan	Phase 2
Stebbinsoseris decipiens Santa Cruz microseris	-- / -- / 1B	Broadleaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, and openings in valley and foothill grassland, sometimes on serpentinite, at elevations of 10-500 meters. Annual herb in the Asteraceae family; blooms April-May.	**Low** Suitable habitat present within the Master Plan site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 6.3 km from the Master Plan site.	**Low** Suitable habitat present within the Phase 2 site. Not identified during 2011 botanical surveys. The nearest CNDDB occurrence is approximately 6.4 m from the Phase 2 site.
Trifolium buckwestiorum Santa Cruz clover	-- / -- / 1B	Broadleaved upland forest, cismontane woodland, and margins of coastal prairie on gravelly soils at elevations of 105-610 meters. Annual herb in the Fabaceae family; blooms April-October.	**Unlikely** Suitable habitat present within Master Plan site; however, soils within the site are unlikely to support this species and species was not identified during 2011 botanical surveys.	**Unlikely** Suitable habitat present within Phase 2 site; however, soils within the site are unlikely to support this species and species was not identified during 2011 botanical surveys.
Trifolium hydrophilum Saline clover	-- / -- / 1B	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools at elevations of 0-300 meters. Annual herb in the Fabaceae family; blooms April-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Trifolium polyodon Pacific Grove clover	-- / SR / 1B	Closed-cone coniferous forest, coastal prairie, meadows and seeps, and mesic areas in valley and foothill grassland at elevations of 5-120 meters. Annual herb in the Fabaceae family; blooms April-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.
Trifolium trichocalyx Monterey clover	FE / SE / 1B	Sandy openings and burned areas of closed-cone coniferous forest at elevations of 30-240 meters. Annual herb in the Fabaceae family; blooms April-June.	**Unlikely** No suitable habitat present within the Master Plan site.	**Unlikely** No suitable habitat present within the Phase 2 site.

STATUS DEFINITIONS:

Federal
FE = listed as Endangered under ESA
FT = listed as Threatened under ESA
BCC = Birds of Conservation Concern
-- = not listed

State
SE = listed as Endangered under CESA
ST = listed as Threatened under CESA
SR = listed as Rare under CESA
CFP = California Fully Protected Species
CSC = CDFW Species of Special Concern
WL = CDFW Watch List
CNDDB = CNDDB Special Animals List
-- = not listed

California Native Plant Society
1B = List 1B species; rare, threatened, or endangered in California
2B = List 2B species; rare, threatened, or endangered in California but more common elsewhere
List 4 = Limited distribution (CNPS Watch List)
-- = not listed

Bold font indicates Fort Ord HMP Species

POTENTIAL TO OCCUR:
Present – known occurrence of species within the site
High – known occurrence of species in the vicinity from the CNDDB or other documentation; presence of suitable habitat conditions
Moderate – known occurrence of species in the vicinity from the CNDDB or other documentation; presence of marginal habitat conditions
Low – species known to occur in the vicinity from the CNDDB or other documentation; presence of low-quality habitat conditions
Unlikely – species not known to occur in the vicinity from the CNDDB or other documentation; no suitable habitat is present
Not Present – species not observed during surveys

APPENDIX D.

The Birds of Fort Ord East of Route 1

THE BIRDS OF FORT ORD EAST OF ROUTE 1

Revised 5 Feb 07

David Styer with historic data provided by Don Roberson

An asterisk (*) after a bird's name means that the species was probably breeding, or confirmed breeding on Fort Ord east of Route 1. This list is based almost entirely on my own inventories. These have taken place during the following time periods: 25 Feb - 16 Jun 96, 9 Jul - 16 Aug 97, 27 Jun - 16 Aug 98, 27 Jul - 19 Aug 99, 7 Jun - 28 Jun 00, 5 Feb 01 - 3 Mar 01, 17 Sep 01 - 2 Nov 01, 13 Dec - 31 Dec 01, and most of 2002 and 2003. In 2004–2006 only the more outstanding sightings were noted. The few records based on other people's sightings are noted. All collective references to Christmas Bird Counts (CBCs) refer to the nine Monterey CBCs provided by Roberson. This count takes place in a 15-mile diameter circle that includes the southwest portion of Ft. Ord.

1.	Cackling Goose	1 record: 1 seen by D. Roberson's CBC group on 29 Dec 00.
2.	Canada Goose*	Seen in small numbers. Nested, but unsuccessfully in 2002. Successfully nested at Machine Gun Flats in 2005.
3.	Wood Duck	The first record was 5 males at Boy Scout Lake on 12 Oct 05. Some were seen there until 7 Dec 05.
4.	Gadwall*	The first record was five seen on 8 Aug 98 on a vernal pond. Expected in small numbers. In 2002 there were 3 records from 12 Mar to 24 Mar, and 5 records from 29 Aug to 29 Oct, all at Mudhen Lake. Seen in January and December in 2003.Nested on Machine Gun Flats in 2005; young noted on 22 May 05.
5.	American Wigeon	Winter visitor. A pair was on Mudhen Lake on 18 Feb 01; 3 were there on 23 Mar 02, and 1 to 2 pairs were there from 23 Nov 02 through 31 Jan 03. Seen regularly at the vernal pools 29 Jan 05 through 2 Apr 05. Also, seen regularly at Boy Scout Lake Nov and Dec 05, with approximately 10 there on 13 Dec.
6.	Mallard*	Seen on ponds through year. Young seen on Mudhen Lake 6 Jun 96 and on Boy Scout Pond on 2 Jun 96. Young seen on several ponds in 1998. One hundred to three hundred regularly visited Mudhen Lake in the fall of 2001. There were 87 visiting the vernal pool at Machine Gun Flats on 2 Mar 04. Bill Collins saw around 500 on the pond behind Range 37 in the fall of 2000. Ronnie L. Ryno found young at Mudhen Lake on 9 Jun 89 during the Monterey County Breeding Bird Atlas project.
7.	Cinnamon Teal	First record: 1 male on the pond behind Range 37 on 31 Mar 96. Two spent most of Aug 99 on Fox Pond. There were several records in Mar 05, and 3 were on Mudhen Lake on 21 Jul 05.In early 2006 they were seen on Boy Scout Lake:2 on 24 Jan and 4 on 21 Feb.
8.	Northern Shoveler	A pair was at Mudhen Lake on 29 Oct 01, 6 were there 6 Oct 02 and 3 were there on 25 Oct 05.
9.	Northern Pintail	First record: 3 females on Mudhen Lake on 22 Oct 01. Six were there, including a male, on 2 Nov 01, 2 were there on 22 Oct 02, and a pair was at Boy Scout Lake on 13 Dec 05.

10.	Green-winged Teal	A pair was at Mudhen Lake from 30 Mar to 7 Apr 96. They visited Mudhen Lake in early Nov 02, and 20 were there on 5 Nov 02. On 12 Dec 05 19 males were on Mudhen Lake. The next day a flock of 35 (males and females) were on Boy Scout Lake. They were seen there in dwindling numbers up until 21 Feb 06.
11.	Redhead	A male was seen at Mudhen Lake from 13 Dec 01 through 4 Feb 02.
12.	Ring-necked Duck	An occasional fall and winter visitor. 1st record: 1 male in holding pond near west end of Eucalyptus Rd. on 28 Jun 98.There were 5 females on Mudhen Lake on 20 and 27 Nov, and 1 male there on 1 Dec 06. Notably, Bill Collins saw around 35 in the pond behind Range 37 in the fall of 2000.
13.	Greater Scaup	1 record: 1 female in the holding pond at the west end of Eucalyptus Road on 26 Oct 01.
14.	Bufflehead	One female spent the entire summer of 1998 on the same pond (see ring-necked Duck). 2 females were on the same pond in Jan 03. A pair was on Machine Gun Flats on 22 Feb 05.
15.	Common Goldeneye	Seen in winter 1996 on above-mentioned pond before inventory started, and in Dec 01.
16.	Hooded Merganser	2 records: One immature male on Mudhen Lake 25 Feb - 24 Mar 96, and 1 female on Mudhen Lake on 24 Nov 06.
17.	Common Merganser	1 record: seen in the Salinas River on 30 Apr 05.
18.	Ruddy Duck	Occasional visitor. 2 males on the vernal pool on Machine Gun Flats on 17 Jul 98, and 1 female on the Catfish Pond on 18 Oct 02.Two females spent much of Dec 05 on Mudhen Lake. A resident of Mudhen Lake beginning 9 Oct 06.
19.	Wild Turkey*	Seen irregularly during the inventory. Dick Pitschka and I saw 3 adult females and 7 young across Jacks Road from Mudhen Lake on 21 Jun 00. Noticeably more common by 2001 than in the past. In 2003 and 2004, 2 or 3 flocks of up to 20 were seen, and they continue to have young.
20.	California Quail*	Seen, except in the most open grassland, throughout Ft. Ord, throughout the inventory. Possibly increasing: in 1996 most coveys with 10 or fewer birds. In 2001 many coveys with 10 to 20 birds. They continue roughly the same size through 2006. I have been told that coveys with a 100 California Quail were common in the past.
21.	Loon species	2 flew over the BLM office area on 2 Nov 01.
22.	Pied-billed Grebe*	Seen throughout the year on permanent ponds. In 1996 and 1997 young produced only on Mudhen Lake. In 1998 young were produced on at least four vernal ponds.
23.	Eared Grebe	2 records: 1 stayed at the holding pond on the west end of Eucalyptus Road from 4 Oct to 11 Oct 01, and 1 was on Mudhen lake from 15 Nov 05 through 29 Nov 05.

24.	Double-crested Cormorant	Winter visitor to Mudhen Lake. Seen late December through March, irregularly until May. Up to 5 have been seen at once. On 30 Nov 06 30 flew over Mudhen Lake.
25.	American Bittern	1 record: 1 seen at Mudhen Lake on and around 7 Aug 99.
26.	Great Blue Heron	One or two regularly visit the permanent ponds.
27.	Great Egret	Occasional visitor to the permanent ponds. 1 frequently seen at the dwindling Mudhen Lake in 2003. One at a puddle in East Garrison on 22 Mar 05 was a surprise.
28.	Green Heron	4 records prior to 2006: 1 seen by Sam Fitton on 6 Apr 98, 1 seen at Mudhen Lake 11 Jun 02, 1 seen by Steve Moore at the pond on Crescent Bluff Road on 25 Apr 03, and 1 flew from Toro Creek Pond on 7 Jul 05. Bruce Gerow saw them regularly at the mouth of El Toro Creek, just off Ft. Ord. There were 5 records at Mudhen Lake and Boy Scout Lake in 2006.
29.	Turkey Vulture	Seen throughout Ft. Ord throughout the year, although uncommon in the backcountry in the fall. Possibly breeding, but not confirmed, although evidence continues to build. Numbers on CBCs have increased almost steadily from 1 in 1984 to 17 in 2001.
30.	Osprey	1st record: 1 eating on top of high-tension tower by Range 45 on 6 Apr 96. 1 flew over Mudhen Lake on 19 Oct 01. In 2002 Osprey were seen on 4 Jan, 8 Jan, and 11 Apr. In 2003 there were 3 records: 1 on 3 Jan at Mudhen Lake, 1 in April flying over Ingman Court, and 1 on 3 May at El Toro Creek. Again, one was seen at Mudhen Lake on 3 Jan 04.
31.	White-tailed Kite*	Seen in small numbers (1 or 2) over grasslands and vernal pools. In the spring of 1998 Roberto Maceira saw approximately 10 spending the day by one pool, and in the summer of 2006 Tim Buhl saw a group of 11, including young.
32.	Bald Eagle	An immature bird was seen at Mudhen Lake in the spring of 1999. On 4 Mar 02 Bill Collins saw 1 subadult on Machine Gun Flats.
33.	Northern Harrier	A winter resident on the grasslands, and an occasional migrant elsewhere. 1 to 3 are usually seen in grasslands. One summer record: 1 on 8 Jul 98.
34.	Sharp-shinned Hawk	Fairly common fall migrant, arriving in Sep, and uncommon spring migrant. Also seen on 1 and 2 Aug 99. A winter resident in 2003 and 2004.
35.	Cooper's Hawk*	Seen throughout the inventory, and widely, but thinly spread over Ft. Ord.
36.	Red-shouldered Hawk*	Common year-round in the "front" of Ft. Ord, near housing. Seen less in other locations. Ronnie L Ryno observed an occupied nest near Mudhen Lake 16 Apr 86.

37.	Red-tailed Hawk*	Seen throughout Ft. Ord throughout the year. Eleven Red-tailed Hawks wheeling over the BLM office on 25 Jul 98 was an extraordinary sight. Nests are seen regularly; for example, Ronnie L. Ryno saw on occupied nest on 16 Apr 86. Usually around 10 are seen on CBCs, but on 28 Dec 84 there were 25 counted.
38.	Ferruginous Hawk	2 records: Don Roberson saw one in the Grasslands on 28 Dec 84, and I saw 1 near Imjin Rd. on 14 Apr 02.
39.	Golden Eagle	1st record: 1 over grassland, Oil Well Rd., on 6 Apr 96. An uncommon fall migrant, rare in other seasons. Seen in February, March, and September in 2003. One was seen on the CBC on 29 Dec 00, and on Lightfighter Road during the CBC on 27 Dec 05.
40.	Crested Caracara	1 record: Tim Buhl saw 1 fly across Highway 1 on 11 Sep 06.
41.	American Kestrel*	Seen throughout the year. Perhaps 4 to 8 pairs breed on Ft. Ord. Especially visible on the grasslands. On the 9 CBCs the low count was 4 and the high count was 14.
42.	Merlin	Uncommon migrant or winter visitor:1 was seen near Laguna Seca during the CBC on 27 Dec 89. 1 at Machine Gun Flats on 9 Mar 96 and on 11 Jan 02, 1 on First Ave. on 19 Oct 01, 1 at Parker Flats on 30 Dec 03, and 1 by Fox Pond on 9 Dec 04. 1 was seen at El Toro Creek on 26 Feb 05, and another was seen at Machine Gun Flats on 25 Mar 05.
43.	Peregrine Falcon	One seen circling over First Ave. on 4 Oct 01.
44.	Prairie Falcon	3 records: 1 seen at Machine Gun Flats on 19 Oct 01, 1 seen by Bill Reese on 27 Dec 04, and 1 was seen flying over Old Reservation Rd. on 30 Aug 06.
45.	Virginia Rail	1 record: 1 first heard on 28 Oct responded repeatedly to a taped call on 30 Oct 06.
46.	Sora	Few records: 1 on pond behind Range 37 on 31 Mar 96; 1 seen on Mudhen Lake on 1 and 2 Mar 01, and 1 was at the Catfish Pond much of Oct 04. They were heard from 21 Oct to 13 Nov 06 on Mudhen Lake, with a maximum of 3 heard on 26 Oct.
47.	Common Moorhen	2 records of single individuals on Mudhen Lake: on 23 Oct 01, and seen from16 Oct to 23 Oct 06.
48.	American Coot*	In 1996 common through April, then most gone. Approximately 2 young produced in 1996 and 1997. In 1998 seen in summer on at least 6 ponds, with at least 25 young produced. In the dry year, 2001, only a pair at the Catfish Pond produced young (5). By summer 2004 all ponds except the Catfish Pond had dried, so Coots could only be seen there. Coots returned to the refilled Mudhen Lake by 25 Mar 05, and approximately 40 were seen there on 14 Nov 06.

49.	Killdeer	Seen at Mudhen Lake through Mar 96, but not later that year. Up to 8 seen at the vernal pool behind the BLM buildings in July and August of 1998. Larger numbers, e.g., 26 on 11 Dec 02, seen in fall or winter in fields such as Parker Flats.
50.	Spotted Sandpiper	1 record: 2 in breeding plumage at Fox Pond on 4 Jul 98.
51.	Solitary Sandpiper	3 records: 1 bird at vernal pond behind BLM headquarters on 1 Aug 98, 1 at the Catfish Pond on 29 Jul 03, and there was also 1 on the Salinas River at the mouth of El Toro Creek on 3 May 03.
52.	Greater Yellowlegs	2 March records in 1996: 6 on Reserve 12 on 9 Mar and 1 heard at Mudhen Lake on 24 Mar. Seen visiting the mud-flats behind the BLM buildings in July and August of 1998, at Fox Pond in Aug 99, 3 on Machine Gun Flats on 11 Jan 02. Visited Mudhen Lake and Machine Gun Flats in March, April, October, and November in 2003. There were 14 on Machine Gun Flats on 2 Mar 04, and 22 on 14 Mar 05.1 flew over South Boundary Road during the CBC on 29 Dec 00.
53.	Whimbrel	1 record: on 29 Jul 03 one flew over me on Parker Flats Road, and circled around and called.
54.	Western Sandpiper	1 record: 1 at Fox Pond on 14 Aug 99.
55.	Least Sandpiper	1 stayed at Fox Pond in 1999. First record: 31 Jul 99. Mary Paul saw 2 at Boy Scout Lake on19 Dec 05, and 1 was seen at the pond by Riso Ridge Road on 13 Nov 06.
56.	Long-billed Dowitcher	Visitors to Fox Pond in 1999. I saw 1 on 5 Aug, the first record, and 10 or more on 18 Aug.
57.	Wilson's Snipe	Steve Moore and Suzy Worcester have seen several at vernal pools; e.g., they saw 1 at Twin Pond on 6 Apr 03. In 2004 there was 1 at Machine Gun Flats on 22 Apr, and there were 2 at the Catfish Pond on 16 and 21 Oct. 3 records in 2005: 10 were counted at Machine Gun Flats on 29 Jan, 2 at Mudhen Lake on 29 Oct, and 1 at Toro Creek Pond on23 Nov. One was at Machine Gun Flats on 23 Jan 06.
58.	Wilson's Phalarope	First record: 1 immature bird on pond behind BLM office on 2 Aug 98.There were 3 on Fox Pond in Aug 99.
59.	Red-necked Phalarope	3 on the pond on Reserve 5 on 26 Jul 97, up to 19 on Fox Pond in Aug 99, and up to 6 on Mudhen Lake in Aug 06.
60.	Red Phalarope	1 record: 1 seen by Bill Reese's CBC group on Mudhen Lake on 27 Dec 05.
61.	Mew Gull	1 record: a large and varied group of gulls were on top of the Commissary building during the CBC count on 28 Dec 84, when Ft. Ord was an active military base. There were 130 of these gulls.
62.	California Gull	Several are regularly seen flying over Ft. Ord and visiting such places as Burger King in fall and winter. Don Roberson saw 1105 on the commissary roof during the CBC on 28 Dec 84.
63.	Herring Gull	1 record: 38 on 28 Dec84 (see comment at Mew Gull).

64.	Thayer's Gull	1 record: 1 adult on 28 Dec84 (see comment at Mew Gull).
65.	Western Gull	2 records: Don Roberson counted 159 on the Commissary roof during the 28 Dec 84 CBC, and a flock of approximately 6 were seen flying over CSUMB on 19 Jul 98.
66.	Glaucous-winged Gull	1 record: 1 on 28 Dec84 (see comment at Mew Gull).
67.	Black-legged Kittiwake	1 record: an exhausted individual found by Shirley Tudor in the Inland Ranges on 25 Feb 11.
68.	Elegant Tern	2 records: Sam Fitton heard 1 on 26 Jul 97, and Bruce Gerow heard 1 on 1 Aug 98.
69.	Rock Pigeon*	In spite of being common in the housing areas of Ft. Ord, they are infrequently seen in the interior backcountry. There are a few records each year.
70.	Band-tailed Pigeon	Chuck Haugen had seen them along El Toro Creek. Charlie Saunders and I saw 5 on 18 Mar 03 flying over Trail 22. Following that, I saw 24 on 9 May, 7 on 16 Jun, and 3 on 11 Nov 03. In 2006 there were 6 at the BLM Offices on 4 Jan, 10 at Engineer Canyon Road on 8 Mar, and 30 down from Mudhen Lake on 5 Apr. Fifteen were seen on the CBC on 27 Dec 96.
71.	Eurasian Collared-Dove	
72.	Mourning Dove*	Seen, usually 1 to 4 at a time, throughout the inventory and in all areas. On 24 Jul 97, Robin Whatley and I counted over 60 in one spot along Oil Well Road, and I saw approximately 60 by Eucalyptus Road on 15 Oct 06. Less common in the dry years of 2002 and 2003, but a flock of 30 was seen in the grasslands on 2 Dec 03.
73.	Greater Roadrunner*	Few records: near Mudhen Lake: 1 heard on 6 Apr 96 and 1 heard on 2 Nov 01. Also seen by Barloy Canyon Road and Trail 22 in the spring of 2002. People have said they see them down Crescent Bluff Road, and Engineering Canyon Road. Steve Moore and Eric Morgan independently saw 1 at Machine Gun Flats on 19 Apr 03, our only 2003 record. A Roadrunner on Eucalyptus Road entertained the volunteers on 18 May 04. Tammy Jakl saw 1 on Trail 10 on 26 Oct 05. Ronnie Ryno saw 1 near Mudhen Lake on16 Apr 89. Don Roberson saw 2 on the CBC on 28 Dec 84, and 1 on the CBC on 28 Dec 99.
74.	Barn Owl*	Resident, but few seen. In Aug 98 they were found to come out at dusk over the grasslands at Skyline and Oil Well Roads, and hover like Red-tailed Hawks. [Id. aided by Sam Fitton.] In Jul 06 Wendi Wendt showed us a cliff-side nest with 4 young.
75.	Western Screech-Owl*	Resident. Seen once or twice each year, including an adult and 1 young on 26 Jul 97.
76.	Great Horned Owl*	A permanent resident, and breeding bird, seen throughout Ft. Ord. At least 5 pairs live in the vicinity of Eucalyptus Road. Mark Littlefield observed a nest with young on25 Feb 91.

77.	Burrowing Owl	Jack Massera reported that they used to live in the grasslands. Bruce Delgado saw 2 in Nov 97. The Fittons and I looked for them on 15 Aug 98, and we found pellets that were no more than a week old [*fida* Sam Fitton]. The volunteer group saw 1 on 4 Feb 03 near the corner of Skyline and Guidotti Roads. In late Oct 05 Jessie Quinn saw 3 or 4, and Phil Smith found 1 that stood by its hole under a Coyote Brush bush. Smith reported at least 12 on a subsequent trip that winter (2005-06). Observed on the 1993, 1994, 1998, 2005, and 2006 CBCs.
78.	Common Poorwill*	In the chaparral throughout the inventory. Infrequently calls in July and August. Heard calling as early as 31 Jan 03. In fall they are seen but not heard. Late records: 6 on 20 Oct 01, and 4 on 28 Oct 06.
79.	Vaux's Swift	
80.	White-throated Swift	Appears to be nesting under the highway bridges adjacent to Ft. Ord. Seen widely over Ft. Ord on 19 Feb 01, as in a migration. Seen throughout the year, but usually scarce in winter. One was seen on the CBC of 29 Dec 94. They were common on the Reservation Road bridge over El Toro Creek in the fall of 2006, with at least 28 seen on 16 Nov, and seen until my last trip to the area on 24 Dec.
81.	Anna's Hummingbird*	One to several seen everywhere except pure grassland throughout the year. Most actively breeding in winter. Ronnie Ryno saw an occupied nest on 8 May 89, and I watched nest activity at the BLM office area from 5 Jan to 16 Feb 06. Usually between 40 and 70 individuals have been counted on the CBCs, but 179 were noted on the 1984 CBC.
82.	Rufous Hummingbird	Bruce Gerow said that a big migratory wave of Rufous Hummingbirds passed through Ft. Ord in April 1989.
83.	Allen's Hummingbird*	Seen at BLM compound in 1996 and at the Catfish Pond from 16 Mar to 8 Jun 03, and again in 2004, starting 15 Feb. In 2004, also noted in the BLM office area on 11 Feb, and along El Toro Creek on 10 Mar.
84.	Belted Kingfisher	One or two seem to visit Ft. Ord regularly, except during the breeding season. Seen most regularly at Mudhen Lake. They are more regular, and possibly nesting, in the Salinas River area, a region not inventoried prior to 2006.
85.	Lewis's Woodpecker	From 20 Dec 93 to 6 May 94 there were "dozens" on eastern Ft. Ord. For example, 5 were seen on the CBC on 28 Dec 93. [See Don Roberson, *Monterey Birds,* 2nd Edition, 2002.] Tim Buhl saw 1 at the Catfish Pond on 2 Oct 03. It was still there the next day.
86.	Acorn Woodpecker*	In 1996 most individuals were along El Toro Creek. In 1998 there was a small colony next to Mudhen Lake. In the falls of 2001 and 2005, strong acorn years, Acorn Woodpeckers were widely distributed all over Ft. Ord. One to five could be seen in many places. By the end of the dry, low yield year, 2002, Acorn Woodpeckers were again scarce on Ft. Ord, with a total of 2 at Mudhen Lake.

87.	Red-breasted Sapsucker	3 records of 1 near Mudhen Lake: 7 Apr 96, 12 Nov 02, and 21 Oct 06. In 2003 there were 3 records of 1 in the BLM office area: 4 Mar, 18 Mar, and 31 Dec. Not seen on CBCs.
88.	Nuttall's Woodpecker*	Seen in oak trees throughout the year. Usually just 1 or 2 seen. Perhaps more easily seen in sycamore trees along El Toro Creek. Anywhere from 1 to 8 have been seen on CBCs.
89.	Downy Woodpecker*	Thinly spread over riparian locations throughout the year. At most 2 have been seen on any CBC, but the count circle excludes most of the riparian areas of Ft. Ord.
90.	Hairy Woodpecker*	Widely distributed on Ft. Ord in very small numbers. For example, a pair can usually be seen at Mudhen Lake. Much more widely distributed in the fall of 2001. At most 3 have been noted on any CBC.
91.	Northern Flicker*	Seen throughout oak savannah throughout the inventory. Up to 10 seen per field trip. From 10 to 20 have been noted on most CBCs.
92.	Olive-sided Flycatcher*	Uncommon spring migrant; 3 records of 1 each: on Crescent Bluff Rd. on 28 Apr 96, at El Toro Creek on 7 May 02, and Machine Gun Flats on 14 May 03. In 2004 through 2006 a pair nested in the BLM office area. On 13 Jul 04 an adult was seen with 2 fledglings.
93.	Western Wood-Pewee	4 records: 1 seen at the camp ground by West Camp Street on 15 Aug 99, and 1 May 03 (singing), 2 at the BLM office area on 8 May 03, and Bruce Gerow saw 1 at Mudhen Lake on 21 Apr 04.
94.	Gray Flycatcher	1 record: Jane Styer and I saw one near Skyline Road on 2 May 03.
95.	Pacific-slope Flycatcher*	Summer resident in trees in riparian locations. First spring record: 17 Mar 04. In 1998 nested under eaves at front entrance to BLM main building. The latest annual record was 1 seen 27 Sep 01. Early arrival in 2004 with 3 March records; and in 2005 with arrival noted on 25 Mar.
96.	Black Phoebe*	1 or 2 pairs are seen at most riparian locations throughout the year. On CBCs prior to 1999 fewer than 8 individuals were noted per count; from 1999 on 10 or more have been noted per count
97.	Say's Phoebe	Winter resident on grasslands: last seen on 7 May 02. First fall record: 10 Sep 02. Usually fewer than 5 seen on one field trip. Usually 5 to 15 individuals have been seen per CBC.
98.	Ash-throated Flycatcher*	Summer resident throughout oak-chaparral. First spring record: 2 Apr 05. Infrequently seen in August. Latest record: 13 Aug 02.
99.	Cassin's Kingbird	Bruce Gerow saw 1 very vocal bird on Ft. Ord near the Toro Estates Entrance from 19 to 21 May 01. Another vocal bird was seen at Boy Scout Lake on 19 Aug 05.

100.	Western Kingbird*	1 or 2 pairs breed on the grasslands near El Toro Creek. The 1st spring records are usually in early April. Seen on 27 Mar 04. A "fall" migrant was on Machine Gun Flats on 2 Aug 99. Bruce Gerow confirmed breeding in 2001.
101.	Loggerhead Shrike	Not seen in 1996. Uncommon, but widely distributed in somewhat open areas since then.
102.	Hutton's Vireo*	Year-round resident in the Coast Live Oaks. When they are singing I can usually detect 1 to 4 individuals in one place. Most CBCs have recorded between 2 and 7 individuals.
103.	Warbling Vireo*	Likely breeding in dense willow locations. Seen only in spring, and in drier years likely only a migrant. Earliest records: 27 Apr 02, 21 Apr 04, and 18 Apr 05. I was surprised that there was one at the Dam Crossing on 22 Jun 04.
104.	Steller's Jay	Usually associated with El Toro Creek community, first recorded on Ft. Ord on 27 Jul 97. Widely distributed over Ft. Ord in the fall of 2001, a good acorn year. Noted around Mudhen Lake in November and December 05.
105.	Western Scrub-Jay*	Highly visible common bird throughout the oak-chaparral throughout the inventory. The CBCs have recorded between 32 and 90 individuals.
106.	American Crow*	Although abundant in the housing areas on Ft. Ord, it is uncommon in the backcountry. The CBCs have recorded between 16 and 90 individuals.
107.	Common Raven	Infrequent visitor. Bruce Gerow saw two fly over the vicinity of Mudhen Lake in the spring of 1999. From then through 2003 I have widely scattered records: 10 Jun 00, 21 Oct 01, 3 May 02, 8 Aug 02, 17 Nov 02, 21 May 03, and 11 Sep 03. The six records in 2004 of up to 5 individuals suggest a population increase. In 2005 there were 4 records, and in 2006 there were 11 records of 1 to 4 individuals.
108.	Horned Lark*	Seen in high grassland throughout the year. Young birds observed in June and July. They appear to be much more common in winter. They were uncommon in 2002. Five of the 9 CBCs have recorded no Horned Larks. The 28 Dec 93 CBC recorded 69 larks, far more than any other Ft. Ord count.
109.	Purple Martin	1 record: four flew west over Mudhen Lake on 14 Aug 99.
110.	Tree Swallow*	Seen at ponds in small numbers. In 1996 first seen on 9 Mar, in 2001 on 12 Feb, in 2002 on 8 Feb, and in 2003 on 9 Mar. In July/August inventories, not seen in 1997, and last seen on 12 Jul 98, 1 Oct 01, 15 Jun 02, and 8 Jun 03. A possible migration peak in April. Three were seen on the 29 Dec 98 CBC.

111.	Violet-green Swallow*	At ponds in small numbers during the winter/spring inventory of 1996. Early record: 10 Feb 01. Around 60 birds seen on 2 Mar 01. Rarely seen in summer. In 2002 seen regularly from 6 Mar until 11 Jun, but not otherwise. In 2003 and 2004 seen until mid-June, probably nesting in a cliff face on Barloy Canyon Road. Also, 4 seen on the 29 Dec 98 CBC, and 3 were at Mudhen Lake on 30 Dec 03.
112.	Northern Rough-winged Swallow	Seen in small numbers from early March (5 Mar 02) to early July (8 Jul 98). Seen as early as 12 Feb 01.
113.	Cliff Swallow*	Summer resident. Until 2003 the early inventory date was 2 May 02. In 2003 approximately 50 were flying along El Toro Creek on 6 Apr, and in 2004 they were seen as early as 15 Mar. The most common swallow into August. Not seen in Sep 01, and last seen on 7 Aug 02, 12 Aug 03, and 19 Aug 05.
114.	Barn Swallow*	Summer resident with nests observed. Usually first seen in March. One individual was seen on 20 Jan 06. Seen over the grasslands as well as over ponds. The 20 Barn Swallows seen over the vernal pond behind the BLM office appeared migratory. In Aug 04 a flock settled around the corner of Eucalyptus and Parker Flats Roads. Approximately 60 were seen there on the 20th. Some last records for the year are: 22 Sep 01, 12 Sep 02, and 12 Aug 03. One was seen on the 29 Dec 98 CBC.
115.	Chestnut-backed Chickadee*	Seen throughout the inventory in scattered localities where there are oak trees. Up to 10 may be seen in a given location. The 1993 CBC reported 43 individuals, but the count has usually seen fewer than 15.
116.	Oak Titmouse*	Common in the oaks and riparian woods throughout the year. Usually fewer than 10 are seen. The 1993 CBC reported 54 titmice, all other CBCs found 17 or fewer individuals.
117.	Bushtit*	Common throughout the year wherever there are trees or chaparral. Usually seen in flocks (of up to 30 birds). Usually 100–200 are seen during CBCs, but 326 were counted on 28 Dec 84.
118.	Red-breasted Nuthatch	Infrequent winter resident, noted on several CBCs.: 1 in '96, 2 on the golf course in '98, 3 in '00, and 1 seen near BLM office on 28 Dec 01. A small "wave" came through in the fall of 2004, with the 1st heard in Coast Live Oaks on 29 Sep., and one wintered in the BLM office area and was last seen on 30 Apr 05.
119.	White-breasted Nuthatch	5 records: 1 or 2 in the Valley Oaks near El Toro Creek on 27 Jul 97, 15 Aug 99, and 28 Oct 03; one was seen near El Toro Creek on 18 Sep 01. One was in the Coast Live Oaks at Boy Scout Lake on 16 Nov 05
120.	Pygmy Nuthatch*	1 record prior to 2006: Don Roberson saw 2 on the golf course on the CBC on 28 Dec 99. On 6 Mar 06 a pair was seen mating in the pine planting along South Boundary Road. On 5 Jun they were seen feeding fledglings in the same location.

121.	Brown Creeper	Uncommon winter resident. They have been seen at the golf course on several CBCs: 1998. 2000, and 2005. There was 1 at BLM offices from 11 Dec 02 until 28 Jan 03.
122.	Rock Wren	One was in an eroded area not far from the top of Oil Well Road, seen on 21 and 27 Oct 01.
123.	Bewick's Wren*	Common in the trees, brush, and chaparral throughout the inventory. During the height of song one may hear roughly 10 singing. On CBCs anywhere from the teens to the 30s have usually been recorded. On 28 Dec 93 52 were counted.
124.	House Wren*	Seen in riparian locations from March until July. Latest records: 19 Aug 99, 13 Oct 02, and 17 Oct 06. Less frequent, and last noted on 17 May, in the dry year 2004.
125.	Marsh Wren	One singing on Mudhen Lake 25 Feb to 2 Mar 01, and 1 at the Catfish Pond in the fall (8 Oct) of 2002, in Mar 03, and Oct 04. Previously seen by Bill Collins in the pond near Range 36. They were seen at Mudhen Lake from 26 Oct to 15 Dec 06, with a maximum of 4 seen on 13 Dec.
126.	Golden-crowned Kinglet	Few winter records. There were 2 noted on the golf course on the 1998 CBC. Seen in Dec 01 until 10 Mar 02. Not seen again until 12 Dec 02.
127.	Ruby-crowned Kinglet	Winter resident in trees. Last seen on 6 Apr 96, 12 Apr 02, and 6 Apr 03. Main fall arrival in early October, *e.g.* 3 Oct 02, 6 Oct 03. Usually fewer than 10 are seen, but in the fall of 2006 up to 30 could be seen at a single place. Usually 15–30 are seen on the CBCs.
128.	Blue-gray Gnatcatcher*	Recorded from 30 Mar 96 and 10 Mar 02 through spring in oak-chaparral areas. Last records: 7 Jul 98, 19 Aug 99, 2 seen in chapparal on the 2001 CBC, and 20 Aug 02. Robert Horn saw 1 near Creekside on 1 Nov 03.
129.	Western Bluebird*	Seen throughout the year, although recorded on a minority of the stops. The flocks usually have 5 or fewer individuals. Bluebirds may have become more common on Ft. Ord between 1996 and 2006.
130.	Mountain Bluebird	7 seen on Camp Ord on 3 Jan 37. [See Don Roberson, *Monterey Birds,* 2nd Edition, 2002.]
131.	Townsend's Solitaire	1 record: 1 seen and photographed by the BLM Office on 22 Oct 07.
132.	Swainson's Thrush	First heard singing in dense willows along Crescent Bluff Road on 4 May 96. Heard singing on 8 and 16 Jun 96 near Guidotti Gate. Migrant heard singing on 14 May 02. In 2003 a May migrant. Noted 23 to 30 Apr 05. Just 1 or 2 seen per day.
133.	Hermit Thrush	Widely spread fall records of 1 to 3 birds starting 18 Oct 01, 13 Oct 02, and 14 Oct 03. A winter resident; most have left by the end of February. Sporadic records up to 6 Apr (2003). A surprising 9 seen at once at the Huffman Tank on 23 Nov 02.On the 9 CBCs a high of 22 were counted on 28 Dec 99 and a low of 3 were noted on 27 Dec 96.

134.	American Robin*	A few present in certain locations, e.g. Mudhen Lake, and the BLM compound. Seen throughout the year. On 15 Aug 98 there was a "fall" flock of ten by the BLM office. Only 1 record from 18 Sep through 18 Oct 01. After that, more frequently seen. In 2003 seen on 6 Jun, and not again until 7 Nov. On 3 Feb 04 there was a winter flock of 32 at the corner of Eucalyptus and Barloy Canyon Roads. An outstanding record was the 1190 counted on the 1994 CBC.
135.	Varied Thrush	Seen by Don Roberson at Lower Pilarcitos Pond on 2 CBCs: 1 seen on 28 Dec 92 and 3 seen on 28 Dec 99. Also seen, 1 each, on 24 Nov and 25 Dec 06 at the BLM office area, and on 1 Dec 06 near Lower Pilarcitos Pond. The 24 Nov and 1 Dec birds were singing.
136.	Wrentit*	Seen (heard) throughout the chaparral throughout the year.
137.	Northern Mockingbird*	Small numbers usually seen near housing areas, but also seen around trees or shrubs in the grasslands.
138.	Brown Thrasher	1 seen near Mudhen Lake on 14 Oct 84. [See Don Roberson, *Monterey Birds,* 2nd Edition, 2002.]
139.	California Thrasher*	Seen (heard) throughout the chaparral throughout the year, but with lower frequency than the Wrentit.
140.	European Starling	Seen in many locations throughout the year. Common along El Toro Creek; however, infrequently seen at many places. In 2006 they were more common throughout Ft. Ord.
141.	American Pipit	Winter visitor: 7 at Fox Pond on 14 Feb 01; 39 not far from the top of Oil Well Road on 17 Feb 01. In 2003 last seen on 21 Mar, and in 2004 on 12 Apr.
142.	Cedar Waxwing	Winter resident. First fall record: 10 seen on 3 Oct 01. On 26 Feb 01 there were 44 by El Toro Creek. Late records: on 7 May 02 there were about 10 by El Toro Creek, and on 25 May 03 there were 32 in the same location; in 2004 there were 50 seen on 19 May and 7 seen on 4 Jun. In 2005 seen mainly in April. Seen just 3 times in 2006.
143.	Phainopepla	2 seen along Crescent Bluff Road on 12 Apr 02. Reported by Chuck Haugen in July 2002. Up to 3 seen visiting elderberries along El Toro Creek on 25 and 26 Jul 02. Next seen 28 and 29 Sep 06, when 2 visited an elderberry on the corner of Eucalyptus and Barloy Canyon Roads. Previously reported by Bruce Gerow as a non-breeding visitor during the Monterey Breeding Bird Atlas project.
144.	Orange-crowned Warbler*	First annual records: 9 Mar 96, 1 Mar 01, 9 Mar 03, 15 Feb 04, 18 Feb 05. On 9 Mar 03, 16 were heard singing. Frequently recorded in chaparral/oaks from 14 Apr on. Infrequently recorded in July and August. In 2001 a noticeable fall migration in September and October, and 2 were seen on 1 Nov. In 2003 later individuals included 1 on 22 Oct and 1 on 4 Dec, both near water. They have been seen on approximately half of the CBCs.
145.	Nashville Warbler	Migrant. 1st record: 1 at El Toro Creek on 17 Sep 01. Other records of 1 individual from 6 to 9 Oct 01, 11 Mar 03, and 21 Apr 03.

146.	Northern Parula	1 sure record: 1 on 5 Oct 01 on 7th Street. Also, likely an immature female seen on Parker Flats Cutoff on 27 Oct 02.
147.	Yellow Warbler	Spring records: 1 heard near Mudhen Lake on 21 Apr 96, and ones seen on 14 May and16 May 02, 17 Apr 03, and 17 and 25 Apr 04. In 2001 one to three were regularly seen from mid-September to mid-October.
148.	Yellow-rumped Warbler	Winter resident. Peak on 6 Apr 96, and last seen on 20 Apr 96 and 12 Apr 02. First seen on 27 Sep 01, 1 Oct 02, and 26 Sep 06. Also, there was an isolated record of 1 on Ingman Ct. on 15 Aug 02. Nearly all are of the Audubon's race. I saw 1 bird of the Myrtle race on 2 Nov 01, and 2 on 19 Nov 03. On 9 CBCs a low of 27 were seen in 1989 and a high of 104 were seen in 1993. The 1993 CBC count included 12 of the Myrtle race.
149.	Black-throated Gray Warbler	4 spring records: 20 Apr, 28 Apr, 4 May 96, and 28 Apr 03. A female was seen on the golf course during the CBC on 29 Dec 98.
150.	Townsend's Warbler	Winter resident. Earliest fall record 20 Sep 01. Seen through February in 2001. Six or fewer seen per field trip. Spring records: a female seen on 1 Jun 96 and 3 males on 23 Mar 02; in 2003 seen from 9 Mar until 8 May. On 9 CBCs fewer than 10 were noted on 4 years, and more than 10 on 5 years, with a maximum of 33 in1993.
151.	Hermit Warbler	3 records, all at the BLM office area: 1 on 5 May 03, 5 seen on 8 May 03, and 1 on 28 Apr 05.
152.	Black-and-white Warbler	1 record: 1 seen by Don Roberson on the 28 Dec 84 CBC.
153.	MacGillivray's Warbler	In the spring of 1999 Bruce Gerow encountered a singing male in the chaparral on Crescent Bluff.
154.	Common Yellowthroat*	Probably to be found all year at the corner of Barloy Canyon and Eucalyptus Roads and/or Mudhen Lake prior to the 2003 burn. In 2003 not seen in these areas following the July fire. In the dry year of 2004, just a few records from 21 Apr to 30 Jun. Mainly noted around Mudhen Lake in 2006.
155.	Wilson's Warbler*	Summer resident some years along upper El Toro Creek. Earliest records: 7 Apr 96 and 27 Mar 04. Latest record: 2 Aug 97. A migratory flock of 10 at the BLM office on 8 May 03 was unusual.
156.	Yellow-breasted Chat	1 record: 1 heard singing in a tangle along Crescent Bluff Rd. on
157.	Western Tanager	Spring migrants recorded on 4 May and 1 Jun 96, and from 1 to 8 May 03. In 2005 the early record was 24 Apr, and by 30 Apr a flock of 3 was seen. Two flocks noted in May 03, with a maximum of 10 at the BLM office on the 8th. Fall migrants on 25 Jul to 2 Aug 98, and until 20 Sep 01. A late bird was seen near Parker Flats Cut-off on 29 Oct 05.
158.	[Green-tailed Towhee	1 seen on 28 Feb 02 on Parker Flats Road near Eucalyptus Road. Efforts to find the bird later failed.]

159.	Spotted Towhee*	A permanent resident seen throughout the chaparral. In comparison with the California Towhee, this bird is more restricted in habitat and fewer are seen.
160.	California Towhee*	Common throughout the year, and widely distributed. Seen on virtually all trips, although not in large flocks. On 9 CBCs a low of 18 were seen in 1989 and a high of 63 were noted in1993.
161.	Rufous-crowned Sparrow*	In April of 2000 Sam Fitton found 2 singing by the big washout into Mudhen Lake. One was still there at least as late as 21 Jun 00. Seen along Barloy Canyon Road on 9 and 14 May 02, and from 13 Feb until 18 Mar in 2003.
162.	Chipping Sparrow*	1 record prior to 2004: 2 at the campground on Watkins Gate Rd. on 11 May 03. Regularly seen in the burn area in the spring of 2004, with nesting probable. Seen there again in 2005.
163.	Lark Sparrow*	Seen all year, but infrequently in the winter. Most commonly seen in the grasslands, but also apparently breeding in or near the chaparral areas. Regularly seen at the BLM compound.
164.	(Bell's) Sage Sparrow*	Resident. Thinly spread over the burned chaparral areas. I likely overlooked them before Bruce Gerow pointed out that they were there. My first record: 4 Jul 98. Birds with young fledgling seen on 3 Jul 06. Don Roberson noted between 1 and 4 individuals on the CBCs in11993, 1996, 1998, and 2000.
165.	Savannah Sparrow	Winter resident in the grasslands. Approximately 60 seen high in the grasslands on 17 Dec 06. Last spring record: 28 Apr 96. First fall records: 26 Sep 01, and 22 Oct 02.
166.	Grasshopper Sparrow*	Breeding bird of the grasslands. First seen on 14 Apr 96, on 27 Apr 02, on 21 Mar 03, on 9 Mar 04, and 16 Mar 05. Approximately 30 singing birds detected in 1996, 5 or 6 of these were on Machine Gun Flats. Bird in juvenal plumage seen on 16 Jun 96. Seen until the end of the inventory in 1996. There were 35 or more singing birds on Ft. Ord in Jun 00. There were likely as many in Jun 02, but likely fewer in 2003.
167.	Fox Sparrow	Winter resident, but much more common in fall. First noted in chaparral on 5 Oct 01, 1 Oct 02, 30 Sep 03, and 29 Sep 05. Last seen on 25 Jan 02 and 14 Mar 03. Usually 1 or 2 seen, but 10 to 20 were at the Huffman Tank on 29 Oct 02. 84 were seen on the 28 Dec 84 CBC. All Fox Sparrows seen have been of the 'Sooty' race.
168.	Song Sparrow*	There are 2 to 6 individuals at nearly every pond throughout the inventory.
169.	Lincoln's Sparrow	Mostly a spring and fall migrant, but few recorded per year. The 2 that Sam Fitton and I saw at Fox Pond on 11 Aug 99 were unusually early.
170.	White-throated Sparrow	1 record: 1, perhaps immature, at Mudhen Lake 15 Oct 01.
171.	Harris's Sparrow	One immature seen on Trail 22 on 16 Jan and 25 Jan 02.

172.	White-crowned Sparrow	Winter resident in backcountry Ft. Ord. Last seen on 29 Apr 05. Earliest fall record: 2 at Fox Pond on 13 Aug 99. In the fall of 2001 the main migration arrived by 26 Sep. I usually record fewer than 10, but I saw approximately 50 along El Toro Creek on 30 Nov 03.
173.	Golden-crowned Sparrow	Common winter resident, October through April. Last seen on 21 Apr 96, and on 2 May 02. Seen in good numbers, around 20, by 5 Oct 01 (and 6 Oct 03). First noted in fall on 1 Oct 02 and 30 Sep 03.
174.	Dark-eyed Junco*	Common breeding bird in oak woods and at the BLM compound. Seen throughout the year. In 2003 flocks of 50 were seen in October, but in other seasons 20 or fewer were seen.
175.	Black-headed Grosbeak*	Summer resident near Guidotti Gate. Seen as early as 16 Apr 02 and 7 Apr 03, and as late as 1 Aug 99.
176.	Lazuli Bunting*	4 records prior to 2002: 28 Apr 96, 4 May 96, and 28 Jun 98, 1 Aug 99. The June record was of a singing male at Mudhen Lake. Strong migration in 2002, seen from 23 Apr to 25 May, with a peak of around 15 seen on 7 May. Weak migration in 2003, seen from 1 May until 6 Jun. A strong migration again in 2004; noted 19 Apr to 30 Jun, with around 30 individuals in the burn area alone. Probable breeding in the burn area followed the migration. In 2006 they probably bred in the 2005 burn area off Parker Flats Road.
177.	Red-winged Blackbird*	Concentrated near ponds and also seen elsewhere throughout the year, although scarce in August, except, possibly, at the roost at the pond on Watkins Gate Road near West Camp Street.
178.	Tricolored Blackbird*	The known colony on Oil Well Road has been active most years. The colony has maintained over 50 birds. On 26 Jul 98 I watched them come to feed at the play fields of El Toro Creek community. Ten or more visit the Equestrian Center in winter. They were seen there up to 28 Feb 02. 120 were counted on the 27 Dec 89 CBC, and 200 on the 28 Dec 93 CBC.
179.	Western Meadowlark*	Small numbers on grassland and Machine Gun Flats in the spring and summer. Larger, more widespread groups of up to 50 seen in the fall and winter. Usually seen in double digits on the CBCs; a low of 8 was seen on the 29 Dec 01 count, and a high of 323 on 28 Dec 93.
180.	Brewer's Blackbird*	Present throughout the inventory. Especially common at the BLM compound, prior to the fall of 2001. Common in residential areas. 850 were noted on the 27 Dec 89 CBC.
181.	Brown-headed Cowbird	5 records: 22 Mar 96, 30 May 02, 23 May 03, 29 Apr and 30 Apr 05.
182.	Hooded Oriole*	Added to inventory on 11 Jul 98. Sam Fitton pointed out that they were near El Toro Creek. I found at least 3 pairs breeding in Fan Palms in El Toro community, and using Ft. Ord to feed. They continue to be seen only in this area.

183.	Bullock's Oriole*	Summer resident. Earliest records: 20 Apr 02 and 2 Apr 03. Breeding along El Toro Creek, and possibly other riparian areas with tall (Eucalyptus) trees. Not seen after mid-August. Bruce Gerow noted especially large numbers of both oriole species nesting in the El Toro Creek area in 2001.
184.	Purple Finch*	Present in the oaks and at the BLM compound throughout the inventory. Usually no more than 5, but sometimes 10 or 20 are in a flock.
185.	House Finch*	Seen in small numbers throughout Ft. Ord throughout the inventory. Seen at the BLM compound in larger numbers. Abundant in the housing areas of Ft. Ord.
186.	Pine Siskin*	At BLM compound from first inventory until 2001. However, not encountered in the fall (inventory in 2001). Seen Jan 02 through 23 Apr 02, and then gone: perhaps sensitive to drought. In the drought year of 2003 seen only from 23 Jan to 28 Apr. No Siskins noted in the dry year of 2004, and a few were noted in 2005 or 2006.
187.	Lesser Goldfinch*	Seen throughout the inventory wherever there are trees. Uncommon in the backcountry in the dry season of 2002. Hardly seen after Jul 03, another dry season, and in2006 not noted after 7 Dec.
188.	Lawrence's Goldfinch*	Seen at the BLM compound and in riparian locations in the chaparral. First seen on 24 Mar 96. Not seen at all in 1998. In 2000 last seen on 15 Jun. The 2002 records span 14 Apr to 20 Aug. In 2003 just 2 records of 2 each on 23 May and 16 Jun. The year 2004 was a strong one with records regularly from 19 Apr to 10 Sep, especially in the burn area where they probably bred. Two fall records: 2 near El Toro Creek on 27 Oct 01, and 1 at recent burn on 19 Oct 06.
189.	American Goldfinch	Fall and winter resident. 1st record: approximately 50 near El Toro Creek on 9 Feb 01. Smaller numbers seen in fall starting 24 Oct 01, 22 Oct 03, and 1 Nov 05. Usually the first fall records are in October.
190.	House Sparrow*	Common in the housing areas on Ft. Ord. Barely seen in Backcountry Ft. Ord.

APPENDIX E.

Supplemental Forest Resource Evaluation

Denise Duffy & Associates, Inc.
PLANNING AND ENVIRONMENTAL CONSULTING

MEMORANDUM

Date: January 28, 2019

To: Erin Harwayne, AICP, Senior Project Manager, DD&A

From: Patric Krabacher, ISA Certified Arborist 11759, Assistant Environmental Scientist, DD&A

Subject: Supplemental Forest Resource Evaluation for the California Central Coast Veterans Cemetery 2015 Master Plan

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Denise Duffy & Associates, Inc. (DD&A) is contracted by the California Department of General Services (DGS) to provide environmental consulting services for the California Central Coast Veterans Cemetery (CCCVC) 2015 Master Plan (proposed project), located within the City of Seaside (City) and the County of Monterey (County). The 2015 Master Plan is a comprehensive, long-term development plan that identifies and addresses any issues related to the development of the CCCVC. Phase 1 of the 2015 Master Plan has been completed under separate environmental review. The proposed project involves implementing the remaining Phases 2 through 11 of the 2015 Master Plan over an approximately 100-year period. Phase 2 is currently under design and construction is anticipated to commence in late 2019 or early 2020. Phases 3 through 11 will be designed and implemented approximately every subsequent 10 years. In regard to forest resources, the intent of the proposed project is to maintain an aesthetic presence of existing coast live oak (*Quercus agrifolia*) trees and retain ecological functions, as feasible, while meeting project objectives and requirements.

In accordance with City and County ordinances, DD&A performed a forest resource evaluation of the proposed project site on January 9, 2019. This memorandum describes the methodology and results of the evaluation, and supplements the existing Forest Resource Evaluation Report prepared by Staub Forestry and Environmental Consulting (Staub Evaluation; Staub, 2010) with current data.

Regulatory Framework

Although the Master Plan site is located within City and County limits, the property is owned by the State of California (State), which is not required to comply with local ordinances and policies. However, the State will do so when feasible, and has decided to use a combination of local City and County ordinances to reduce impacts associated with the loss of coast live oak trees within the proposed project site.

City of Seaside

Seaside Municipal Code, Chapter 8.54.020, Definitions, states:

> *"Tree means a woody perennial plant which usually but not necessarily has a single trunk and a height of ten feet or more, or has a circumference of twenty inches measured at twenty-four inches above the ground."*

Seaside Municipal Code, Chapter 8.54.070, Replacement of Trees, states:

> *"In all cases where removal of a tree from a site has been authorized on an undeveloped parcel, the developer shall replace the tree with a minimum five-gallon specimen tree of a species and in a location approved by the board of architectural review, if applicable, or other individual or body responsible for the approval of applicant's plans. This requirement may be modified or waived if it is determined that replacement on one-for-one basis constitutes an unreasonable hardship."*

Monterey County

Applicable County ordinances related to the project can be found in Monterey County Code, Title 16 – Environment, Chapter 16.60 – Preservation of Oak and Other Protected Trees. The sections related to the project include:

Section 16.60.030 – Regulations.

A. "No oak or madrone tree six inches or more in diameter two feet above ground level shall be removed in the North County Area Plan or Toro Area Plan areas without approval of the permit(s) required in Section 16.60.040 of this Chapter."

E. "No landmark oak tree shall be removed in any area except as may be approved by the Director of Planning pursuant to Section 16.60.040 of this Chapter. Landmark oak trees are those trees which are twenty-four (24) inches or more in diameter when measured two feet above the ground, or trees which are visually significant, historically significant, or exemplary of their species."

Section 16.60.040 – Permits required.

C. "Removal of More Than Three Protected Trees.

1. Removal of more than three protected trees on a lot in a one-year period shall require a Forest Management Plan and approval of a Use Permit by the Monterey County Planning Commission."

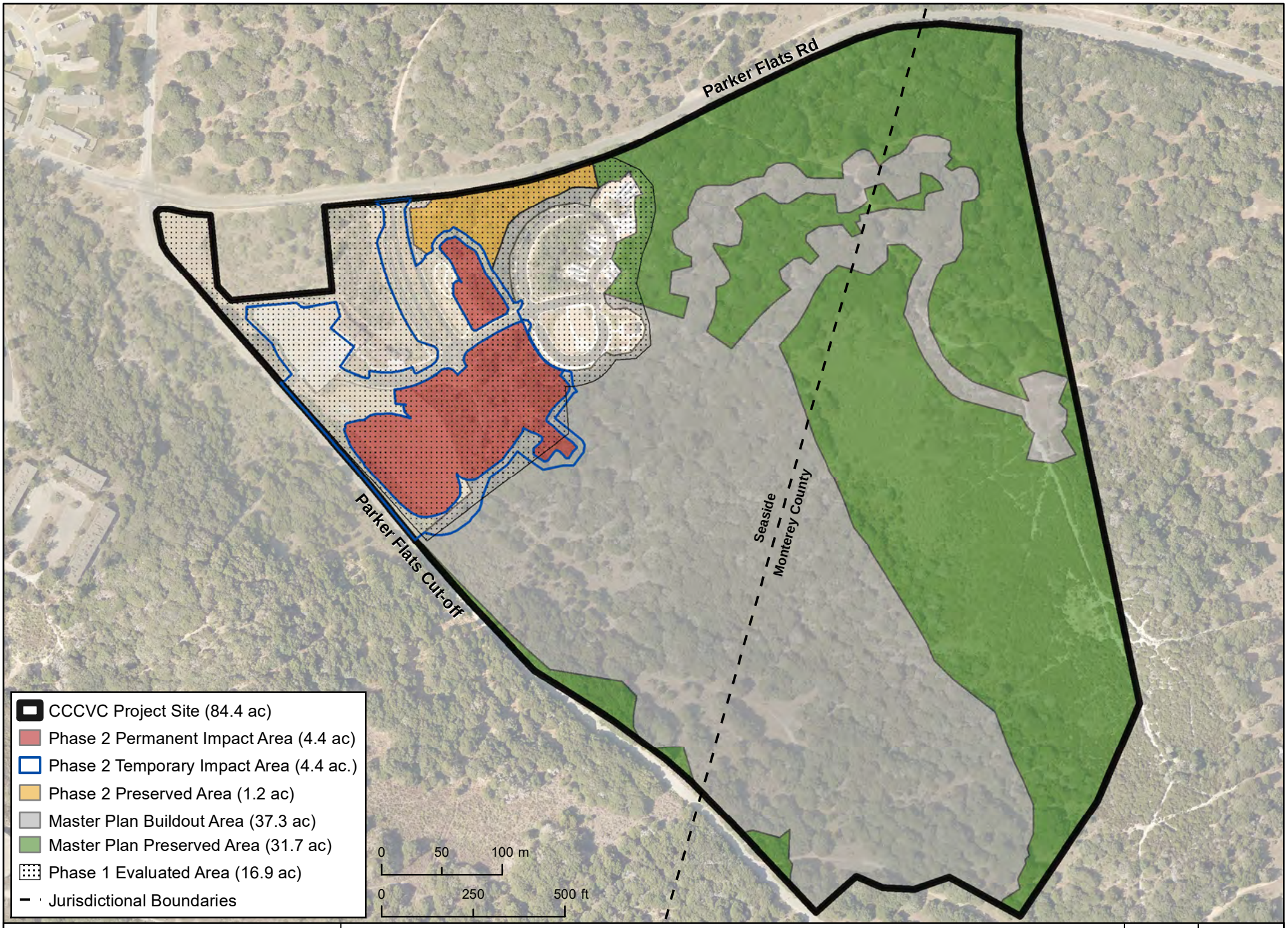
D. "Relocation or Replacement. As a consideration of the granting of a permit pursuant to Subsections C, the applicant shall be required to relocate or replace each removed protected tree on a one-to-one ratio. This requirement may be varied upon a showing that such a requirement will create a special hardship in the use of the site, or such replacement would be detrimental to the long-term health and maintenance of the remaining habitat."

Site Description

The proposed project site is split into the Phase 2 area and the remaining 2015 Master Plan area. The Phase 2 area is in the northwestern part of the property, entirely within Seaside city limits (Figure 1). The Master Plan area is located partly with Seaside city limits and partly within unincorporated Monterey County.

Vegetation within the proposed project site consists primarily as oak woodland also contains some maritime chaparral, coastal scrub, non-native grassland, ruderal, and developed areas[1] (Figure 2). Oak woodland cover within the site is comprised almost entirely of coast live oak.

[1] For a full description of vegetation types within the proposed project site, see the Biological Resources Report prepared for the site (DD&A, 2019).



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Project Site Map

N

Date
04-11-2019

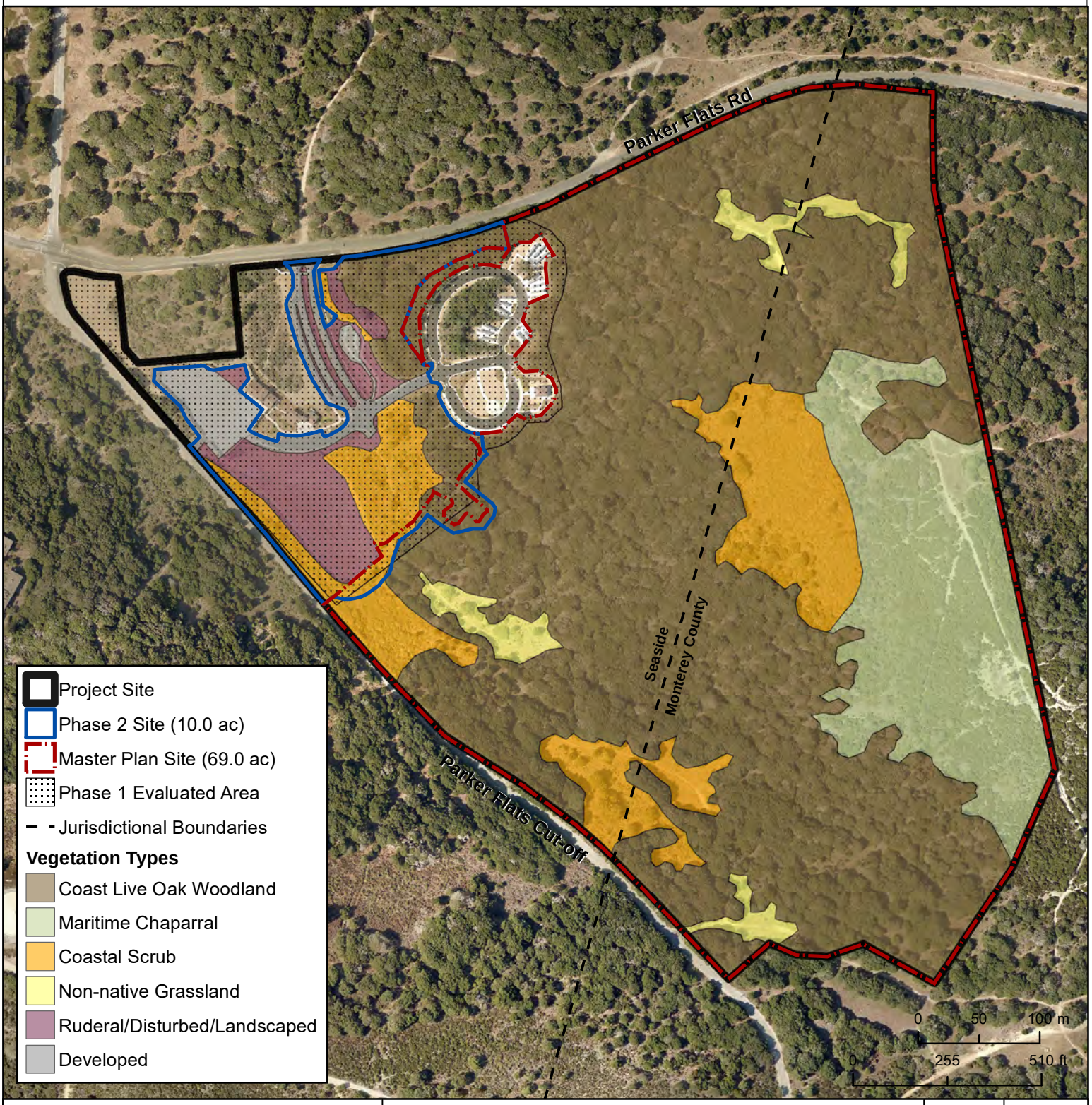
Scale
1 in=333.3 ft

Figure
1

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 2 - Project Site Map 4-11-19.mxd

Vegetation Type	Phase 2 Site				Master Plan Site		
	Permanent Impact Area	*Temporary Impact Area/ Staging*	*Preserved Area*	***Total***	*Buildout Area*	*Preserved Area*	***Total***
Coast Live Oak Woodland	1.1	0.5	1.0	**2.6**	31.1	17.1	**48.2**
Maritime Chaparral	0.0	0.0	0.0	**0.0**	1.3	10.0	**11.3**
Central Coastal Scrub	1.6	0.7	0.1	**2.4**	3.4	4	**7.4**
Non-Native Grassland	0.0	0.0	0.0	**0.0**	1.5	0.6	**2.1**
Ruderal/Disturbed/Landscaped	1.7	1.1	0.1	**2.9**	0.0	0.0	**0.0**
Developed	0.0	2.1	0.0	**2.1**	0.0	0.0	**0.0**
Total	**4.4**	**4.4**	**1.2**	**10**	**37.3**	**31.7**	**69**

Please note that the Phase 2 Temporary Impact Area/Staging overlaps with the Master Plan Site. As such, there is overlap in the vegetation type acreages of coast live oak woodland and central coastal scrub.



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Vegetation Map

N

Date 04-09-2019

Scale 1 in = 366.7 ft

Figure 2

Path: D:\GIS\GIS_Projects\2018-67 CCCVC\Map Products\Bio Report Maps\Fig 8 - Vegetation Map.mxd

A few Monterey cypress (*Hesperocyparis macrocarpa*) and Monterey pine (*Pinus radiata*) specimens, including a few larger Monterey pines, were also observed; however, neither species is native to the area. These species appear to be naturalized occurrences that have colonized the site from offsite plantings. The dominant understory species varies throughout the site but includes non-native annual grasses such as ripgut brome (*Bromus diandrus*) or slender oat (*Avena barbata*), poison oak (*Toxicodendron diversilobum*), coffeeberry (*Frangula californica*), and manzanita (*Arctostaphylos sp.*). Pockets of invasive species (primarily ice plant [*Carpobrotus edulis*] and non-native grasses) also occur throughout the area.

Methodology

DD&A Assistant Environmental Scientist and ISA Certified Arborist Patric Krabacher surveyed the site on January 9, 2019. The survey area included all proposed development areas within the proposed project site. The survey included an evaluation of current conditions as compared to the Staub Evaluation to determine if conditions had changed from 2010. A 2013 vegetation map prepared for the Monterey Downs Specific Plan Project (which included the proposed project site) was referenced to determine if oak woodland habitat mapping in the site had changed in recent years.

Tree Stand Description

As stated above, much of the proposed project site is covered by coast live oak woodland. The Staub Evaluation estimates 162 trees per acre of the proposed project site. The site visit verified that this estimate is still accurate. Consist with the Staub Evaluation, coast live oak trees on the site are still growing in "cluster" or "grouped" form. Average tree height and breast height diameter (DBH) is also consistent with the Staub Evaluation at no more than 25 feet tall (usually 10 to 12 feet) and 6 to 8 inch DBH. Trees are generally in fair condition but are maturing slowly. Slow maturation or minor changes in size class and health may be the result of abiotic and biotic stressors observed (see Results below).

Still consistent with the Staub Evaluation, coast live oak density varies greatly from very dense woodland to open savannah. Savannah habitats were more prevalent on the eastern and southern facing slopes, and dense woodland on the upper, western, and northern facing slopes. The denser stands (or "clustered" stands) tended to occur in the openings on the upper slopes of the property. It can be assumed that the number of landmark sized trees has increased over the past 10 years; however, since trees are maturing slowly, this change will be minor.

Results

The oak woodland within the proposed project site is limited in height both by heavy wind pressure and excessive soil drainage. The oak woodlands appear to be young but slowly maturing. Few or no oak seedlings or saplings were observed. The absence of oak regeneration is a statewide problem due to a variety of factors such as grazing, wildlife browsing, avian and rodent predation, and competition for moisture with annual grasses. All these abiotic stressors are consistent with the Staub Evaluation.

The biotic stressors identified in the Staub Evaluation include California oak worm (*Phryganidia californica*) and pitch canker (*Fusarium circinatum*). These stressors are still present within the proposed project site; however, additional symptoms of biotic stressors not identified in the Staub Evaluation were identified in the January 2019 site visit. These include oak branch canker (*Diplodia quercina*), Phytophthora root/crown rot, oak ambrosia beetles (*Monarthrum species*), and oak bark beetles (*Pseudopityophthorus species*). No

indicators or symptoms for sudden oak death (SOD) (*Phytophthora ramorum*) were observed. According to the California Oak Mortality Task Force (COMTF), a task force of the California Forest Pest Council, the closest mapped SOD site is in Carmel Valley somewhere in the Quail Meadows area (COMTF, 2019).

As identified in the Staub Evaluation, dieback from California oak worm was the main stressor defoliating coast live oak trees in the area; however, many of the trees appear to be fully or partially recovered. Recovery from the defoliation is affected by minimal moisture on the site due to wind pressure and excessively drained sandy soils. The predominance of trees in fair or better condition is characteristic of native, unmanaged oak woodlands. In general, the trees appear to have recovered well from the oak worm defoliation of the past several years. Currently, most of the oak dieback observed appears to be from Phytophthora root/crown rot in combination with bark beetles. Phytophthora cause crown and root rot diseases of herbaceous and woody plants. The pathogen kills plants by growing from the roots up through the root crown and into the lower trunk, where it kills the inner bark and causes a browning of the outer layer of sapwood.

Recommendations

To retain healthy stands of oak woodland resources within the proposed project site, it is recommended that each phase of the proposed project is designed to avoid coast live oak woodland and individual trees to the greatest extent feasible. If avoidance is not feasible, mitigation measures may be recommended in compliance with local, state, and federal regulations. All recommendations from the Design Considerations and Recommendations, Oak Removal/ Oak Woodland Mitigation, and Tree Replacement sections of the Staub Evaluation should be considered during the design stage of each phase. Tree inventories or more focused arborist reviews based on specific phase designs should be conducted to determine and minimize specific impacts of each phase of the 2015 Master Plan.

If you have any questions or comments regarding this memorandum, please contact Erin Harwayne or Patric Krabacher at (831) 373-4341.

References

Denise Duffy & Associates, Inc. (DD&A). 2013. Monterey Downs Specific Plan Project Biological Resources Report.

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Staub Forestry and Environmental Consulting. 2010. Forest Resource Evaluation California Central Coast Veteran's Cemetery Monterey, California. (November 2010).

California Oak Mortality Task Force (COMTF). Accessed January 2019. Available online at suddenoakdeath.org.

Appendix E

Cultural Reports

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912

PHASE 1 ARCHAEOLOGICAL SURVEY FOR THE CENTRAL COAST CALIFORNIA VETERANS CEMETERY AND EASTSIDE ROAD INFRASTRUCTURE PROJECTS SEASIDE, MONTEREY COUNTY, CALIFORNIA

by

Mary Doane, B.A., and Gary S. Breschini, Ph.D., RPA

September 28, 2010

Prepared for
Denise Duffy & Associates

SUMMARY: PROJECT 4407
RESULTS: NEGATIVE
ACRES: <100
SITES: NONE
UTMG: CEMETERY NW 6.0750/40.5510, NE 6.0828/40.5527, S 6.0815/40.5428; EASTSIDE ROAD SW 6.0815/40.5428, NE 6.1121/40.5720
MAPS: USGS 7.5 MINUTE MARINA AND SALINAS QUADRANGLES

DISCLAIMER: *This study was prepared under contract with the Fort Ord Reuse Authority, California, with financial support from the Office of Economic Adjustment, Department of Defense. The content reflects the views of the Fort Ord Reuse Authority and does not necessarily reflect the views of the Office of Economic Adjustment.*

For City and County Planning Departments:		Yes	No	N/A	See text
Evidence of:	Sacred/Religious site	___	_X_	___	_____
	Native American Remains	___	_X_	___	_____
	Anything of Archaeological Significance	___	_X_	___	_____
	Findings of Historical Significance	___	_X_	___	_____

INTRODUCTION

In August 2010 Archaeological Consulting was authorized by Denise Duffy to prepare a Phase 1 Archaeological Survey report for the Central Coast California Veterans Cemetery (CCCVC) and Eastside Road Infrastructure Projects in Seaside, Monterey County, California.

As part of our methodology in the preparation of this report, we have conducted: 1) a background records search at the Northwest Regional Information Center of the California Historical Resources Information System (CHRIS), located at Sonoma State University, Rohnert Park; 2) a Sacred Lands File Search through the Native American Heritage Commission (NAHC) and consultation with locally affiliated Native Americans; and 3) a field reconnaissance of project areas not in unexploded ordnance (UXO) restricted areas. The following report contains the results of these investigations as well as our conclusions and recommendations.

PROJECT LOCATION AND DESCRIPTION

The proposed CCCVC site is located in the former Fort Ord, now in the City of Seaside and Monterey County, California (see Map 1). The adjoining Eastside Road construction project includes a new alignment from Eucalyptus Road in the southwest meandering east of the proposed cemetery to a connection with Intergarrison Road in the northeast as well as improvements eastward on Intergarrison Road to Old County Road (see Map 2).

The Universal Transverse Mercator Grid (UTMG) coordinates for the approximate corners of the proposed cemetery site are as follows: northwest 6.0750/40.5510, northeast 6.0828/40.5527, and south 6.0815/40.5428 on the USGS 7.5 minute Marina Quadrangle (1947; photorevised 1983). The proposed Eastside

Road Alignment will run between Eucalyptus Road at 6.0815/40.5428 in the southwest and Intergarrison Road at 6.1121/40.5720 in the northeast on the USGS 7.5 minute Marina Quadrangle (1947; photorevised 1983). Road improvements will continue on Intergarrison Road to 6.1240/40.5717 on the USGS Salinas Quadrangle (1947; photorevised 1984)

The current project involves assessment of the cemetery site and accessible portions of the proposed Eastside Road alignment to determine if the proposed project will cause a significant impact to prehistoric or historic cultural resources.

At the time of our field reconnaissance the surface visibility was variable throughout the project area. While portions of the cemetery site afforded fair to good visibility from roads, trails, animal tracks and burrows, others areas were virtually inaccessible due to dense stands of chaparral and poison oak. Meadows and grassy patches provided good overall visibility augmented by rodent throw.

Portions of the Eastside Road alignment were not accessible due to unexploded ordnance restrictions (see Map 3). Nevertheless, overall soil surface visibility in those project areas surveyed was adequate for the purposes of this reconnaissance.

PROJECT METHODOLOGY

The methodology used in the preparation of this report included three primary steps, as follows:

Background Research

The background research for this project included an examination of the archaeological site records, maps, and project files of the Northwest Regional Information Center of the California Historical Resources Information System,

located at Sonoma State University. In addition, our own extensive files and maps were examined for supplemental information, such as rumors of historic or prehistoric resources in the general project area. These literature searches are undertaken to determine if any archaeological resources have been recorded in the project area, and whether the area has been included in previous archaeological research or reconnaissance studies.

The Regional Information Centers were established by the California Office of Historic Preservation as the local repository for all archaeological reports prepared under cultural resource management regulations. A background literature search at the appropriate Regional Information Center is required by state guidelines and current professional standards. Following completion of a project, a copy of the report must be deposited with that organization.

Native American Consultation

A Sacred Lands search was initiated with the Native American Heritage Commission. Following the search, the commission recommended consultation with locally affiliated Native Americans and provided a list of individuals from several bands to contact for such consultation. Contact was made by mail, email and/or telephone.

Field Reconnaissance

The field reconnaissance was conducted by Mary Doane, B.A., and Gina Kay on several days between August 19 and September 16, 2010. The pedestrian survey consisted of a "general surface reconnaissance" of all accessible project areas which could reasonably be expected to contain visible cultural resources, and which could be viewed without major vegetation removal. The project areas were surveyed using generally straight line transects, where possible. However, dense vegetation cover necessitated transition to a controlled intuitive survey method at times.

RESULTS OF THE RECONNAISSANCE

Background Research

The background search of the files at the Northwest Regional Information Center found one recorded cultural resource located within one kilometer of the cemetery site boundary. Historic resource P-27-2717, the Fort Ord Water Tank, is located on the ridge southwest of the cemetery site. No prehistoric resources have been recorded in the project vicinity. The project area contains no resources listed in the California Inventory of Historical Resources (March 1976), California Historical Landmarks, and the National Register of Historic Places (see Attachment 1).

The project area lies within the currently recognized ethnographic territory of the Costanoan (often called Ohlone) linguistic group. Discussions of this group and their territorial boundaries can be found in Breschini, Haversat, and Hampson (1983), Kroeber (1925), Levy (1978), Margolin (1978), and other sources. In brief, the group followed a general hunting and gathering subsistence pattern with partial dependence on the natural acorn crop. Habitation is considered to have been semi-sedentary and occupation sites can be expected most often at the confluence of streams, other areas of similar topography along streams, or in the vicinity of springs. These original sources of water may no longer be present or adequate. Resource gathering and processing areas and associated temporary campsites are frequently found on the coast and in other locations containing resources utilized by the group. Factors which may influence the locations of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, ecotones, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps or other activity areas can also be found along ridges or other travel corridors.

Two previous surveys (Waite 1995, Doane and Haversat 2006) may have included portions of the project area. In addition Fort Ord has been the subject of two overviews and another large-scale survey for cultural resources (Zahniser and Roberts 1980, Swernoff 1981 and 1982).

Native American Consultation

The Sacred Lands file search through the Native American Heritage Commission found no recorded resources in the project area. Correspondence and consultation with several of the Native Americans recommended by the commission resulted in no additional information about resources within the project area (see Attachment 2). Nevertheless areas of general concern were noted, mainly that any pertinent discoveries during the project should be reported to local Native American groups.

Field Research

None of the materials frequently associated with prehistoric cultural resources in this area (dark midden soil, marine shell fragments, flaked or ground stone, old bone fragments, fire-affected rock, etc.) were observed during the field reconnaissance. Surface soil in the cemetery site and in the road alignment was mostly tan to golden sand with a light gray organic loam noted in densely wooded areas. In old dirt road tracks crossing the project area, sandstone bedrock was exposed. No evidence of significant historic resources was found in the project area.

CONCLUSIONS AND RECOMMENDATIONS

Based on the background research through the California Historic Resources Information System and the Native American Heritage Commission and on our field survey, we have concluded that the project area contains no evidence of significant resources.

Therefore the project, as currently designed, will have no effect on significant historic resources. For that reason, we make the following recommendation for the development of the CCCVC infrastructure.

- The proposed project should not be delayed for archaeological reasons.

Because of the possibility of unidentified (e.g., buried) cultural resources being found during any road or development project, we recommend that the following standard language, or the equivalent, be included in any permits issued for the project area:

- If archaeological resources or human remains are unexpectedly discovered during any construction, work shall be halted within 50 meters (±160 feet) of the find until it can be evaluated by a qualified professional archaeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated, with the concurrence of the Lead Agency, and implemented.

REFERENCES

Breschini, G. S., T. Haversat, and R. P. Hampson

1983 **A Cultural Resources Overview of the Coast and Coast-Valley Study Areas [California].** Coyote Press, Salinas.

Doane, M. and T. Haversat

2006 *Phase 1 Archaeological Reconnaissance for the Marina Coast Water District Regional Urban Water Augmentation Project, Recycled Water Component, Northern Segment, in Marina and Seaside, Monterey County, California.* Report on file with the Northwest Information Center, Sonoma State University.

Kroeber, A. L.

1925 Handbook of the Indians of California. **Bureau of American Ethnology Bulletin** 78.

Levy, R.

1978 Costanoan. Pp. 485-495 in **Handbook of North American Indians, Vol. 8, California.** Smithsonian Institution, Washington, D.C.

Margolin, M.

1978 **The Ohlone Way.** Heyday Books, Berkeley.

Swernoff, M.

1981 *A Reconnaissance Cultural Resources Survey of Fort Ord, California: draft report.* Report on file with the Northwest Information Center, Sonoma State University.

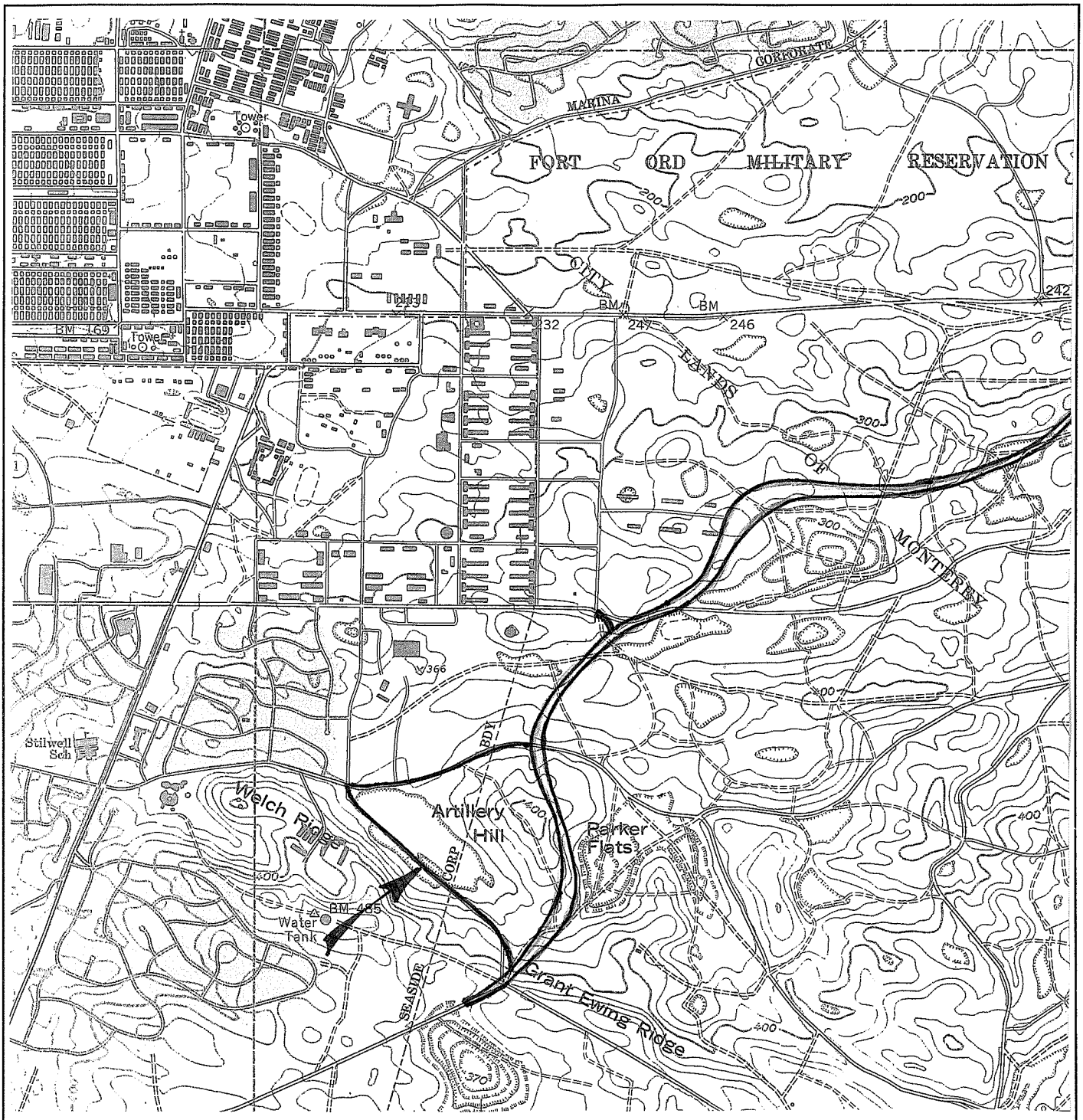
1982 *A Reconnaissance Cultural Resources Survey of Fort Ord, California.* Report on file with the Northwest Information Center, Sonoma State University.

Waite, P. R.

1995 *A Cultural Resources Survey of 783 Hectares, Fort Ord, Monterey County, California.* Report on file with the Northwest Information Center, Sonoma State University.

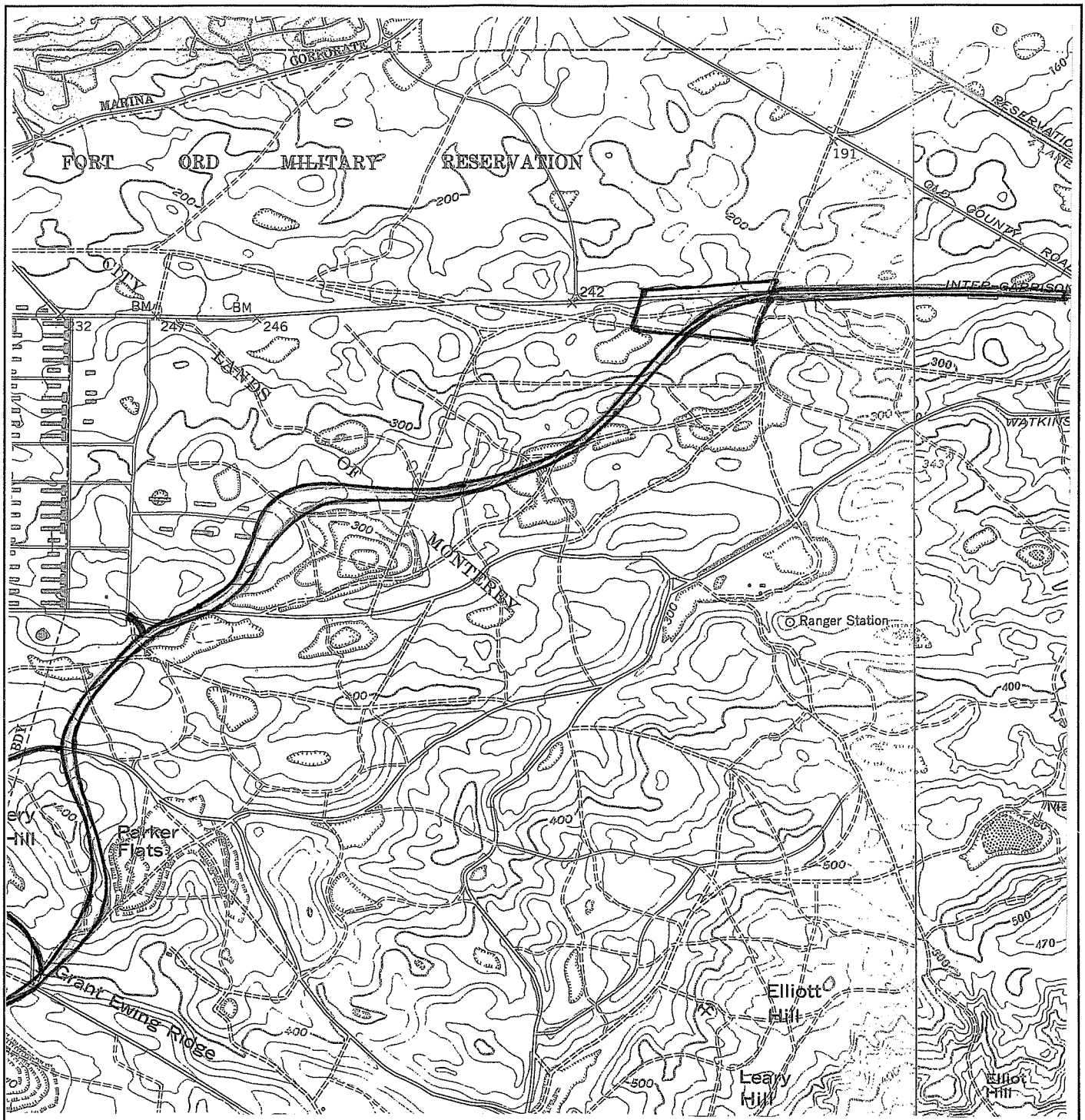
Zahniser, J. L. and L. J. Roberts

1980 *Cultural Resources Literature Search and Overview, Fort Ord, California.* Report on file with the Northwest Information Center, Sonoma State University.



Veterans Cemetery from USGS Marina 7.5 Minute Quad

Map 1. Project Location.



Eastside Road from USGS Marina and Salinas 7.5 Minute Quads

Map 2. Project Location.



Title:
Veterans Cemetery Cultural Survey Map

Map 3. Cultural Resources Survey Area and No Access Areas

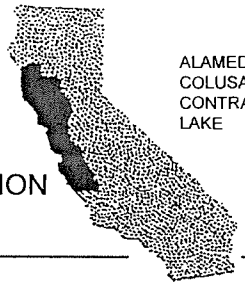
Date: 8-2-2010
Scale: 1 inch = 1,201 feet
Project: 2010-14 VET CEM

Monterey | Truckee | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

ATTACHMENT 1

CHRIS Documentation

CALIFORNIA
HISTORICAL
RESOURCES
INFORMATION
SYSTEM



ALAMEDA
COLUSA
CONTRA COSTA
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
Email: leigh.jordan@sonoma.edu
http://www.sonoma.edu/nwic

Date: 27 August 2010 NWIC File No: 10-0198

To: Mary Doane, Archaeological Consulting, P.O. Box 3377, Salinas, CA 93912

From: Lisa Hagel

Re: AC 4407 & 4420

Marina, Salinas, Seaside, & Monterey 7.5'

Sites in or within 1/2 mile radius of the project areas:

There were no recorded sites within either project area.

1. AC 4407: P-27-2717 is within ½ mile.
2. AC 4420: C-898; CA-MNT-168, 262, 829, 170, 972, & 172; P-27-2777 & 2902 are within ½ mile.

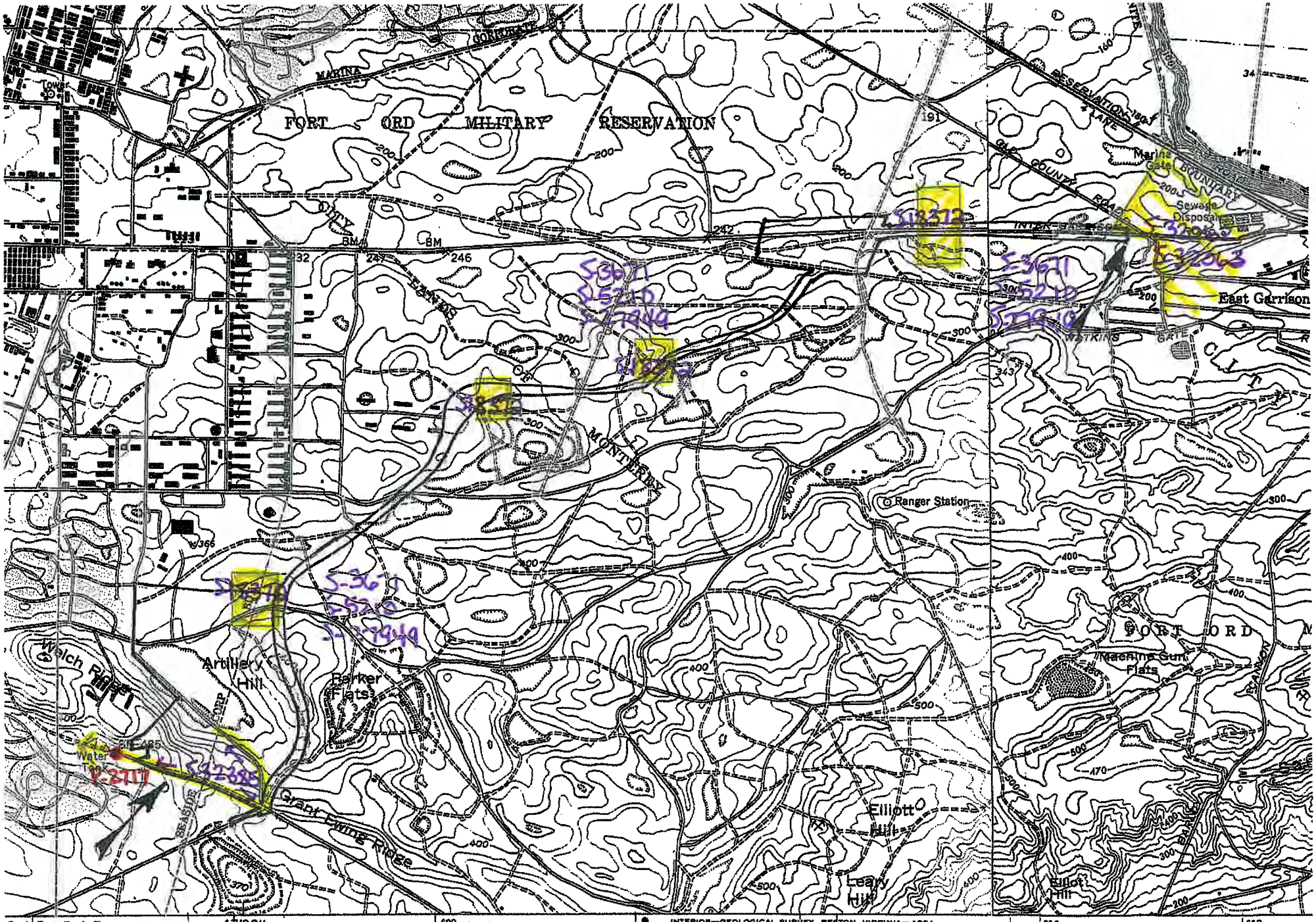
The site locations are plotted on your maps.

Studies within the project areas:

1. AC 4407: S-18372, 5210, 3671, 27949, 32385, 32062, & 32063 are within the project area.
2. AC 4420: S-7973 appears to be within or adjacent to the project area.

Enclosed are bibliographic references for the reports. The study locations are plotted on your maps.

OHP Historic Properties Directory: There were no properties within either project area.



MARINA QUAD

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1954

SALINAS QUAD

Mapped by the Army Map Service

Published for civil use by the Geological Sur

Northwest Information Center Report Detail Record: S-003671

Previous designation(s): E-579 MNT

Citation Information

Authors: Jack L. Zahniser
Lois J. Roberts
Year: 1980
Title: Cultural Resources Literature Search and Overview, Fort Ord, California
Originator: Environmental Research Archaeologists
No. Pages: 0
No. Maps: 0
Report Type(s): Records/literature search
Regional overview
Inventory Size:
No.Sites: 4
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-000139		CA-MNT-3	
P-27-000307		CA-MNT-200H	LAGUNA SECA RANGER STATION FORT
P-27-000510		CA-MNT-416	MON
P-27-000849		CA-MNT-776H	

Notes

Location Info

County(ies): Monterey
USGS 7.5' Quads: Marina
Salinas
Seaside
Spreckels
Address:

Database Record Metadata

	Date	*User*	
Entered:	4/7/2005	nwic-main	
Last Modified:	5/7/2009	hagell	
IC Actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Date Mapped:

Northwest Information Center Report Detail Record: S-005210

Previous designation(s):

Citation Information

Authors: Michael Swernoff
Year: 1982
Title: A Reconnaissance Cultural Resources Survey of Fort Ord, California.
Originator: Professional Analysts
No. Pages: 78
No. Maps: 4
Report Type(s): Archaeological survey
Inventory Size: c 1047.5 ac
No.Sites: 2
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-000510		CA-MNT-416	MON
P-27-000990		CA-MNT-933H	

Notes

Location Info

County(ies): Monterey
USGS 7.5' Quads: Marina
Salinas
Seaside
Spreckels
Address:

Database Record Metadata

	Date	*User*	
Entered:	4/7/2005	nwic-main	
Last Modified:	11/7/2006	lisa	
IC Actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Date Mapped:

Northwest Information Center Report Detail Record: S-018372

Previous designation(s):

Citation Information

Authors: Philip R. Waite
Year: 1995
Title: A Cultural Resources Survey of 783 Hectares, Fort Ord, Monterey County, California
Originator: Geo-Marine, Inc.
No. Pages: 79
No. Maps: 20
Report Type(s): Archaeological survey
Inventory Size: c 783 ha
No.Sites: 3
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-000139		CA-MNT-3	
P-27-000510		CA-MNT-416	MON
P-27-001698		CA-MNT-1731H	

Notes

Location Info

County(ies): Monterey
USGS 7.5' Quads: Marina
Salinas
Seaside
Spreckels
Address:

Database Record Metadata

	Date	*User*	
Entered:	4/7/2005	nwic-main	
Last Modified:	2/19/2009	hagell	
IC Actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Date Mapped:

Northwest Information Center Report Detail Record: S-027947

Previous designation(s):

Citation Information

Authors: Architectural Resources Group
Year: 2003
Title: Draft: Fort Ord, East Garrison, Historic Resources Assessment; July 28, 2003
Originator: Architectural Resources Group
No. Pages: 212
No. Maps: 8
Report Type(s): Historic study
Inventory Size:
No.Sites: 73
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-002718			Officers Lavatories
P-27-002719			Buildings 13 and 16
P-27-002720			Building 14
P-27-002721			Mess Halls
P-27-002722			Lavatory Buildings
P-27-002723			Building 91
P-27-002724			Warehouses
P-27-002725			Rod and Gun Club
P-27-002726			Building T-5 and T-20
P-27-002727			Building T-6
P-27-002728			Building T-7
P-27-002729			Building T-8
P-27-002730			Building T-9
P-27-002731			Building T-10
P-27-002732			Building T-22
P-27-002733			Building T-23
P-27-002734			Building T-24
P-27-002735			Buildings T-25 and T-26
P-27-002736			Buildings T-71 and T-73
P-27-002737			Recreation Buildings
P-27-002738			Buildings T-87 and T-97
P-27-002739			Theater
P-27-002740			Building 101
P-27-002741			Building T-104
P-27-002742			Building T-105
P-27-002743			Building T-120
P-27-002744			Building T-121
P-27-002745			Telephone Exchange Building
P-27-002746			Battle Simulation Building
P-27-002747			Building T-132
P-27-002748			Chapel
P-27-002749			Auto Shop

Notes

The East Garrison appears to be eligible as a National Register District.
See also S-32062 & S-32063.

Location Info

County(ies): Monterey
USGS 7.5' Quads: Salinas
Address:

Northwest Information Center Report Detail Record: S-027947

Database Record Metadata

	Date	User	
Entered:	4/7/2005	nwic-main	
Last Modified:	8/27/2010	hagell	
IC Actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
Date Mapped:			

Northwest Information Center Report Detail Record: S-027949

Previous designation(s):

Citation Information

Authors: Michael Swernoff
Year: 1981
Title: A Reconnaissance Cultural Resources Survey of Fort Ord, California: Draft Report.
Originator: Professional Analysts
No. Pages: 103
No. Maps: 4
Report Type(s): Archaeological survey
Inventory Size: c 1047 ac
No.Sites: 6
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-000510		CA-MNT-416	MON
P-27-000990		CA-MNT-933H	

Notes

4 unrecorded historic properties.

Location Info

County(ies): Monterey
USGS 7.5' Quads: Marina
Salinas
Seaside
Spreckels
Address:

Database Record Metadata

	Date	*User*
Entered:	4/25/2005	leigh
Last Modified:	11/7/2006	lisa
IC Actions:		
Date Mapped:		

Northwest Information Center Report Detail Record: S-032062

Previous designation(s):

Citation Information

Authors: Architectural Resources Group
Year: 2006
Title: East Garrison Preservation Plan, Fort Ord, Monterey County
Originator: Architectural Resources Group
No. Pages: 168
No. Maps:
Report Type(s): Management plan
Inventory Size: c 28,000 ac
No.Sites: 32
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-002718			Officers Lavatories
P-27-002719			Buildings 13 and 16
P-27-002720			Building 14
P-27-002721			Mess Halls
P-27-002722			Lavatory Buildings
P-27-002723			Building 91
P-27-002724			Warehouses
P-27-002725			Rod and Gun Club
P-27-002726			Building T-5 and T-20
P-27-002727			Building T-6
P-27-002728			Building T-7
P-27-002729			Building T-8
P-27-002730			Building T-9
P-27-002731			Building T-10
P-27-002732			Building T-22
P-27-002733			Building T-23
P-27-002734			Building T-24
P-27-002735			Buildings T-25 and T-26
P-27-002736			Buildings T-71 and T-73
P-27-002737			Recreation Buildings
P-27-002738			Buildings T-87 and T-97
P-27-002739			Theater
P-27-002740			Building 101
P-27-002741			Building T-104
P-27-002742			Building T-105
P-27-002743			Building T-120
P-27-002744			Building T-121
P-27-002745			Telephone Exchange Building
P-27-002746			Battle Simulation Building
P-27-002747			Building T-132
P-27-002748			Chapel
P-27-002749			Auto Shop

Notes

See also S-32063.

Location Info

County(ies): Monterey
USGS 7.5' Quads: Salinas
Address:

Northwest Information Center Report Detail Record: S-032062

Database Record Metadata

	Date	*User*
Entered:	10/26/2006	jill
Last Modified:	8/27/2010	hagell
IC Actions:		
Date Mapped:		

Northwest Information Center Report Detail Record: S-032063

Previous designation(s):

Citation Information

Authors: Architectural Resources Group
Year: 2004
Title: Fort Ord, East Garrison Historic Resources Assessment
Originator: Architectural Resources Group
No. Pages: 156
No. Maps:
Report Type(s): Architectural survey
Inventory Size: c 28,000 ac
No.Sites: 32
No. Informal:
Collections:
Disclosure: Not for publication

Associated Resources

Primary No.	*HRI No.*	*Trinomial*	*Name*
P-27-002718			Officers Lavatories
P-27-002719			Buildings 13 and 16
P-27-002720			Building 14
P-27-002721			Mess Halls
P-27-002722			Lavatory Buildings
P-27-002723			Building 91
P-27-002724			Warehouses
P-27-002725			Rod and Gun Club
P-27-002726			Building T-5 and T-20
P-27-002727			Building T-6
P-27-002728			Building T-7
P-27-002729			Building T-8
P-27-002730			Building T-9
P-27-002731			Building T-10
P-27-002732			Building T-22
P-27-002733			Building T-23
P-27-002734			Building T-24
P-27-002735			Buildings T-25 and T-26
P-27-002736			Buildings T-71 and T-73
P-27-002737			Recreation Buildings
P-27-002738			Buildings T-87 and T-97
P-27-002739			Theater
P-27-002740			Building 101
P-27-002741			Building T-104
P-27-002742			Building T-105
P-27-002743			Building T-120
P-27-002744			Building T-121
P-27-002745			Telephone Exchange Building
P-27-002746			Battle Simulation Building
P-27-002747			Building T-132
P-27-002748			Chapel
P-27-002749			Auto Shop

Notes

See also S-27947 & S-32062.

Location Info

County(ies): Monterey
USGS 7.5' Quads: Salinas
Address:

Northwest Information Center Report Detail Record: S-032063

Database Record Metadata

	Date	User
Entered:	10/26/2006	jill
Last Modified:	8/27/2010	hagell
IC Actions:		
Date Mapped:		

Northwest Information Center Report Detail Record: S-032385

Previous designation(s):

Citation Information

Authors: Mary Doane
Trudy Haversat

Year: 2006

Title: Phase I Archaeological Reconnaissance for the Marina Coast Water District Regional Urban Water Augmentation Project, Recycled Water Component, Northern Segment, in Marina and Seaside, Monterey County, California

Originator: Archaeological Consulting

No. Pages: 45

No. Maps:

Report Type(s): Archaeological survey

Inventory Size: c 21.75 li mi

No.Sites: 0

No. Informal:

Collections:

Disclosure: Not for publication

Associated Resources

Notes

Location Info

County(ies): Monterey

USGS 7.5' Quads: Marina
Seaside

Address:

Database Record Metadata

	Date	User
Entered:	12/19/2006	guldenj
Last Modified:	8/22/2008	hagell

IC Actions:

Date Mapped:

ATTACHMENT 2

Native American Consultation

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912
Fax (831) 422-4913

September 17, 2010

AC 4407

Erin Harwayne
Denise Duffy and Associates
947 Cass St.
Monterey, CA 93940

Re: CCCVC and Eastside Road Infrastructure Projects

Dear Ms. Harwayne:

At your request we initiated a record search of the sacred lands file with the Native American Heritage Commission (NAHC) on August 13, 2010. Attached please find a copy of the response, dated August 25, from Katy Sanchez of the NAHC. As you will see there was no specific site information found in their files regarding the project area, which lies in traditional Ohlone territory. She recommended that we make additional contacts with other Native American sources of information regarding the potential for cultural resources in the project area. Because these Native American peoples are not a federally recognized tribe, there is no single person or group who represents all of them. A sample copy of the letters regarding your project that were sent on August 26 to the several Native American contacts on the NAHC list is also attached.

I have received responses from several individuals from members of four of the locally affiliated bands, including Tony Cerda of the Coastanoan Rumsen Carmel Tribe, Lousie Miranda-Ramirez of the Ohlone/Costanoan Esselen Nation, Valentin Lopez of the Amah Mutsun Tribal Band, and Jean-Marie Fehling of the Amah/Mutsun Tribal Band. They could offer no information specific to the project area.

Because of their concern for the preservation of the cultural resources which comprise their heritage, the listed Native Americans should be informed of the of the discovery of any previously unknown cultural resources during the course of this project. A continuing sensitivity to their concerns and the inclusion of interested Native Americans in this development will be greatly appreciated by them. I have attached an updated Native American Contacts list.

Please feel free to call if you have any further questions or need additional information in this matter.

Yours truly,



Mary Doane

cc. Native American Heritage Commission

Attachments

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912
Fax (831) 422-4913

August 13, 2010

AC 4407

Debbie Pilas Treadway
State Of California
Native American Heritage Commission
Via fax: 916 657-5390

Re: Sacred Lands File search request

Dear Debbie:

We have just started a Phase I Archaeological Survey for the proposed Central Coast California Veteran's Cemetery (CCCVC) infrastructure project in Seaside, Monterey County. We do not yet have the results of the CHRIS search for recorded archaeological sites in the project area, but we do not expect any based on our previous work in the general area.

We are contacting your office for information on possible Native American Sacred sites or concerns in the project area. Would you please search your Inventory of Sacred Lands to determine whether the project area contains any such resources (see attached map from the USGS 7.5 Minute Marina and Salinas Quads).

We are prepared to contact local Native Americans for their comments on the proposed project area if you will provide us with the names and addresses on your current list for this part of Monterey County.

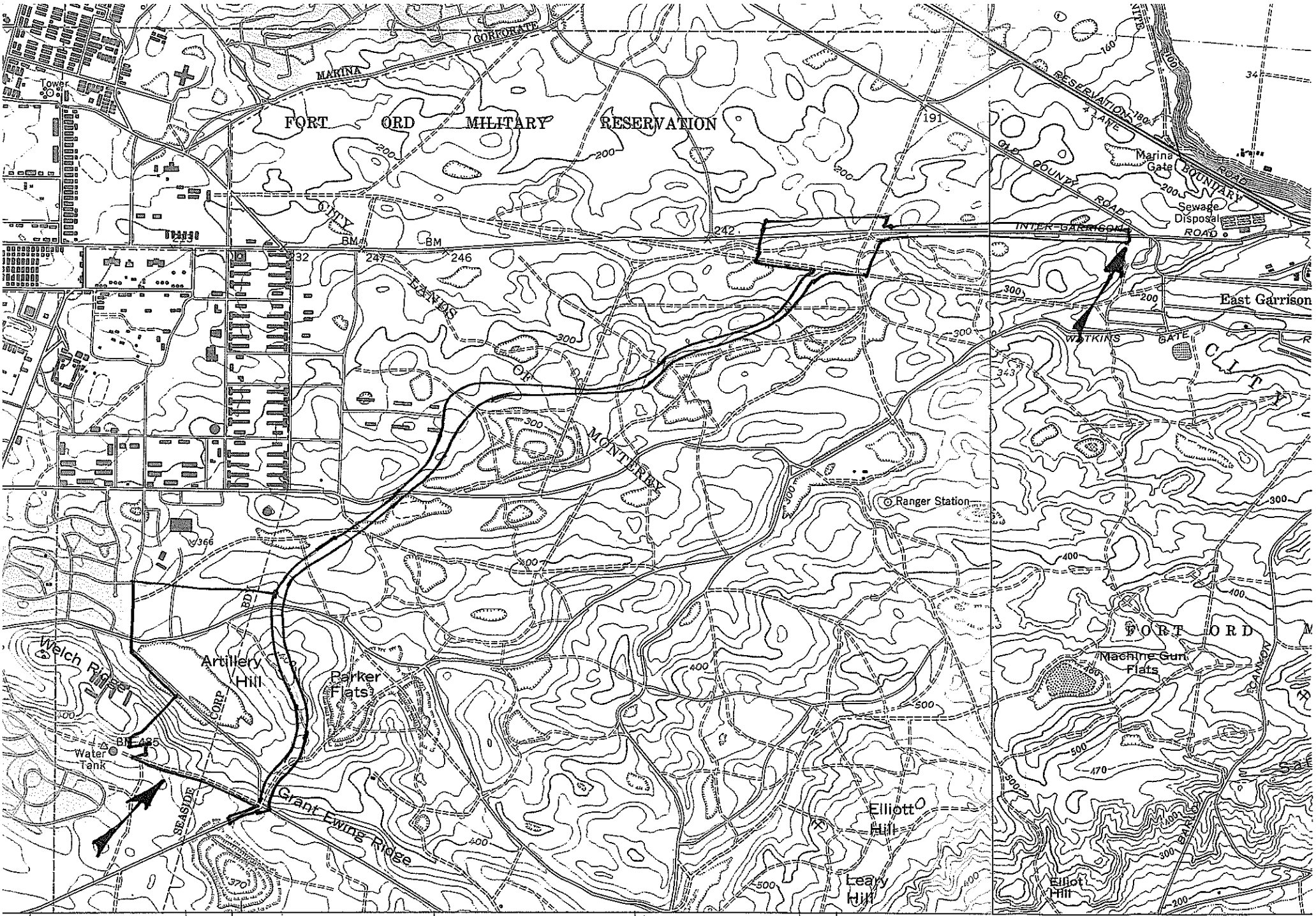
If you have any questions about this request, please do not hesitate to contact our office.

Yours truly,

Mary Doane

Mary Doane

Attachment


FORT ORD MILITARY RESERVATION
MARINA
CORPORATE
RESERVATION
4 LANE
OLD COUNTY ROAD
Marina Gate
BOUNDARY ROAD
Sewage Disposal
INTER-GARRISON ROAD
East Garrison
WATKINS GATE
CUTTY SANDS
BM
OR
MONTEREY
Ranger Station
Tower
Welch Ridge
Artillery Hill
Parker Flats
CORP
Water Tank
BM 485
SEASIDE
Grant Ewing Ridge
Elliott Hill
Leary Hill
Machine Gun Flats
CANYON
FORT ORD
R. 1 E.
R. 2 E.
47'30"
121°45'
609
610
611
612
613
000m.E.
MARINA QUAD
SALINAS QUAD
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1984
1 MILE
6000 7000 FEET
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Mapped by the Army Map Service
Published for civil use by the Geological Sur
Control by USGS, NOS/NOAA, and USCE

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390

August 25, 2010

Mary Doane
Archaeological Consulting
P.O. Box 3377
Salinas, CA 93912

Sent by Fax: 831-422-4913
Number of Pages: 2

RE: Proposed Central Coast California Veteran's Cemetery, Monterey County

Dear Ms. Doane:

A record search of the sacred lands file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4040.

Sincerely,

for Katy Sanchez
Program Analyst

Native American Contact List
Monterey County
August 24, 2010

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 Ohlone/Costanoan
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238

Trina Marine Ruano Family
Ramona Garibay, Representative
16010 Halmar Lane Ohlone/Costanoan
Lathrop , CA 95330 Bay Miwok
soaprootmo@msn.com Plains Miwok
209-629-8619 Patwin

Jakki Kehl
720 North 2nd Street Ohlone/Costanoan
Patterson , CA 95363
jakki@bigvalley.net
(209) 892-1060

Amah MutsunTribal Band
Valentin Lopez, Chairperson
3015 Eastern Ave, #40 Ohlone/Costanoan
Sacramento , CA 95821
vlopez@amahmutsun.org
(916) 481-5785

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
3929 Riverside Drive Ohlone/Costanoan
Chino , CA 91710
rumsen@aol.com
(909) 464-2074
(909) 524-8041 Cell
rumsen@aol.com

Amah/MutsunTribal Band
Irene Zwierlein, Chairperson
789 Canada Road Ohlone/Costanoan
Woodside , CA 94062
amah_mutsun@yahoo.com
(650) 851-7747 - Home
(650) 851-7489 - Fax

Ohlone/Coastanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
PO Box 1301 Esselen
Monterey , CA 93942 Ohlone/Costanoan
ramirez.louise@yahoo.com
408-629-5189
408-205-7579 - cell

Ohlone/Coastanoan-Esselen Nation
Christianne Arias, Vice Chairperson
PO Box 552 Esselen
Soledad , CA 93960 Ohlone/Costanoan
831-235-4590

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Central Coast California Veteran's Cemetery Project; Monterey County.

Native American Contact List
Monterey County
August 24, 2010

Amah MutsunTribal Band
Edward Ketchum
35867 Yosemite Ave Ohlone/Costanoan
Davis , CA 95616 Northern Valley Yokuts
aerieways@aol.com

Amah/MutsunTribal Band
Jean-Marie Feyling
19350 Hunter Court Ohlone/Costanoan
Redding , CA 96003
jmfgmc@sbcglobal.net
530-243-1633

Amah/Mutsun Tribal Band
Joseph Mondragon, Tribal Administrator
882 Bay view Avenue Ohlone/Costanoan
Pacific Grove, CA 94062
831-372-9015
831-372-7078 - fax

Amah/Mutsun Tribal Band
Melvin Ketchum III, Environmental Coordinator
7273 Rosanna Street Ohlone/Costanoan
Gilroy , CA 95020
408-842-3220

Ohlone/Coastanoan-Esselen Nation
Pauline Martinez-Arias, Tribal Council woman
1116 Merlot Way Esselen
Gonzales , CA 93926 Ohlone/Costanoan
maklici0-us@gmail . net
831-596-9897

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Central Coast California Veteran's Cemetery Project; Monterey County.

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912
Fax (831) 422-4913

August 26, 2010

AC Project 4407

Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Re: Central Coast California Veterans Cemetery Project

Dear Ann Marie:

We are working on a Phase 1 archaeological survey for the Central Coast California Veterans Cemetery Infrastructure Project in the City of Seaside and Monterey County (see the section of the USGS Marina and Salinas quad maps attached). The project includes the proposed cemetery site and the proposed Eastside Road alignment between Eucalyptus Road and Intergarrison Road in the Monterey County portion of the former Fort Ord. Portions of the project area are still in the process of unexploded ordnance cleanup and are not currently available for field survey.

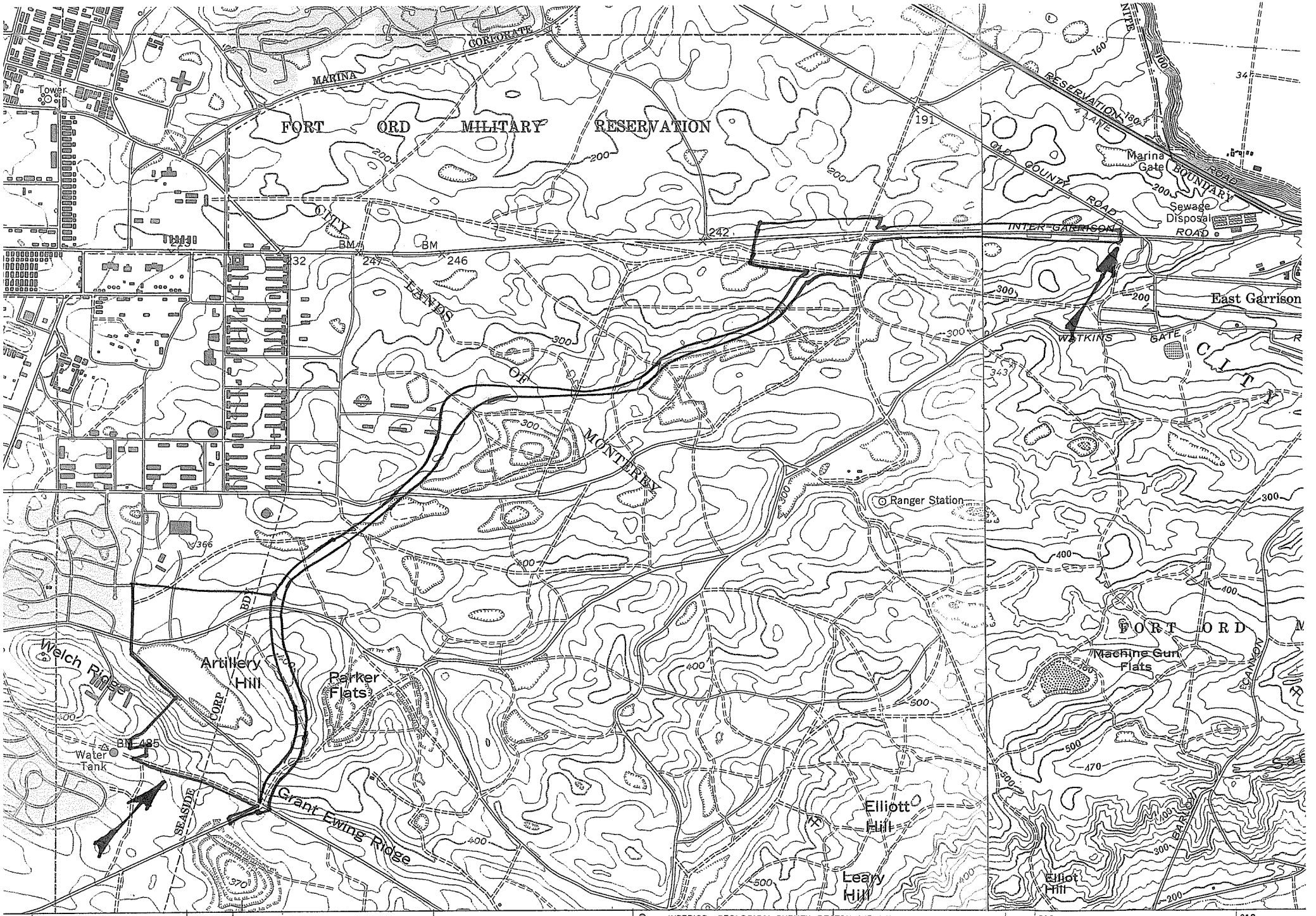
We have contacted the Native American Heritage Commission for information on recorded sites in the project area. Their search found no Sacred Lands recorded there. The commission provided us with a list of local Native Americans, who might have additional information about the area. If you should have any information about cultural resources within or in the vicinity of the project area, please contact this office as soon as possible, but not later than September 9, with your information, comments or the names of other Native Americans who may have information about the area.

If you have any questions about this request, please do not hesitate to contact me at your earliest convenience.

Yours truly,

Mary Doane

Mary Doane


FORT ORD MILITARY RESERVATION
MARINA
CORPORATE
Tower
CITY LANDS
BM
247
246
242
191
RESERVATION
4 LANE
ROAD
Marina Gate
BOUNDARY
Sewage Disposal
OLD COUNTY ROAD
INTER-GARRISON
East Garrison
WATKINS GATE
CITY
OFF
MONTEREY
Ranger Station
FORT ORD
Machine Gun Flats
Welch Ridge
Artillery Hill
Parker Flats
BM 485
Water Tank
Grant Ewing Ridge
SEASIDE
CORP
BDY
Elliott Hill
Leary Hill
Elliot Hill
CANYON
R. 1 E.
R. 2 E.
47'30"
121°45'
609
610
611
612
613
1000m E.
MARINA QUAD
SALINAS QUAD
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1984
1 MILE
6000
7000 FEET
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Mapped by the Army Map Service
Published for civil use by the Geological Sur
Control by USGS, NOS/NOAA, and USCE

Ohlone/Costanoan-Esselen Nation

Previously acknowledged as
The San Carlos Band of
Mission Indians
The Monterey Band
And also known as
O.C.E.N. or Esselen Nation
P.O. Box 1301
Monterey, CA 93942

www.ohlonecostanoanesselennation.org.

September 1, 2010

Mary Doane
Archaeological Consulting
P.O. Box 3377
Salinas, CA 93912

Re: Phase a archaeological survey for the Central Coast California Veterans Cemetery Infrastructure Project in the City of Seaside and Monterey County

Saleki Atsa Mary,

As you know, I am the Tribal Chairperson for the Ohlone Costanoan Esselen Nation. I also represent the tribe to the Native American Heritage Commission and I act as the Most Likely Descendant for OCEN. As Most Likely Descendant I represent the OCEN Tribal Council's decisions regarding the treatment of ancestral Native American human remains and/or cultural resources that are often disturbed or encountered. I am the legal spokesperson for the OCEN Tribe and the Tribal Council. I may also be contacted for information for consultation, and reviewing planned projects for potential adverse impacts and reviewing predictive models that might negatively impact our Tribe's ancestral cemeteries, villages, ceremonial and processing sites.

Included with this letter please find a territorial map by Taylor 1856; Levy 1973; and Milliken 1990, indentifying Tribal areas. Ohlone/Costanoan Esselen Nation is the legal tribal government representative for over 600 enrolled members of Esselen, Carmeleno, Monterey Band, Rumsen, Chalon, San Carlos Mission and/or Costanoan Mission Indian descent. Though other indigenous people may have lived in the area, the area is the indigenous homeland of our people.

We ask that a sacred lands search with the Northwest Information Center, Sonoma State University. Ms. Leigh Jordan can be contacted at (707) 664-0880 or leigh.jordan@sonoma.edu and thank you for your contact of the Native American Heritage Commission in Sacramento, CA. At this time we are unable to provide you with cultural resource information but ask that OCEN be contacted upon any findings on this project.

Please be advised that it is our first priority that our ancestor's remains be protected and undisturbed. We desire that all cultural and sacred items be left with our ancestors on site or where they are discovered. We ask for the respect that is afforded all of our current day deceased, by no other word these burial sites are cemeteries, respect for our ancestors as you would expect respect for your deceased family members in today's cemeteries. **Our definition of respect is no disturbance.**

We request that Ohlone/Costanoan-Esselen Nation be consulted as to any planned projects that might adversely impact known or predicted cultural resources and sacred sites within our aboriginal territory. Furthermore, the Tribal leadership desires to be contacted about which archaeological consultants are selected to conduct: 1) surveys, 2) subsurface testing, 3) presence/absence testing, 4) mitigation and recovery programs, 5) reburial of any of our ancestral remains, 6) placement of all cultural items, and 7) that a Native American Monitor of OCEN, approved by the Tribal Council be used within our aboriginal territory.

We look forward to hearing more information about this project; please feel free to contact me at (408) 629-5189. Nimasianexelpasaleki. Thank you for your attention to this matter.

Sincerely and Respectfully Yours,

Louise J. Miranda Ramirez, Chairperson
Ohlone/Costanoan Esselen Nation
(408) 629-5189

Cc: OCEN Tribal Council
Archaeological Consulting file

Distribution of Ohlone/Costanoan-Esselen Nation Tribal Rancherias, Districts, Landgrants and Historic Landmarks

OCEN DIRECT LINEAL DESCENT

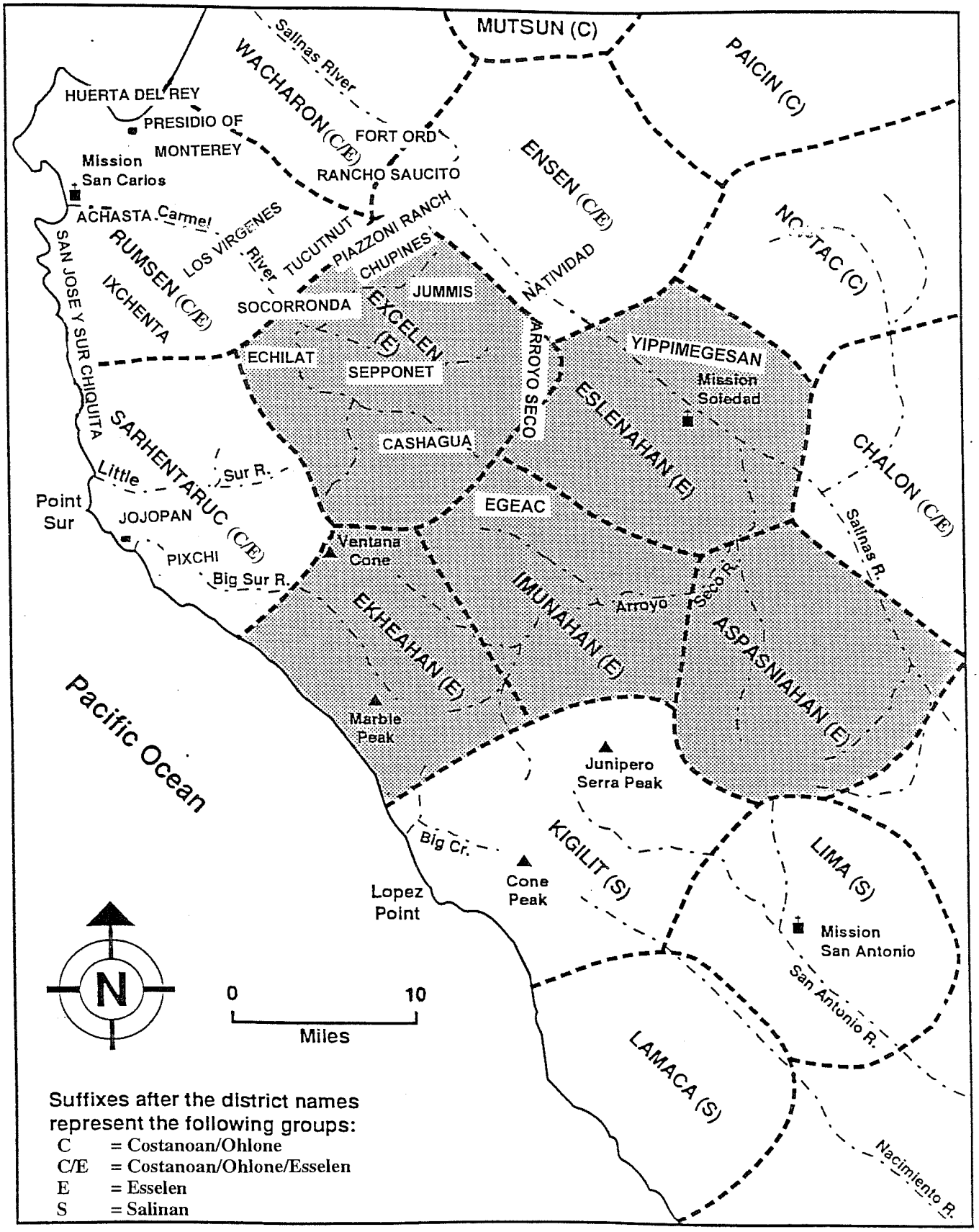


Figure 2:

Map after Taylor 1856; Levy 1973; Hester 1978; Milliken 1990

Delivered-To: flame@razzolink.com
DKIM-Signature: v=1; a=rsa-sha256; c=relaxed/relaxed; d=yahoo.com; s=s1024; t=1283364901;
bh=/oAK0XUjP7RLCsO0Q5cyKTZFvmj4YolrNj/lCMe2DDI=;
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tFW9h6OUJotykFeD0yR7PW0csSKpK
Date: Wed, 1 Sep 2010 11:15:01 -0700 (PDT)
From: Louise Ramirez <ramirez.louise@yahoo.com>
Subject: Re: Project consultation
To: Mary Doane <flame@razzolink.com>
X-MagicMail-UUID: d710650e-b5f4-11df-85fd-0024e859a4aa

Saleki Asatsa Mary,

Thank you for contacting OCEN about this project. I am attaching our letter. I hope to hear more about this project.

Nimasianexelpasaleki

Louise J. Miranda Ramirez
OCEN Tribal Chair

www.ohlonecostanoanesselennation.org

From: Mary Doane <flame@razzolink.com>
To: Louise Ramirez <ramirez.louise@yahoo.com>
Sent: Thu, August 26, 2010 1:37:46 PM
Subject: Project consultation

Hello Louise,

Attached you will find a letter regarding a new project we are working on in the former Fort Ord. Please let me know if you have any information, comments or questions in this matter.

Thanks,
Mary

Delivered-To: flame@razzolink.com
To: flame@razzolink.com
Subject: Re: Project consultation
Date: Mon, 30 Aug 2010 22:47:27 -0400
X-AOL-IP: 67.174.154.100
X-MB-Message-Source: WebUI
From: vjltestingcenter@aol.com
X-MB-Message-Type: User
X-AOL-SENDER: VJLTestingCenter@aol.com
X-MagicMail-UUID: 2090acd0-b4aa-11df-a728-0024e859a4d1

Hi Mary,

The Amah Mutsun Tribal Band has no comment on this project.

Valentin Lopez, Chairman
Amah Mutsun Tribal Band
3015 Eastern Avenue #40
Sacramento, CA 95821

-----Original Message-----
From: Mary Doane <flame@razzolink.com>
To: Val Lopez <vlopez@amahmutsun.org>
Sent: Thu, Aug 26, 2010 1:42 pm
Subject: Project consultation

Hi Val,

Attached you will find a letter regarding a new project we are working on in the former Fort Ord. Please let me know if you have any information, comments or questions in this matter.

Thanks,
Mary

Delivered-To: flame@razzolink.com
From: local user <rumsen@aol.com>
To: Mary Doane <flame@razzolink.com>
Subject: Re: Project consultation
Date: Fri, 27 Aug 2010 07:28:45 -0700
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X-AOL-SCOLL-URL_COUNT: 0
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X-AOL-IP: 173.58.108.215
X-MagicMail-UUID: 69f58e2e-b1e7-11df-a095-0024e859a4c4

Aho Mary, I tried to answer you yesterday but the emial was returned. No we don't habe any additional info but keep us informed please.
Shururu
tony
On Aug 26, 2010, at 1:35 PM, Mary Doane wrote:

> Hi Tony,
>
> Attached you will find a letter regarding a new project we are working on in the former Fort Ord. Please let me know if you have any information, comments or questions in this matter.
>
> Thanks,
> Mary
> <4407 NA Letter 03.pdf>

Delivered-To: flame@razzolink.com
DKIM-Signature: v=1; a=rsa-sha256; c=relaxed/relaxed; d=sbcglobal.net; s=s1024; t=1282864318;
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vaDL3fLJJMRLZro0e7.ONz_umNdxujVFO
Date: Thu, 26 Aug 2010 16:11:58 -0700 (PDT)
From: Jean-Marie <jmfgmc@sbcglobal.net>
Subject: Re: Project consultation
To: Mary Doane <flame@razzolink.com>
X-MagicMail-UUID: 5437c9ba-b167-11df-9563-0024e859a4c4

MARY the heritage commission does not do the kind of seach you need, contact Sonoma State in Sonoma.

Jean-Marie Feyling

--- On **Thu, 8/26/10, Mary Doane** ***<flame@razzolink.com>*** wrote:

> From: Mary Doane <flame@razzolink.com>
> Subject: Project consultation
> To: "Jean-Marie Fehling" <jmfgmc@sbcglobal.net>
> Date: Thursday, August 26, 2010, 1:59 PM
>
> Hello Jean-Marie,
>
> Attached you will find a letter regarding a proposed project in the former Fort Ord. Please let me know if you have any information, comments or questions in this matter.
>
> Thanks,
> Mary

Cultural Resources Inventory Report
Central Coast California Veterans Cemetery Project at Fort Ord
Monterey County, California

Prepared For:
State of California Department of General Services
Real Estate Services Division
707 3rd Street, 4th Floor
West Sacramento, California 95605

Prepared By:

Stephen Pappas and Katherine Knapp MS, RPA
ECORP Consulting, Inc.
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Under the direction of Principal Investigator:

Katherine Knapp MS, RPA

May 2014

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

MANAGEMENT SUMMARY

In 2014, the State of California Department of General Services, Real Estate Services Division (RESD) retained ECORP Consulting, Inc. to conduct a cultural resources inventory for the proposed Central Coast California Veterans Cemetery Project at Fort Ord. RESD proposes to set aside approximately 16 acres to be used for a portion of the proposed Central Coast California Veterans Cemetery located within the former Fort Ord Army Base in Monterey County, California.

ECORP carried out a cultural resources inventory of the Area of Potential Effects (APE) that included a records search, literature review, and field survey. The records search results indicated that four previous cultural resources studies have been conducted [redacted]. The record search results also indicated that one site has previously been recorded [redacted].

As a result of the field survey, one cultural resource was identified [redacted]: FO-001 (earthen berm). This resource is not eligible for inclusion in the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR). Recommendations for the management of unanticipated discoveries are also provided.

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Attachment A – Records Search Confirmation and Historical Society Coordination
Attachment B – Native American Coordination
Attachment C – APE Photographs
Attachment D – ***Confidential*** Cultural Resource Site Locations and Site Records

1.0 INTRODUCTION

In March 2014, ECORP was retained by State of California, Department of General Services (DGS), to conduct a cultural resources inventory of the proposed Central Coast California Veterans Cemetery Project at Fort Ord. RESD proposes to set aside approximately 16 acres to be used for a portion of the proposed Central Coast California Veterans Cemetery located within the former Fort Ord Army Base in Monterey County, California. A survey of the property was required to identify potentially eligible cultural resources (archaeological sites and historic buildings, structures, and objects) that could be affected by the Project.

1.1 Project Location

The Project Area consists of approximately 16 acres of property located in an unsectioned portion of Township 15 South, Range 2 East, Mount Diablo Base and Meridian as depicted on the 1947 (photorevised 1983) Marina, California USGS 7.5' topographic quadrangle map (Figures 1 and 2). It is also located within a portion of Assessor Parcel Number (APN) 031-151-048-000, east of the intersection of Parker Flats Road and Parker Flats Cut-Off.

1.2 Project Description

The proposed Project, consisting of a newly designed cemetery, will include a ceremonial entrance, administration and maintenance complex, columbarium with a capacity for 5,000, a cortege assembly area, committal service shelter, a flag/assembly area, a memorial walkway/donations area, and supporting roads and infrastructure.

The main entrance to the proposed Project would be located on Parker Flats Road approximately 200 yards east of the intersection with Parker Flats Cut-Off. The entrance would be located where there is a break in native vegetation to minimize the need for tree removal. A divided road would lead from the gate down the gentle slope to the administration and maintenance complex.

The Administration/Maintenance complex includes parking for 11 visitors and staff located in front of the administration building. The maintenance complex will parallel Parker Flats Cut-Off at a 90-degree angle from the administration building. The maintenance yard would be sized for the turning radius of semi-trucks. The area adjacent to the maintenance building would be paved with concrete and gravel providing a stable surface for the remainder of the yard. One 500-gallon tank containing gasoline and another 500-gallon tank containing diesel would be located in the maintenance yard. Adjacent to the entry road, and opposite the administration complex, would be the memorial walk. The concrete path would meander from the intersection up the hill parallel to the entry road.

The five columbarium clusters would be set back within the canopy of the existing coast live oak woodland along a looped road, taking advantage of existing breaks in the woodland as part of the Project design. Each columbarium would range between 24 to 40 feet in length depending on the existing grade and vegetation opening. Each columbarium cluster would be accessed directly from the looped road via concrete pathways.

The committal service shelter would be located on a separate loop road and would be sited at the end of the loop with an existing grove of oak trees serving as a backdrop. Designed to accommodate 30 cars, the road would be approached on the right for ease of turning for the cortege. The flag assembly area would be located in the center of the committal service shelter loop. The center of the loop would be graded to be flat and covered with decomposed granite. The grading would create a slope bank retained on the downhill side by a low wall. The national flag would be flown on a 50-foot pole at the back of the assembly area, within concrete paving. A concrete path would provide access from the administration area to the flag assembly area.

Utilities proposed for the project would include the installation of a 12-inch water main for potable water along Normandy Road with 2-inch service lines, a 10-inch water service line for fire suppression following along the east side of Parker Flats Cut-Off, a sanitary sewer system consisting of a sanitary sewer lift station installed between the proposed administration building and maintenance building, and a storm drainage system where runoff will drain into an existing natural depression located in the northwestern corner of the Project.

1.3 Area of Potential Effects

The Area of Potential Effects (APE) consists of the horizontal and vertical limits of the project, and includes the area within which significant impacts or adverse effects to Historical Resources or Historic Properties could occur as a result of the project. The horizontal APE consists of all areas where activities associated with the project are proposed. This includes areas proposed for construction, vegetation removal, grading, trenching, stockpiling, staging, paving, and other elements described in the official project description. The horizontal APE is illustrated in Figures 1 through 3 and also represents the survey coverage area. It measures approximately 16 acres.

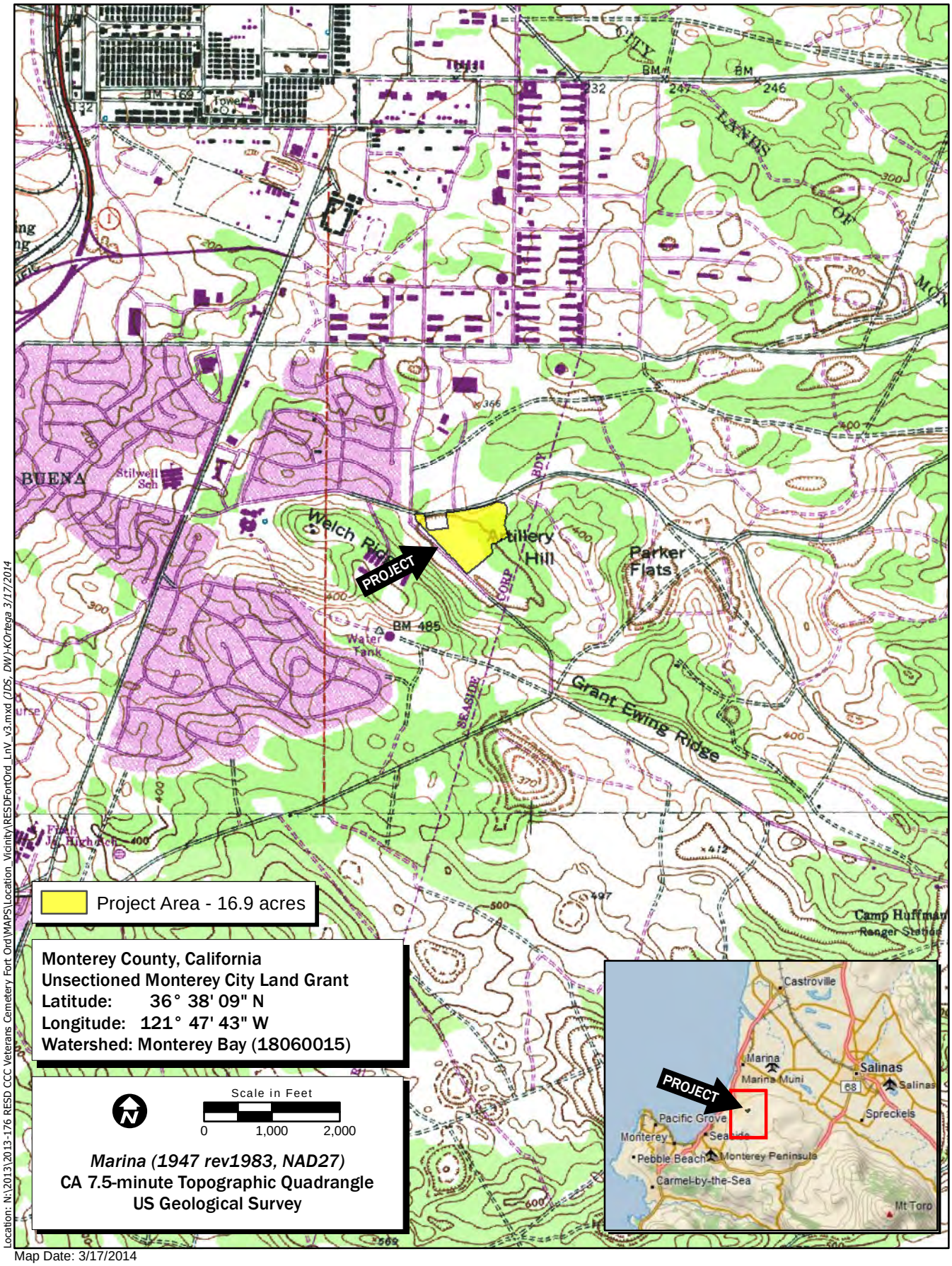
The vertical APE is described as the maximum depth below the surface to which excavations for project foundations and facilities will extend. Thus, the vertical APE includes all subsurface areas where archaeological deposits could be affected. The subsurface vertical APE varies across the project, depending on the location of buried utilities, grading, and structure foundations. Current development plans do not detail the maximum depth of grading, but could extend down to 5-feet below surface for installation of wastewater lines.

The vertical APE also is described as the maximum height of structures, which could impact the physical integrity and integrity of setting of cultural resources, including districts and traditional cultural properties. For the current project, the above-surface vertical APE is up to 50 feet above the surface in the case of the flag pole installation. The maximum height of the proposed structures is 25 feet above the surface.

1.4 Regulatory Context

To meet the regulatory requirements of this project, this cultural resources investigation was conducted pursuant to the provisions for the treatment of cultural resources contained within Section 106 of the National Historic Preservation Act (NHPA) and in the California Environmental Quality Act (CEQA; Pub. Res. Code § 21000 *et seq.*). The goal of NHPA and CEQA is to develop and maintain a high-quality environment that serves to identify the significant environmental effects of the actions of a proposed project and to either avoid or mitigate those significant effects where feasible. CEQA pertains to all proposed projects that require state or local government agency approval, including the enactment of zoning ordinances, the issuance of conditional use permits, and the approval of development project maps. NHPA pertains to projects that entail some degree of federal funding or permit approval.

NHPA and CEQA (Title 14, CCR, Article 5, Section 15064.5) apply to cultural resources of the historical and prehistoric periods. Any project with an effect that may cause a substantial adverse change in the significance of a cultural resource, either directly or indirectly, is a project that may have a significant effect on the environment. As a result, such a project would require avoidance or mitigation of impacts to those affected resources. Significant cultural resources must meet at least one of four criteria that define eligibility for listing on either the California Register of Historical Resources (CRHR) (Pub. Res. Code § 5024.1, Title 14 CCR, Section 4852) or the National Register of Historic Places (NRHP) (36 CFR 60.4). Cultural resources eligible for listing on the NRHP are considered Historic Properties under 36 CFR Part 800 and are automatically eligible for the CRHR. Resources listed on or eligible for inclusion in the CRHR are considered Historical Resources under CEQA.



Location: N:\2013\2013-176 RESD CCC Veterans Cemetery Fort Ord\MAPS\Location_Vicinity\RESDFortOrd_LnV_v3.mxd (JDS, DW)-KOrtega 3/17/2014

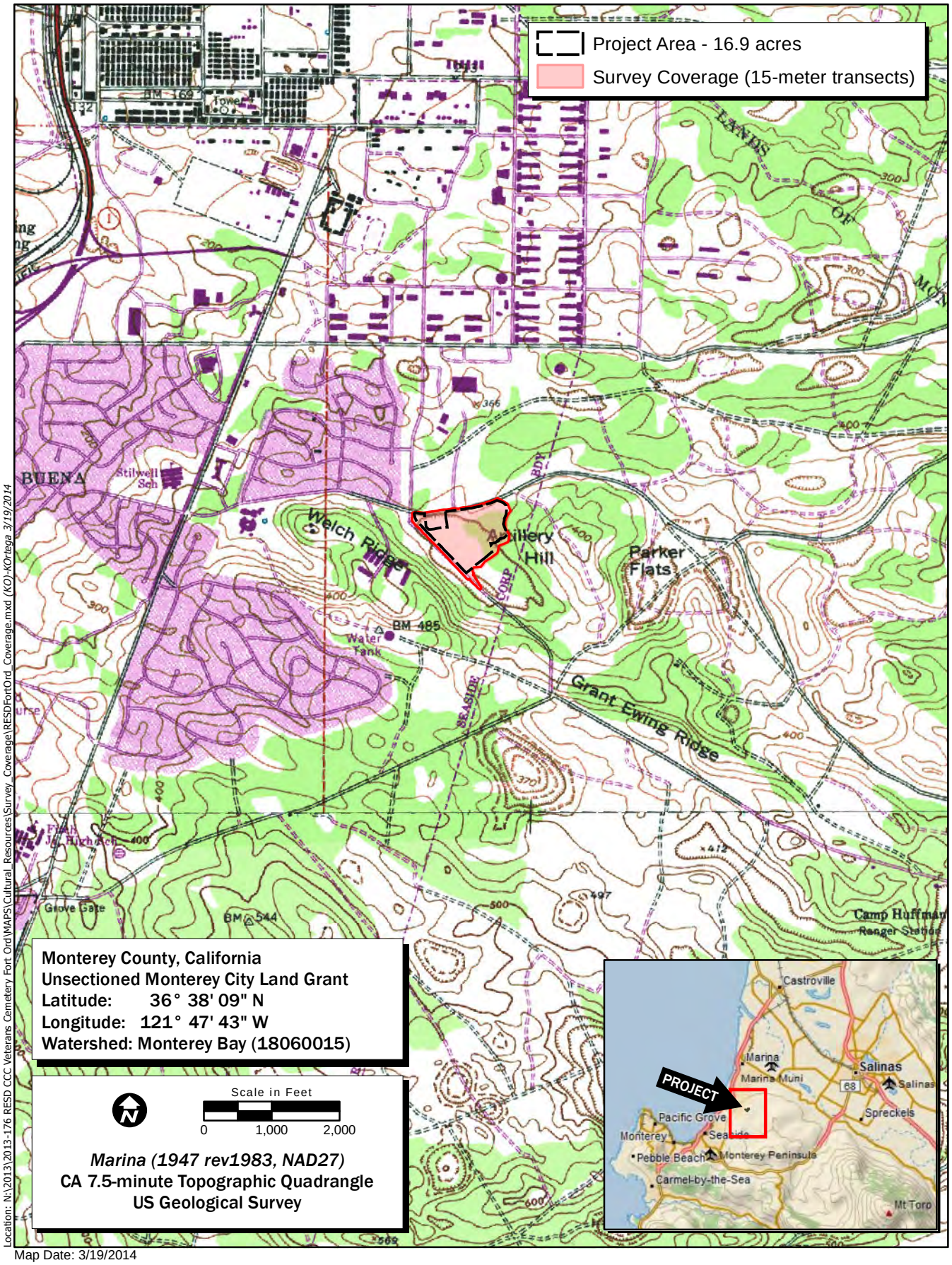
Map Date: 3/17/2014

Service Layer Credits: Copyright:© 2013 DeLorme

Figure 1. Project Location and Vicinity

2013-176 RESD CCC Veterans Cemetery Fort Ord

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Location: N:\2013\2013-176 RESD CCC Veterans Cemetery Fort Ord\MAPS\Cultural_Resources\Survey_Coverage\RESDFortOrd_Coverage.mxd (KO)-KOrtega 3/19/2014

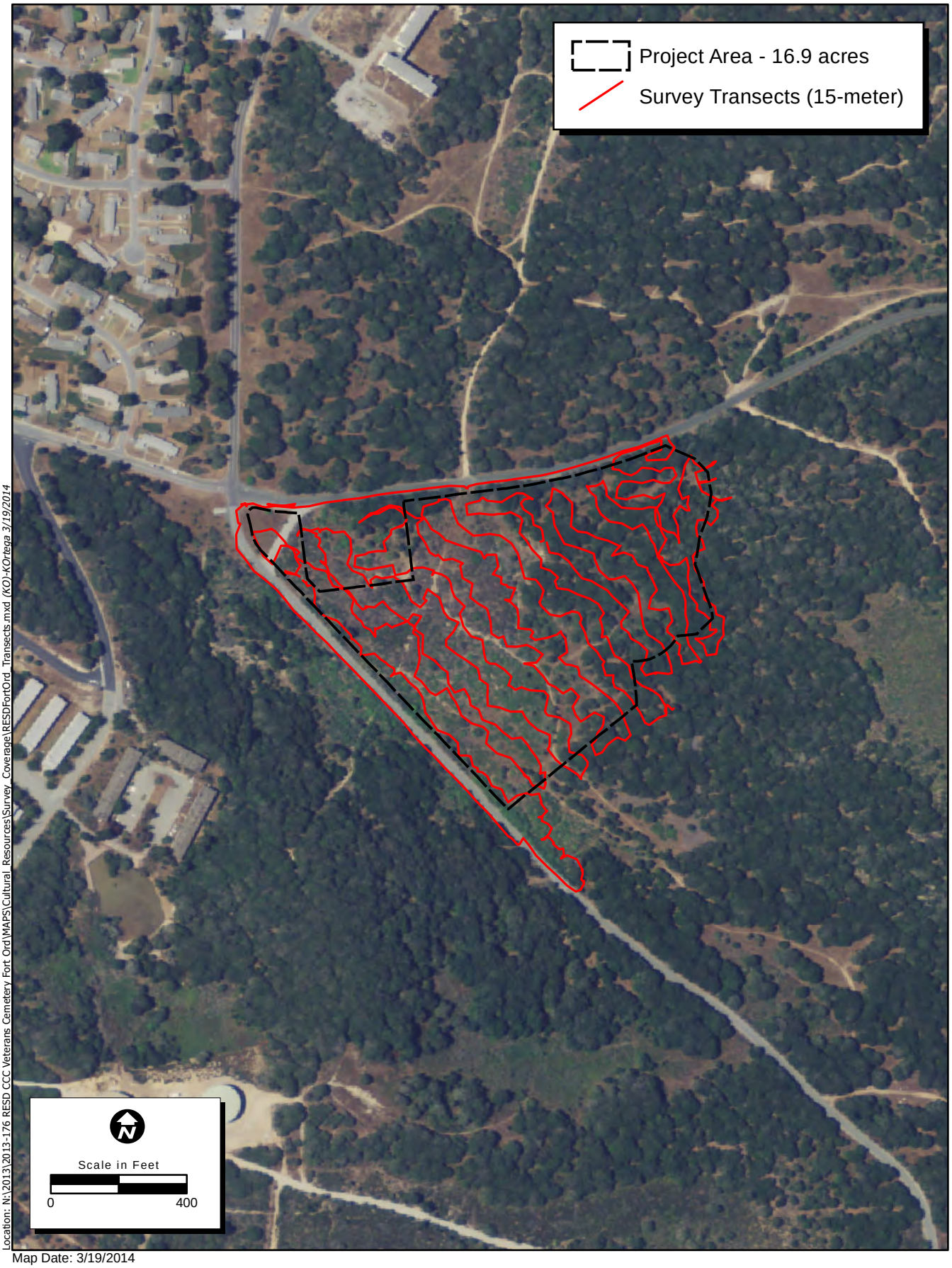
Map Date: 3/19/2014

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Figure 2. Survey Coverage

2013-176 RESD CCC Veterans Cemetery Fort Ord



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Map Date: 3/19/2014
Photo Source: NAIP 2009

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 3. Survey Transect Interval

2013-176 RESD CCC Veterans Cemetery Fort Ord

1.5 Report Organization

The following report documents the study and its findings and was prepared in conformance with the California Office of Historic Preservation's *Archaeological Resource Management Reports: Recommended Contents and Format.* Attachment A includes a confirmation of the records search with the California Historical Resources Information System and coordination with the Monterey County Historical Society. Attachment B contains documentation of Native American Coordination. Attachment C presents photographs of the APE, and Attachment D contains confidential cultural resource site locations and site records.

Sections 6253, 6254, and 6254.10 of the California Code authorize state agencies to exclude archaeological site information from public disclosure under the Public Records Act. In addition, the California Public Records Act (Government Code §6250 *et seq*.) and California's open meeting laws (The Brown Act, Government Code §54950 *et seq*.) protect the confidentiality of Native American cultural place information. Under Exemption 3 of the federal Freedom of Information Act (5 USC 5), because the disclosure of cultural resources location information on federal lands is prohibited by the Archaeological Resources Protection Act of 1979 (16 USC 470hh) and Section 304 of the NRHP, it is also exempted from disclosure under the Freedom of Information Act.

Likewise, the Information Centers of the California Historical Resources Information System maintained by the Office of Historic Preservation prohibit public dissemination of records search information. In compliance with these requirements, the results of this cultural resource investigation were prepared as a confidential document, which is not intended for public distribution in either paper or electronic format.

2.0 SETTING

2.1 Environmental Setting

Elevations range from 300 to 350 feet above mean sea level. The APE consists of undeveloped land characterized by coast live oak woodland, central coastal scrub/non-native grasses, and ruderal/disturbed land. Surrounding land uses include undeveloped coast live oak woodland to the east and southeast, and former Fort Ord military facilities to the north, west, and southwest.

2.2 Geology and Soils

One soil type is identified within the APE. Oceano loamy sand (OaD), 2 to 15 percent slopes, is an excessively drained soil, primarily found in hills at elevations ranging between 30 and 1,100 feet. The parent material consists of a stabilized eolian sand with the profile consisting of loamy sand found between 0 to 80 inches below surface (USDA 2014).

2.3 Vegetation and Wildlife

The vegetation communities found within the proposed APE include ruderal grassland, coast live oak woodland and coastal scrub. The ruderal grassland portion of the APE is located in the northwestern corner and is dominated by a mix of native and non-native grassland species, such as medusahead (*Elymus caput-medusae*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), filaree (*Erodium cicutarium*), common groundsel (*Senecio vulgaris*), California poppy (*Eschscholzia californica*), and common fiddleneck (*Amsinckia intermedia*). The coast live oak woodland is located in the eastern portion of the APE. Within this community the tree canopy is exclusively composed of coast live oak (*Quercus agrifolia*), and the understory is dominated by coastal scrub and chaparral shrubs, such as, poison oak (*Toxicodendron diversilobum*), manzanita (*Arctostaphylos tomentosa ssp. tomentosa*), sticky monkeyflower (*Mimulus aurantiacus*), fuchsia flowered gooseberry (*Ribes speciosum*) and California

coffeeberry (*Frangula californica*). The herbaceous species within the understory and open interstitial spaces consist primarily of native species; these include California hedge nettle (*Stachys bullata*), chaffweed (*Anagallis minima*), California buttercup (*Ranunculus californicus*), miner's lettuce (*Claytonia spp.*), and bedstraw species (*Galium aparine and G. parisiense*). Primarily non-native grasses are intermixed with the herbaceous species, such as big quaking grass (*Briza maxima*), medusahead, and wild oat.

The coastal scrub community, located at the corner of Parker Flats Road and Parker Flats Cut-Off, is characterized by many of the same coastal scrub and chaparral species present in the understory of the coast live oak woodland, and has experienced some oak establishment throughout the area, particularly along the roadside boundaries. Dominant shrub species within the community include California Sagebrush (*Artemisia californica*), California coffeeberry, poison oak, and manzanita. Native and non-native herbaceous species include California mugwort (*Artemisia douglasiana*), common groundsel, Mouseear chickweed (*Cerastium glomeratum*), vetch (*Vicia spp.*), common yarrow (*Achillea millefolium*), iceplant (*Carpobrotus edulis),* and wavyleaf soapplant (*Chlorogalum pomeridianum*).

Habitats within the APE are likely to support black-tailed jackrabbit (*Lepus californicus*), rabbit (*Sylviligus* sp.), California ground squirrel (*Spermophilus beecheyi*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), mountain lion (*Felis concolor*), black-tailed deer (*Odocoileus hemionus columbianus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), California quail (*Callipepla californica*), mourning dove (*Zenaidura macroura*), Western scrub-jay (*Aphelocoma californica*), Western rattlesnake (*Crotalus viridus*) and various lizards species.

3.0 CULTURAL CONTEXT

3.1 Regional Prehistory

It is generally believed that human occupation of California began at least 10,000 years before present (BP). The archaeological record indicates that between approximately 10,000 and 8000 BP, a predominantly hunting economy existed, characterized by archaeological sites containing numerous projectile points and butchered large animal bones. Animals that were hunted probably consisted mostly of large species still alive today. Bones of extinct species have been found, but cannot definitely be associated with human artifacts. Although small animal bones and plant grinding tools are rarely found within archaeological sites of this period, small game and floral foods were probably exploited on a limited basis. A lack of deep cultural deposits from this period suggests that groups included only small numbers of individuals who did not often stay in one place for extended periods (Wallace 1978).

Around 8000 BP, there was a shift in focus from hunting towards a greater reliance on plant resources. Archaeological evidence of this trend consists of a much greater number of milling tools (e.g., metates and manos) for processing seeds and other vegetable matter. This period, which extended until around 5000 BP, is sometimes referred to as the "Millingstone Horizon" (Wallace 1978). Projectile points are found in archaeological sites from this period, but they are far fewer in number than from sites dating to before 8000 BP. An increase in the size of groups and the stability of settlements is indicated by deep, extensive middens at some sites from this period (Wallace 1978).

In sites dating to after about 5000 BP, archaeological evidence indicates that reliance on both plant gathering and hunting continued as in the previous period, with more specialized adaptation to particular environments. Mortars and pestles were added to metates and manos for grinding seeds and other vegetable material. Flaked-stone tools became more refined and specialized, and bone tools were more

common. During this period, new peoples from the Great Basin began entering southern California. These immigrants, who spoke a language of the Uto-Aztecan linguistic stock, seem to have displaced or absorbed the earlier population of Hokan-speaking peoples. During this period, known as the "Late Horizon," population densities were higher than before and settlement became concentrated in villages and communities along the coast and interior valleys (Erlandson 1994; McCawley 1996). Regional subcultures also started to develop, each with its own geographical territory and language or dialect (Kroeber 1925; McCawley 1996; Moratto 1984). These were most likely the basis for the groups encountered by the first Europeans during the eighteenth century (Wallace 1978). Despite the regional differences, many material culture traits were shared among groups, indicating a great deal of interaction (Erlandson 1994). The introduction of the bow and arrow into the region sometime around 2,000 years BP is indicated by the presence of small projectile points (Wallace 1978; Moratto 1984).

3.2 Local Prehistory

Various archaeological investigations in the Salinas Valley and nearby coastal areas have led to the development of a tentative cultural chronology for the area, which is still being refined. Two patterns have been proposed, which reflect the occupation of the area by Hokan speakers, and later, by the Penutian-speaking Costanoans, who were present at the time of Euroamerican contact. Breschini and Haversat (1980: 14-15) provide the following chronology.

> The Sur Pattern appears to be contemporaneous with portions of the Borax Lake Pattern of the North Coast Ranges Region, the Berkeley Pattern of the San Francisco Bay Region, and the Windmiller Pattern of the Lower Sacramento Valley Region. Its origins appear to be Middle Archaic Period (3000 – 5000 BP), although it is possible that this pattern began during the Lower Archaic. The economic system during this period appears to have been generalized, with little in the way of specialization, and could possibly represent foragers as discussed by Binford (1980:4-19). Sites along the ocean are not characterized by "shell middens" as much as by "middens with shell." For the most part, these sites are probably village sites, even along the coast, and should reflect a wide variety of activities… Finally, the Sur Pattern probably associates with the Hokan speakers, the ancestors of the Esselen in the Monterey/Big Sur areas of the South Coast ranges (Breschini and Haversat 1980:14).
>
> The Monterey Pattern seems to originate during the upper Archaic Period, probably by 2500 BP, throughout the entire Monterey District of the South Coast Ranges. It is characterized by specialization of economic modes, probably along the lines of collectors as discussed by Binford (1980:4-19). The coastal sites are characterized by "shell middens" in which extremely large amounts of shell have accumulated… These sites are often not village sites – in many cases they are marine collecting/processing stations or limited duration campsites used primarily for exploiting marine resources. The village sites are located slightly inland of the more exposed coastal gathering/processing sites, and should contain evidence of more diverse activities… The Monterey Pattern almost certainly associates with the Penutian speaking Costanoans, the Indians living along the Monterey Peninsula when the Spanish arrived (Breschini and Haversat 1980:14-15).

3.3 Ethnography

Ethnographically, the APE is in the southern portion of Costanoan territory. The territory extended from the Carquinez Strait from the north down to Carmel and Soledad in the south. The word Costanoan comes from the Spanish word Costanos meaning "coast people" which was given to the tribes in 1770 when the first mission was established in their territory. The "Costanoan" represented a group of people who spoke eight separate languages, but whose dialects were most similar to their geographic neighbors. In all, the Costanoan consisted of approximately 50 different tribelets or politically autonomous nations,

each having their own village with an average of 200 inhabitants (Levy 1978: 485). The Costanoan and neighboring Miwok to the east were placed within the Penutian stock (language group) since the two languages were more similar to each other than to any of the other surrounding languages.

The language spoken in the region of the APE was Awaswas, also known as Santa Cruz Costanoan. This language was spoken within the Soquel Creek, San Lorenzo River, and Waddell Creek watersheds, consisting of approximately 600 to 1,000 people during the protohistoric and prehistoric periods. Within the Awaswas, there were seven major tribelets, three of which were near the APE. These included the Partacsi located near Saratoga Gap; the Sayant, located near the lower San Lorenzo River drainage; and the Achistaca, located upstream from the Sayant. Most of the villages were located in the higher elevations along the streams and creeks where lampreys, steelhead, and salmon were a large part of their diet (Milliken *et al*. 2007).

Each tribelet consisted of one or two main villages with smaller surrounding camps. According to early Spanish explorers, the inhabitants of the tribelets were not willing to go outside of their territory, because of hostility from the neighboring tribelets (in Bolton 1930, 3:129). The tribelets were headed by a single chief who may have been a man or woman, but was usually passed down from father to son. In the case where there was no male offspring, the title was usually passed down to the daughter or sister of the chief.

3.4 Regional History

The first European to visit California was Spanish maritime explorer Juan Rodriguez Cabrillo in 1542. Cabrillo was sent north by the Viceroy of New Spain (Mexico) to look for the Northwest Passage. Cabrillo visited San Diego Bay, Catalina Island, San Pedro Bay, and the northern Channel Islands. The English adventurer Francis Drake visited the Miwok Native American group at Drake's Bay or Bodega Bay in 1579.

In 1595, also at the behest of the leadership of New Spain, the Portuguese explorer Sebastián Rodríguez Cermeño set out along the coast of California to find an area for protection of a group of vessels known as the Manila Ships. During his exploration, Cermeño wrecked the Spanish ship, *San Agustín* at Drake's Bay, but continued his voyage south on a smaller makeshift boat called the *San Buenaventura*. On December 10, 1595, Cermeño encountered the Monterey Bay, which he called San Pedro Bay (Kyle 2002). After Cermeño's travels, Sebastian Vizcaíno explored the coast as far north as Monterey in 1602. He reported that Monterey was an excellent location for a port (Castillo 1978).

Colonization of California began with the Spanish Portolá land expedition. The expedition, led by Captain Gaspar de Portolá of the Spanish army and Father Junipero Serra, a Franciscan missionary, explored the California coast from San Diego to the Monterey Bay Area in 1769. As a result of this expedition, Spanish missions to convert the native population, presidios (forts), and pueblos (towns) were established. The Franciscan missionary friars established 21 missions in Alta California (the area north of Baja California) beginning with Mission San Diego in 1769 and ending with the mission in Sonoma established in 1823. The purpose of the missions and presidios was to establish Spanish economic, military, political, and religious control over the Alta California territory.

The nearest mission to the APE was the Mission San Carlos Borromeo, commonly known as the Carmel Mission, located 9 miles south of the APE in Carmel. This mission was established in 1771, with the building dedication in 1797. This mission was one of Father Serra's favorite missions, which also became the headquarters of the *padre presidente* of the California missions. Carmel Mission served as the presidente headquarters until 1803 (Kyle 2002).

Other missions in the region included Mission San Antonio De Padua in Jolon established in 1771, Mission San Francisco de Asis (Dolores) established in 1776 on the San Francisco peninsula, Mission Santa Clara de Asis at the south end of San Francisco Bay in 1777, Mission San Jose in 1797, Mission San Rafael,

established as an asistencia in 1817 and a full mission in 1823, and Mission San Francisco Solano in Sonoma in 1823 (Castillo 1978; California Missions Online n.d.). Presidios were established at San Francisco and Monterey.

After Mexico became independent from Spain in 1821, what is now California became the Mexican province of Alta California with its capital at Monterey. In 1827, American trapper Jedediah Smith traveled along the Sacramento River and into the San Joaquin Valley to meet other trappers of his company who were camped there, but no permanent settlements were established by the fur trappers (Thompson and West 1880).

The Mexican government closed the missions in the 1830s and former mission lands, as well as previously unoccupied areas, were granted to retired soldiers and other Mexican citizens for use as cattle ranches. Much of the land along the coast and in the interior valleys became part of Mexican land grants or "ranchos" (Robinson 1948). During the Mexican Period there were small towns at San Francisco (then known as Yerba Buena) and Monterey. The rancho owners lived in one of the towns or in an adobe house on the rancho. The Mexican Period includes the years 1821 to 1848.

John Sutter, a European immigrant, built a fort at the confluence of the Sacramento and American Rivers in 1839 and petitioned the Mexican governor of Alta California for a land grant, which he received in 1841. Sutter built a flour mill and grew wheat near the fort (Bidwell 1971). Gold was discovered in the flume of Sutter's lumber mill at Coloma on the South Fork of the American River in January 1848 (Marshall 1971). The discovery of gold initiated the 1849 California Gold Rush, which brought thousands of miners and settlers to the Sierra foothills east and southeast of Sacramento.

The American period began when the Treaty of Guadalupe Hidalgo was signed between Mexico and the United States in 1848. As a result of the treaty, Alta California became part of the United States as the territory of California. Rapid population increase occasioned by the Gold Rush of 1849 allowed California to become a state in 1850. Most Mexican land grants were confirmed to the grantees by U.S. courts, but usually with more restricted boundaries, which were surveyed by the U.S. Surveyor General's office. Land outside the land grants became federal public land, which was surveyed into sections, quarter-sections, and quarter-quarter sections. The federal public land could be purchased at a low fixed price per acre or could be obtained through homesteading (after 1862) (Robinson 1948).

3.5 Project Area History

Following the end of the Mexican-American War in 1848, the Presidio of Monterey became a U.S. Army post and developed into a large training facility for the Army. In the late 1800s, the training area consisted of sand dunes and open ranges surrounding Monterey. In 1917, a cavalry post and artillery training field were established on over 15,000 acres of land originally located within the Monterey City Land Tracts. This original plot of land was known as the Gigling Reservation, which was previously used as agricultural and grazing lands. This original Gigling Reservation consists of the eastern portion of the current Fort Ord. In the late 1930s, facilities such as barracks, mess halls, a sewage treatment plant, and administrative buildings were constructed in the Gigling Reservation. At this same time, wars within the Pacific were beginning and a stronger military presence was needed in the region. In 1939, the U.S. Army acquired additional lands to the west, known as Camp Clayton and Camp Ord. The following year, all three camps were combined and identified as Fort Ord, named after General Edward Otho Crespa Ord who fought in the Civil War (BLM 2014b, Kyle 2002, California State Military Department 2014).

During World War II and into the following decades, Fort Ord was established as the headquarters of the Seventh Infantry Division of the U.S. Army and one of the main facilities of basic training for the Army. As the base grew as a well-established major basic training ground, the surrounding towns of Seaside, Marina, and Monterey grew to provide services for the thousands of people who provided support functions for Fort Ord (Kyle 2002).

As a result of the announcement of military installation reductions in 1990, Fort Ord was listed as one of the many bases that would be downsized. The next year, it was officially announced that Fort Ord would be closed, and the Seventh Infantry Division would be moved to Fort Lewis near Tacoma, Washington (California State Military Department 2014). By 1993, the base was officially deactivated and the land was parceled out to various federal and state agencies including the campus of California State University at Monterey (1,500 acres), the Defense Department (750 acres), the Bureau of Land Management (BLM), and the California State Parks System. The BLM acquired approximately half of the land within the post to be preserved as open space and the California State Parks System acquired the coastal weapons range (Kyle 2002).

4.0 METHODS

4.1 Personnel Qualifications

This inventory report was prepared under the direction of Principal Investigator and Registered Professional Archaeologist Katherine Knapp, who meets the Secretary of the Interior's Professional Qualifications Standards for prehistoric archaeologist. Field Director and Staff Archaeologist Stephen Pappas and Katherine Knapp, RPA prepared the report. Roger Mason, Ph.D., RPA, provided quality assurance for this report. Site-specific information and field inventory was provided by Stephen Pappas. Resumes are available upon request.

Katherine Knapp, MS, RPA is a Registered Professional Archaeologist with over 17 years of cultural resource management, contract archaeology, and teaching experience. She has managed projects in northern and southern California, northern and central Utah, Arizona, the Northwest, the Midwest, the Plains, the Southeast, Virginia, and the Middle East. A veteran of the US Army, she exceeds the Secretary of the Interior's Professional Qualifications Standards for prehistoric archaeologist, holding a B.A. degree in Anthropology and an M.S. degree in Anthropology (Archaeology). Ms. Knapp has been the sole or co-author to over 30 cultural resources inventory reports and technical reports and she has also written, contributed to, and edited a variety of environmental compliance documents including Environmental Assessments (EAs), Environmental Impact Statements (EISs), and Environmental Impact Reports (EIRs). She has conducted evaluations of cultural resources for eligibility to the National Register of Historic Places and California Register of Historical Resources and is experienced in the development of mitigation measures for Section 106 (NHPA) and CEQA projects.

Stephen Pappas is a Staff Archaeologist and Field Director for ECORP and has nine years of experience in cultural resources management, primarily in California and New Mexico. He holds a B.A. degree in Anthropology and has participated in all aspects of archaeological fieldwork, including survey, test excavation, data recovery, and construction monitoring. He has extensive familiarity in meeting the cultural resource requirements of CEQA and Section 106 of the NHPA.

4.2 Records Search Methods

A records search for the property was completed at the Northwestern Information Center (NWIC) of the California Historical Resources Information System at California State University-Sonoma on 27 February 2014 (NWIC search #13-1310; Attachment A). The purpose of the records search was to determine the extent of previous surveys within a 0.5-mile (800-meter) radius of the proposed project location, and whether previously documented prehistoric or historic archaeological sites, architectural resources, or traditional cultural properties exist within this area.

In addition to the official records and maps for archaeological sites and surveys in Monterey County, the following historic references were also reviewed: *Office of Historic Preservation's (OHP) Directory of Properties, Historic Property Data File for Monterey County* (OHP 2012a); *OHP's Archaeological*

Determinations of Eligibility (OHP 2012b); *The National Register Information System Website* (NPS 2014); *OHP's, California Historical Landmarks Website* (OHP 2014); *California Historical Landmarks* (OHP 1996 and updates); *California Points of Historical Interest* (OHP 1992 and updates); *Directory of Properties in the Historical Resources Inventory* (OHP 1999); *Caltrans Local Bridge Survey* (Caltrans 2014a); *Caltrans State Bridge Survey* (Caltrans 2014b); and *Historic Spots in California* (Kyle 2002).

Other references examined include a DataQuick Property Search (DataQuick 2014) and historic General Land Office (GLO) land patent records (BLM 2014a). Historic maps reviewed include:

- 1859 GLO Survey of Township 15S, Ranges 2 & 3 E, of the Mount Diablo Meridian, CA
- 1874 GLO Surveyor Plat Map, Township 15S, Range 2E, Mount Diablo Meridian, CA
- 1947 USGS Marina, California (1:24,000)
- 1947 (photorevised 1956, 1968, 1970, 1974, 1976, and 1983) USGS Marina, California (1:24,000)
- 1961 GLO Portion of the Fort Ord Military Reservation Boundary, Mil. Res. 7

Historic aerial photos taken in 1956, 1968, 1974, 1981, 1987, 1994, and 2010 were also reviewed for any indications of property usage and built environment.

There are no locally maintained lists of historical resources for Monterey County or the nearby towns of Seaside or Marina.

4.3 Evaluation Methods

4.3.1 Federal Evaluation Criteria

Under federal regulations implementing Section 106 of the NHPA (36 CFR 800), cultural resources identified in the Project APE must be evaluated using NRHP and eligibility criteria. The eligibility criteria for the NRHP are as follows (36 CFR 60.4):

> "The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess aspects of integrity of location, design, setting, materials, workmanship, feeling, association, and
>
> (a) is associated with events that have made a significant contribution to the broad patterns of our history;
>
> (b) is associated with the lives of a person or persons significance in our past;
>
> (c) embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) has yielded or may be likely to yield information important in prehistory or history."

In addition, the resource must be at least 50 years old, except in exceptional circumstances (36 CFR 60.4).

Historical buildings, structures, and objects are usually evaluated under Criteria A, B, and C based on historical research and architectural or engineering characteristics. Archaeological sites are usually evaluated under Criterion D, the potential to yield information important in prehistory or history. An archaeological test program may be necessary to determine whether the site has the potential to yield important data. The lead federal agency, in this case, the U.S. Army Corps of Engineers, makes the

determination of eligibility based on the results of the test program and seeks concurrence from the State Historic Preservation Officer.

Effects to NRHP-eligible resources (historic properties) are adverse if the project may alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

4.3.2 State Evaluation Criteria

Under state law (CEQA), cultural resources are evaluated using CRHR eligibility criteria in order to determine whether any of the sites are Historical Resources. CEQA requires that impacts to Historical Resources be identified and, if the impacts would be significant, that mitigation measures to reduce the impacts be applied.

An Historical Resource is a resource that 1) is listed in or has been determined eligible for listing in the CRHR by the State Historical Resources Commission; 2) is included in a local register of historical resources, as defined in Public Resources Code 5020.1(k); 3) has been identified as significant in an historical resources survey, as defined in Public Resources Code 5024.1(g); or 4) is determined to be historically significant by the CEQA lead agency [CCR Title 14, Section 15064.5(a)]. In making this determination, the CEQA lead agency usually applies the CRHR eligibility criteria.

For this Project, only the fourth definition of an Historical Resource is applicable because there are no resources previously determined eligible or listed on the CRHR, there are no resources included in a local register of historical resources, and no resources identified as significant in a qualified historical resources survey.

The eligibility criteria for the CRHR are as follows [CCR Title 14, Section 4852(b)]:

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the U.S.;

(2) It is associated with the lives of persons important to local, California, or national history.

(3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition, the resource must retain integrity. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association [CCR Title 14, Section 4852(c)].

Historical buildings, structures, and objects are usually evaluated under Criteria 1, 2, and 3 based on historical research and architectural or engineering characteristics. Archaeological sites are usually evaluated under Criterion 4, the potential to yield information important in prehistory or history. An archaeological test program may be necessary to determine whether the site has the potential to yield important data. The CEQA lead agency makes the determination of eligibility based on the results of the test program. Cultural resources determined eligible for the NRHP by a federal agency are automatically eligible for the CRHR.

Impacts to a Historical Resource (as defined by CEQA) are significant if the resource is demolished or destroyed or if the characteristics that made the resource eligible are materially impaired [CCR Title 14, Section 15064.5(a)].

4.4 Native American Coordination Methods

ECORP contacted the California Native American Heritage Commission (NAHC) on 18 March 2014 to request a search of the Sacred Lands File for the APE. The NAHC responded on 2 April 2014 and provided a list of Native American contacts (Attachment B). Each individual on the list was contacted by letter on 3 April 2014 and by phone on 29 and 30 April 2014. Responses received after the report has been submitted will be forwarded to the lead agency.

4.5 Other Interested Party Consultation Methods

A letter was sent to the Monterey County Historical Society on 28 February 2014 in order to solicit comments or obtain historical information that the repository might have regarding events, people, or resources of historical significance in the area (Attachment A).

4.6 Field Methods

On 17 March 2014, the entire APE was subjected to an intensive pedestrian survey under the guidance of the *Secretary of the Interior's Standards for the Identification of Historic Properties* (National Park Service 1983) using parallel transects 15 meters apart (Figures 2 and 3). One-half person day was expended in the field. At that time, the ground surface was examined for indications of surface or subsurface cultural resources. The general morphological characteristics of the ground surface were inspected for indications of subsurface deposits that may be manifested on the surface, such as circular depressions or ditches. Whenever possible, the locations of subsurface exposures caused by such factors as rodent activity, water or soil erosion, or vegetation disturbances were examined for artifacts or for indications of buried deposits. No subsurface investigations or artifact collections were undertaken during the pedestrian survey.

All cultural resources encountered during the survey were recorded using Department of Parks and Recreation 523-series forms approved by the California Office of Historic Preservation. The resources were photographed, mapped using a handheld sub-meter GPS receiver, and recorded with a Primary Record and Location Map.

5.0 INVENTORY AND EVALUATION RESULTS

5.1 Records Search

The records search consisted of a review of previous research and literature, records on file with the NWIC for previously recorded resources, and historical aerial photographs and maps of the vicinity.

5.1.1 Previous Research

Four previous cultural resource investigations have been conducted [redacted]. One of those previous investigations covered 100 percent of the current APE including additional areas to the east of the Project (Table 1). These studies revealed the presence of one historical site, [redacted], [redacted]. The previous studies were conducted between 1995 and 2010 and vary in size from less than one linear mile to 1,935.4 acres.

[redacted]

[redacted]					
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The results of the records search indicate that the entire property was previously surveyed for cultural resources in 2010 as part of a Phase 1 archaeological survey. Methods for that survey, however, were not specifically addressed in the 2010 report and it is unknown if appropriate archaeological pedestrian survey methods were employed. Therefore, in order to ensure that an accurate updated survey for cultural resources was conducted for the APE, a pedestrian survey of the APE was warranted.

The records search also determined that one previously recorded historic-era cultural resource is located [redacted]). The historic-era resource is a [redacted].

[redacted]

[redacted]					
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

5.1.2 Records

[redacted]

[redacted]

[redacted]

[redacted]

5.1.3 Map Review and Aerial Photographs

The review of historical aerial photographs and maps of the APE provide information on the past land uses of the property. Based on this information, the property was initially used as open space or training areas for the Fort Ord military reservation. Following is a summary of the review of historical maps and photographs.

- The 1947 USGS Marina, California (1:24,000) map shows the APE on the western side of Artillery Hill with the existing roads in their current location.

- The 1947 (photorevised versions for 1956, 1968, 1970, 1974, and 1976) USGS Marina, California (1:24,000) maps show the APE in the same condition as the original 1947 map with the adjoining roads and Artillery Hill in the same location.

- The 1947 (photorevised 1983) USGS Marina, California (1:24,000) map shows the APE on the west side of the "Seaside Corp Boundary," which indicates the city limits of the town of Seaside.

- A review of aerial photographs from 1956 reveal the APE as apparently unused open space with trees, the same roadways that currently exist, and the hillside to the east.

- Aerial photographs from 1968, 1974, and 1981 show that the majority of the APE lacked vegetation and trees. The vegetation clearance may have been carried out as preparation for development. However, later photos indicate that no development occurred. In addition to the

vegetation removal, a trail running north-south was first present on the 1968 aerial and continued to be present through subsequent aerials.

- The aerial photographs from 1987 and 1994 show vegetation beginning to reappear on the property and the dirt trail previously running through the property beginning to fade as if unused.

- The aerial photographs from 2010 to present show the property in its current state.

5.2 Native American Coordination Results

The NAHC responded to the initial inquiry made 18 March 2014 on 2 April 2014 and provided a list of Native American contacts (Attachment B). Each individual on the list was contacted by letter on 3 April 2014 and by phone on 29 and 30 April 2014. On 28 April 2014, Louise J. Miranda Ramirez, Chairwoman of the Ohlone/Costanoan-Esselen Nation replied by letter stating that Fort Ord is within the indigenous homeland of their people and that they would like copies of all surveys, subsurface testing results, mitigation and recovery programs, to be notified if ancestral remains are found, and to be notified of the placement of all cultural items. Additionally, Ms. Ramirez requested that a Native American monitor of the Ohlone/Costanoan-Esselen Nation be used within aboriginal territory. On 29 April Ms. Ramirez stated in a phone call that according to the Santa Cruz Historical Society artifacts have been found on numerous occasions on Fort Ord.

Additional calls were successful in gathering information and requests regarding the project. Valentin Lopez of the Amah Mutsun Tribal Band stated that their territory is on the other side (north) of the Salinas River and does not contain the APE. Irene Zwierlein of the Amah Mutsun Tribal Band stated that she had no concerns with the project; however, if anything is found, she requested that a qualified archaeologist and tribal member are on hand. Pauline Martinez-Arias of the Ohlone/Coastanoan-Esselen tribe stated that she would like archaeologists to keep an eye out for cultural material, and to call her to acquire qualified Native American monitors. Michelle Zimmer of the Amah Mutsun Tribal Band of Mission San Juan Bautista stated that there are known burials on Fort Ord and that if remains are found, a qualified and trained Native American Monitor must be on site. She also requested that all crews receive Cultural Awareness Training prior to starting work. Ann Marie Sayers, Chairperson of the Indian Canyon Mutsun Band of Costanoan requested that an archaeological and a Native American monitor be present if there is a considerable amount of earth movement during construction. Any additional responses received after submission of this report will be forwarded to the lead agency.

5.3 Other Interested Party Consultation Results

As of the date of this report, ECORP has not received a response to the letters sent to the Monterey County Historical Society.

5.4 Field Survey Results

The terrain within the surveyed area was primarily level, with dense vegetation of tall grasses and poison oak covering most of the surface in the northern edge and eastern half of the area (Figure 4). These areas had a surface visibility of approximately 5 to 10 percent, while the remaining areas along the western half, consisting of a partially exposed tan sandy soil between chaparral and brush, had a surface visibility of 20 to 30 percent (Figure 5). A trail system with paths about one foot wide was observed throughout the APE, most likely as a result of local pedestrian traffic. Several walkers and joggers frequented the areas surrounding the APE, and may have also used the paths within the APE as well. Along the western portion of the APE were areas where refuse dumping had occurred. These dumping areas consisted of a few piles of sidewalk concrete fragments and road asphalt. In addition to the building material, modern cans and bottles were observed, mostly in the western portion of the APE, but also in the eastern portion of the project.



Figure 4. Project overview dense oak vegetation (view south, 17 March 2014).



Figure 5. Project overview of sandy chaparral area (view north, 17 March 2014).

5.4.1 Newly Identified Resource and Evaluation

One resource was recorded within the APE. **FO-001** [redacted] berm [redacted] (Figure 6). The [redacted] berm [redacted] Overall, the [redacted] is in fair condition with the northwestern end possibly having been impacted during construction of Parker Flats Road, while the southeastern end erodes into the landscape. The function of [redacted] is unknown, but was most likely constructed as part of training operations at Fort Ord.

Although the function of the [redacted] is unknown, it may have been used for military training, as the area was primarily used for that function from the late 1930s to the early 1990s. Because of its possible association with early military operations on Fort Ord, FO-001 has been evaluated here.

Simple features such as berms typically do not individually contribute to the broad patterns of history as these features often leave no temporal indicators (NRHP Criterion A / CRHR Criterion 1). Earthen features such as berms are similarly difficult to associate with specific individuals due to their lack of association with standing structures and GLO maps and records, and no information exists in the archival record to associate this site with important individuals in history (NRHP Criterion B / CRHR Criterion 2). Archival and field efforts do not suggest that this berm embodies the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values (NRHP Criterion C / CRHR Criterion 3). Finally, berms in general do not provide important information in history or prehistory (NRHP Criterion D / CRHR Criterion 4). Therefore, site FO-001 does not meet the eligibility criteria for inclusion in the NRHP or CRHR as an individual resource.

FO-001 does retain integrity of location, setting, materials, and feeling, and association as it is in its original location where it may have been used for military training or other functions. However, due to overgrown vegetation, partial destruction along the western end, and its' overall simple design, it is difficult to determine its exact function. Regardless of integrity, the resource does not meet any of the NRHP/CRHR eligibility criteria.



Figure 6. Overview of FO-001, berm (view southeast, 17 March 2014).

6.0 MANAGEMENT CONSIDERATIONS

6.1 Conclusions

As a result of the inventory, one site, FO-001 [redacted] was identified within the APE. This [redacted] represents a possible feature used in military training activities. This feature is common throughout military bases, cannot be associated with an important event or significant person in history, does not contain standing structures, and does not contribute anything new to the historic record. Therefore, this site was evaluated as not eligible for inclusion in the NRHP or CRHR. It is recommended that project activities proceed.

Until the lead agency concurs with the identification and evaluation of eligibility of cultural resources, no ground-disturbing activity or demolition should occur.

6.2 Likelihood for Subsurface Cultural Resources

Due to the lack of alluvial soils within the APE and that site FO-001 does not have the potential to contain subsurface deposits, there is an extremely low likelihood of subsurface cultural resources.

6.3 Unanticipated Discovery

There always remains a possibility that unrecorded cultural resources are present beneath the ground surface, and that such resources could be exposed during project construction. Both CEQA and Section 106 of the NHPA require the lead agency to address any unanticipated cultural resource discoveries during project construction. Therefore, ECORP recommends the following mitigation measures be

adopted and implemented by the lead agency to reduce potential adverse impacts to less than significant.

> Mitigation Measure #1: Unanticipated Discovery
> If subsurface deposits believed to be cultural or human in origin are discovered during construction, then all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgment. A Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the NAHC, will be required if the nature of the unanticipated discovery is prehistoric.
>
> Work cannot continue within the no-work radius until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR.
>
> If a potentially-eligible resource is encountered, then the archaeologist, lead agency, and project proponent shall arrange for either 1) total avoidance of the resource, if possible; or 2) test excavations to evaluate eligibility and, if eligible, total data recovery as mitigation. The determination shall be formally documented in writing and submitted to the lead agency as verification that the provisions in CEQA/NEPA for managing unanticipated discoveries have been met.

In the event that evidence of human remains is discovered, construction activities within 100 feet of the discovery will be halted or diverted and the requirements of Mitigation Measure #1 will be implemented. In addition, the provisions of Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the California Public Resources Code, and Assembly Bill 2641 will be implemented. When human remains are discovered, state law requires that the discovery be reported to the County Coroner (Section 7050.5 of the Health and Safety Code) and that reasonable protection measures be taken during construction to protect the discovery from disturbance (AB 2641). If the Coroner determines the remains are Native American, the Coroner notifies the NAHC, which then designates a Native American Most Likely Descendant (MLD) for the project (Section 5097.98 of the Public Resources Code). The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a document with the county in which the property is located (AB 2641).

The Lead Agency is responsible for ensuring compliance with these mitigation measures because damage to significant cultural resources is in violation of CEQA and Section 106. Section 15097 of Title 14, Chapter 3, Article 7 of CEQA, *Mitigation Monitoring or Reporting*, "the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects. A public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity which accepts the delegation; however, until mitigation measures have been completed the lead agency remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program."

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1880 *History of Sacramento County*. Reproduced by Howell-North, 1960, Berkeley.

United States Department of Agriculture
2014 Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Electronic document, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed 24 February 2014.

Wallace, William J.
1978 Post-Pleistocene Archeology, 9000 to 2000 BC. In *Handbook of North American Indians, Vol. 8: California*, edited by R.F. Heizer, pp. 25-36. Smithsonian Institution, Washington, D.C.

LIST OF ATTACHMENTS

Attachment A – Records Search Confirmation and Historical Society Coordination

Attachment B – Native American Coordination

Attachment C – APE Photographs

Attachment D – ***Confidential*** Cultural Resource Site Locations and Site Records

ATTACHMENT A

Records Search Confirmation and Historical Society Coordination

NWIC Billing Worksheet

Client Name: Jeremy Adams Phone: 916-782-4100 IC File Number: 13-1310

Affiliation: Ecorp Consulting, Inc. Email: jadams@ecorpconsulting.com

Proj. Name/Number: Fort Ord 2013-176

Date request rec'd: _____ Date of response: _____

CHECK IN: 9:55 CHECK OUT: 10:30 CHECK IN: _____ CHECK OUT: _____

In-person Time:	Hour(s): 1.0	$ 100.00
Staff Time:	Hour(s): _____	$ _____
Shapefiles:	Number: _____	$ _____
Custom Map Features:	Number: _____	$ _____
Digital Database Record:	Number of row(s): _____	$ _____
Quads:	Number: _____	$ _____
Address-mapped Flat Fee:		$ _____
Hard Copy (Xerox/Computer) pages:	Page(s): 38	$ 5.70
Labor Charge:	Hour(s): _____	$ _____
PDF pages:	Page(s): _____	$ _____
PDF Flat Fee:		$ _____
Other:		$ _____
	SUBTOTAL:	$ 105.70
Fort Ord 2013-176-005-0003	SUBTOTAL Date: _____	$ _____
	SUBTOTAL Date: _____	$ _____
	SUBTOTAL Date: _____	$ _____
Rapid Response surcharge of 50% of total cost:	SURCHARGE:	$ _____
Emergency Response surcharge of 100% of total cost:	SURCHARGE:	$ _____

Information Center Staff

TOTAL: $ 105.70

Sonoma State University Customer ID 000100567

Sonoma State University Invoice No. _____

CHRIS Access and Use Agreement No. 34

File No.: 13-1310

RECORD SEARCH DOCUMENT LIST

	Referenced Document Number or Name	No. of Copies Made
Surveys	18372	5
	32385	6
	37693	16
	39072	4
Sites	2717	4
	GLO maps	3

Name of Researcher: _____ TOTAL: 38

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

February 28, 2014

Monterey County Historical Society
Boronda Adobe History Center
333 Boronda Road
Salinas, CA 93907

RE: Cultural Resources Identification Effort for the Fort Ord Veterans Cemetery Project, Monterey County, California (ECORP Project No. 2013-176).

Dear Monterey County Historical Society:

ECORP Consulting, Inc. has been retained to assist in the planning of the development on the project indicated above. As part of the identification effort, we are seeking information from all parties that may have knowledge of or concerns with historic properties or cultural resources in the area of potential effect.

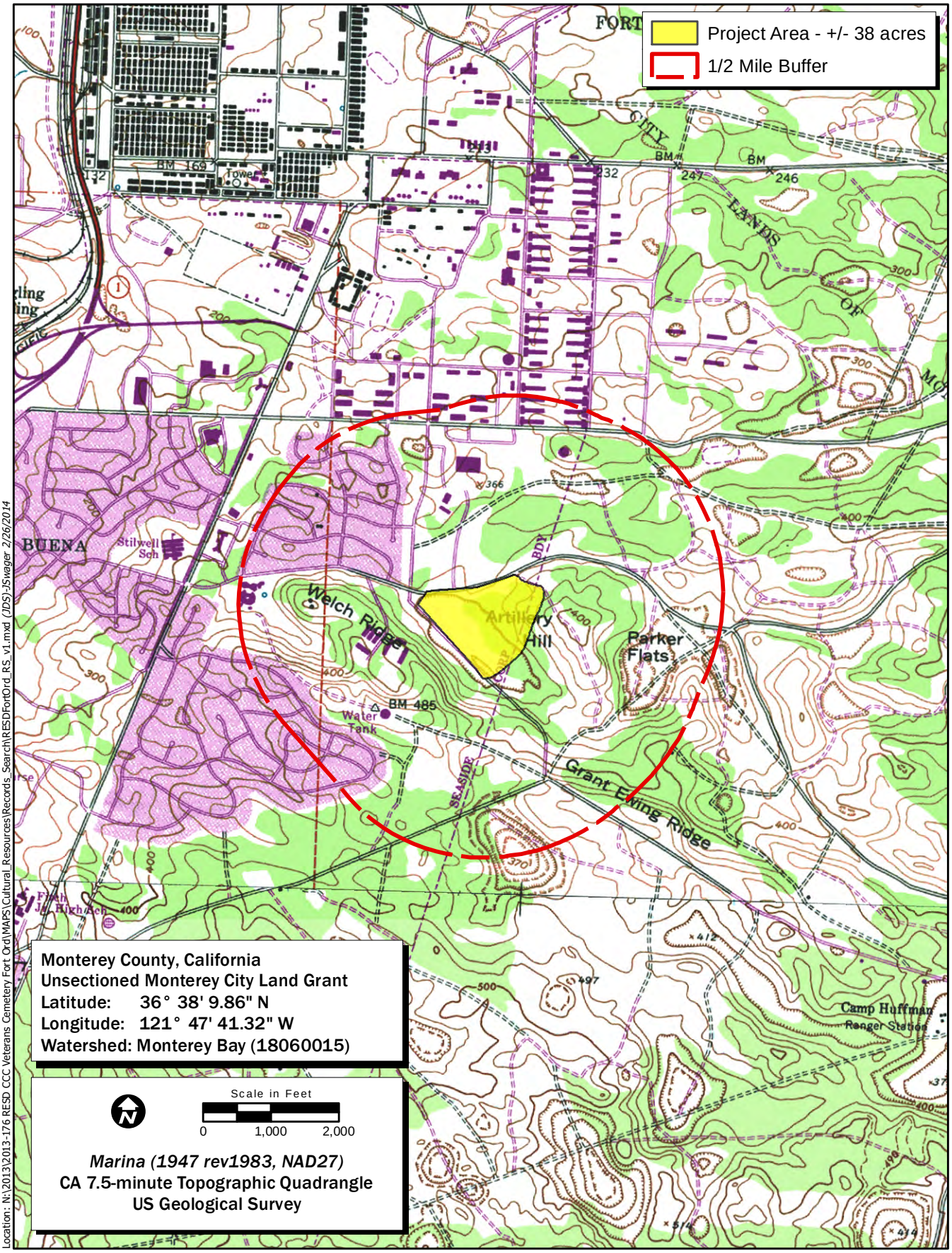
Included is a map showing the project area outlined including a 0.5 mile buffer. We would appreciate input on this undertaking from the historical society with concerns about possible cultural properties or potential impacts within or adjacent to the area of potential effect. If possible, please fax your response to my attention at (916) 782-9134. If you have any questions, please contact me at (916) 782-9100 or jadams@ecorpconsulting.com.

Thank you in advance for your assistance in our cultural resource management study.

Sincerely,

Jeremy Adams

Jeremy Adams, MA
Architectural historian



Location: N:\2013\2013-176 RESD CCC Veterans Cemetery Fort Ord\MAPS\Cultural_Resources\Records_Search\RESDFortOrd_RS_v1.mxd (JDS)-JSwager 2/26/2014

Map Date: 2/26/2014

DRAFT

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Records Search

2013-176 RESD CCC Veterans Cemetery Fort Ord

ATTACHMENT B

Native American Coordination

Native American Contacts
RESD CCC Veterans Cemetery Fort Ord, 2013-176 Monterey County

Name	Affiliation	Date Contacted			Response Received?	Comments
		1. Letter	2. Phone	3. Phone		
Native American Heritage Commission 915 Capital Mall, Room 364 Sacramento, CA 95814 nahc@pacbell.net (916) 373-3710 (916) 373-5471 Fax	N/A	3/18/2014	N/A	N/A	Yes (4/2/2014)	4/2/2014: Rec'd response from NAHC. No sacred lands, provided list of 12 NA contacts.
Jakki Kehl 720 North 2nd Street Patterson, CA 95363 209-892-1060	Ohlone/Costanoan	4/3/2014	4/29/2014	4/30/2014	No	K. Knapp called and received a message that answering machine was full. 4/30/2014: SP called and received a message that answering machine was full.
Linda G. Yamane 1585 Mira Mar Ave. Seaside, CA 93955 Rumsien123@yahoo.com 831-394-5915	Ohlone/Costanoan	4/3/2014	4/29/2014	4/30/2014	No	K. Knapp left a message. 4/30/2014: SP left a message.
Amah Mutsun Tribal Band Valentin Lopez, Chairperson P.O. Box 5272 Galt, CA 95632 vlopez@amahmutsun.org (916) 743-5833	Ohlone/Costanoan	4/3/2014	4/29/2014	N/A	Yes (4/29/2014)	K. Knapp talked with Mr. Lopez who stated that their territory is on the other side of the Salinas River from the project area and he has not comments.
Amah Mutsun Tribal Band Edward Ketchum 35867 Yosemite Ave. Davis, Ca 95616 aerieways@aol.com	Ohlone/Costanoan Northern Valley Yokuts	4/3/2014	4/29/2014	N/A	No	K. Knapp emailed Mr. Ketchum. No response.

Amah Mutsun Tribal Band Irene Zwierlein, Chairperson 789 Canada Road Woodside, CA 94062 irennezwierlein@gmail.com 650-400-4806-cell preferred 650-332-1526-fax	Ohlone/Costanoan	4/3/2014	4/29/2014	N/A	Yes (4/29/2014)	K. Knapp spoke with Ms. Zwierlein who stated that she has no concerns, but asked that if anything is found to make sure that a qualified archaeologist and qualified Tribal member are on hand.
Indian Canyon Mutsun Band of Costanoan Ann Marie Sayers, Chairperson P.O. Box 28 Hollister, CA 95024 ams@indiancanyon.org (831) 637-4238	Ohlone/Costanoan	4/3/2014	4/29/2014	4/30/2014	Yes (4/30/2014)	K. Knapp left a message on 29 Apr 2014. 4/30/2014: SP spoke with AMS, if there is a considerable amount of earth movement during construction, she requested that an archaeological and Native American monitor be present.
Trina Marine Ruano Family Ramona Garibay, Representative 30940 Watkins Street Union City, CA 94587 510-972-0645-home soaprootmo@ms.com	Ohlone/Costanoan Bay Miwok Plains Miwok Patwin	4/3/2014	4/29/2014	4/30/2014	No	K. Knapp left a message 29 Apr 2014. 4/30/2014: SP left a message.
Ohlone/Coastanoan-Esselen Nation Louise Miranda-Ramirez, Chairperson PO Box 1301 Monterey, CA 93942 Ramirez.louise@yahoo.com (408) 629-5189 (408) 205-7579 – cell	Esselen Ohlone/Costanoan	4/3/2014	4/29/2014	N/A	Yes (4/29/2014)	Received a letter on 28 Apr. Ms. Ramirez stated that Fort Ord is within the indigenous homeland of their people and that they would like copies of all surveys, subsurface testing results, mitigation and recovery programs, to be notified if ancestral remains are found, and to be notified of the placement of all cultural items. Additionally, Ms. Ramirez requested that a Native American monitor of the Ohlone/Costanoan-Esselen Nation be used within aboriginal territory. K. Knapp called Ms. Ramirez and she stated that according to the Santa Cruz Historical Society, artifacts have been found on Fort Ord and her concerns expressed in her letter remain the same.

Ohlone/Coastanoan-Esselen Nation Christianne Arias, Vice Chairperson PO Box 552 Soledad, CA 93960 (831) 235-4590	Esselen Ohlone/Costanoan	4/3/2014	4/29/2014	4/30/2014	No	K. Knapp called on 29 April 2014 and left a message. 4/30/2014: SP left a message.
Ohlone/Coastanoan-Esselen Nation Pauline Martinez-Arias, Tribal Councilwoman 1116 Merlot Way Gonzales, CA 93926 Maklici0-us@gmail (831) 596-9897	Esselen Ohlone/Costanoan	4/3/2014	4/29/2014	N/A	Yes (4/29/2014)	K. Knapp called Ms. Martinez-Arias on 29 Apr 2014. Ms. Martinez-Arias stated that she would like that archaeologists keep an eye out for cultural material and to call Louise to acquire qualified Native American monitors.
Coastanoan Rumsen Carmel Tribe Tony Cerda, Chairperson 240 E, 1st Street Pomona, CA 91766 rumsen@aol.com (909) 629-6081	Ohlone/Costanoan	4/3/2014	4/29/2014	4/30/2014	No	K. Knapp called on 29 Apr 2014 and S. Pappas called on 30 April 2014. Both attempts, the call rang through, but no voicemail so hung up after several rings.
Amah Mutsun Tribal Band of Mission San Juan Bautista Michelle Zimmer 789 Canada Road Woodside, CA 94062 amahmutsuntribal@gmail.com (650) 851-7747 – Home (650) 332-1526 – Fax	Ohlone/Costanoan	4/3/2014	4/29/2014	N/A	Yes (4/29/2014)	K. Knapp called on 29 April 2014. Ms. Zimmer stated that there are known burials on Fort Ord and that if remains are found a qualified and trained Native American Monitor must be on site. She also requested that all crews receive Cultural Awareness Training prior to starting work.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: RESD CCC Veterans Cemetery Fort Ord

County: Monterey

USGS Quadrangle: Marina

Township: 15S; Range: 2E Section(s): Unsectioned

Company/Firm/Agency: ECORP Consulting, Inc.

Contact Person:

Street Address: 2525 Warren Drive

City: Rocklin Zip: 95677

Phone: (916) 782-9100

Fax: (916) 782-9134

Email: spappas@ecorpconsulting.com

Project Description:

See attached letter and map.

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

March 18, 2014

Ms. Debbie Pilas-Treadway
Associate Governmental Program Analyst
Native American Heritage Commission
1550 Harbor Blvd
West Sacramento, CA 95691

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County, California T15S, R2E, Unsectioned (ECORP Project No. 2013-176).

Dear Ms. Pilas-Treadway:

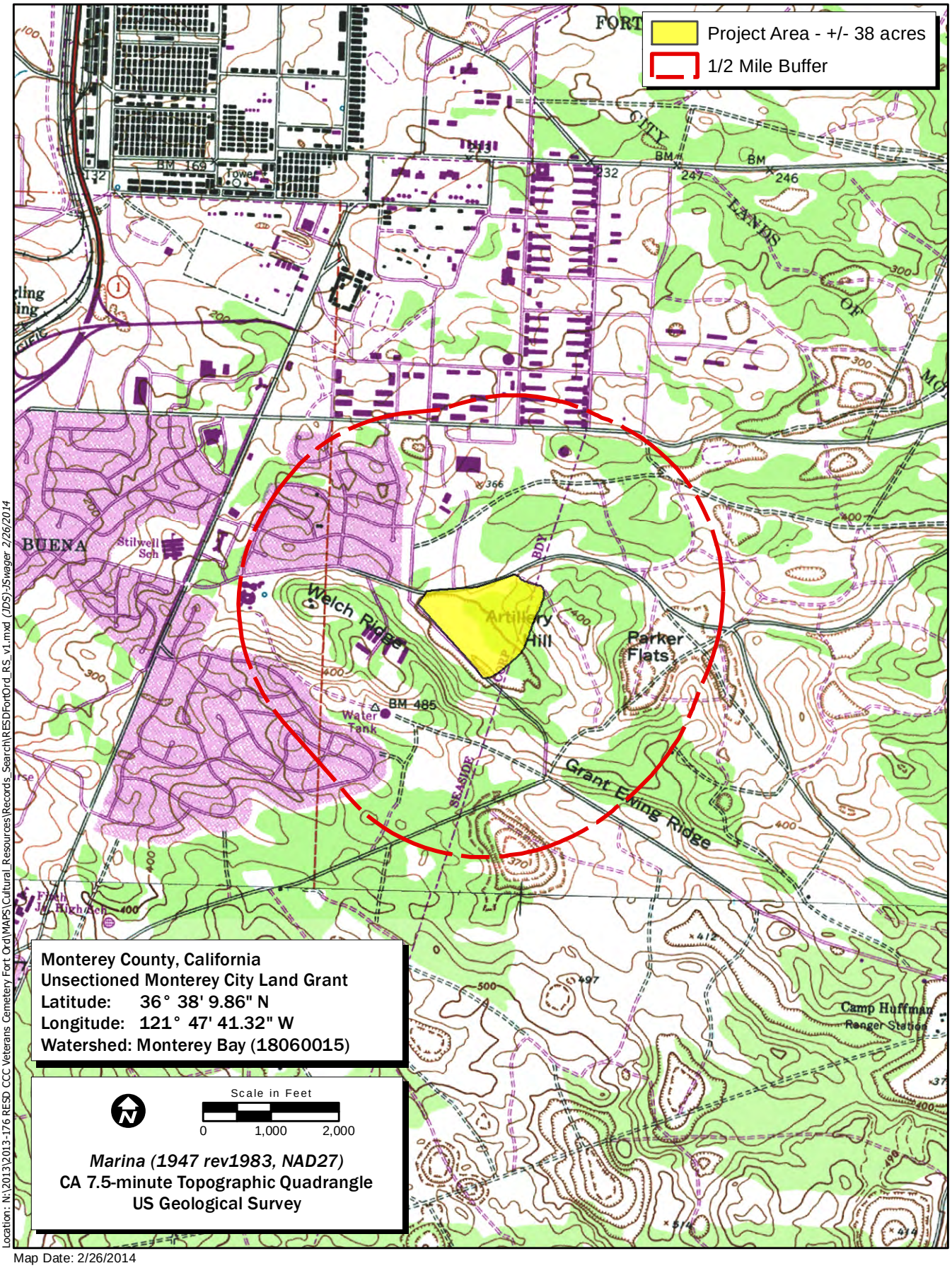
ECORP Consulting, Inc. has been retained to assist in the planning of the development on the project indicated above. As part of the identification effort, we are seeking information from all parties that may have knowledge of or concerns with historic properties or cultural resources in the area of potential effect.

Included is a map showing the project area outlined. We would appreciate input on this undertaking from the Native American community with concerns about possible traditional cultural properties or potential impacts within or adjacent to the Area of Potential Effects. Please understand that this is not a request for location, data or any other information that may be deemed sensitive or confidential to individual Native Americans, Native American organizations, or Federally Recognized Tribes. Information on other parties that may have interests or concerns in the undertaking would be appreciated, so that we may coordinate such comments with the lead agency. Please fax your response to my attention at (916) 782-9134. If you have any questions, please contact me at (916) 782-9100.

Thank you in advance for your assistance.

Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist



Location: N:\2013\2013-176 RESD CCC Veterans Cemetery Fort Ord\MAPS\Cultural_Resources\Records_Search\RESDFortOrd_RS_v1.mxd (JDS)-JSwager 2/26/2014

Map Date: 2/26/2014

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Records Search

2013-176 RESD CCC Veterans Cemetery Fort Ord

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 3, 2014

S Pappas
ECORP Consulting, Inc.
2525 Warren Drive
Rocklin, CA 95677

Sent by Fax: 916 782-9134

Number of Pages: 3

Re: RESD CCC Veterans Cemetery Fort Ord, Monterey County.

Dear Mr/Ms. Pappas,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3712.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

Native American Contact List
Monterey County
April 3, 2014

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
(209) 892-1060
Ohlone/Costanoan

Amah MutsunTribal Band of Mission San Juan Bautista
Irene Zwierlein, Chairperson
789 Canada Road
Woodside , CA 94062
amahmutsuntribal@gmail.com
650-400-4806 cell

650-332-1526 - Fax
Ohlone/Costanoan

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 E, 1st Street
Pomona , CA 91766
rumsen@aol.com
(909) 524-8041 Cell
909-629-6081
Ohlone/Costanoan

Ohlone/Coastanoan-Esselen Nation
Christianne Arias, Vice Chairperson
PO Box 552
Soledad , CA 93960
831-235-4590
Esselen
Ohlone/Costanoan

Ohlone/Coastanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
PO Box 1301
Monterey , CA 93942
ramirez.louise@yahoo.com
408-629-5189
408-205-7579 - cell
Esselen
Ohlone/Costanoan

Amah MutsunTribal Band
Edward Ketchum
35867 Yosemite Ave
Davis , CA 95616
aerieways@aol.com
Ohlone/Costanoan
Northern Valley Yokuts

Trina Marine Ruano Family
Ramona Garibay, Representative
30940 Watkins Street
Union City , CA 94587
510-972-0645-home

soaprootmo@comcast.net
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

Ohlone/Coastanoan-Esselen Nation
Pauline Martinez-Arias, Tribal Council woman
1116 Merlot Way
Gonzales , CA 93926
maklici0-us@gmail
831-596-9897
Esselen
Ohlone/Costanoan

Amah MutsunTribal Band
Valentin Lopez, Chairperson
PO Box 5272
Galt , CA 95632
vlopez@amahmutsun.org
916-743-5833
Ohlone/Costanoan

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238
Ohlone/Costanoan

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed RESD CCC Veterans Cemetery Fort Ord, Monterey County.

Native American Contact List
Monterey County
April 3, 2014

Linda G. Yamane
1585 Mira Mar Ave Ohlone/Costanaon
Seaside , CA 93955
rumsien123@yahoo.com
831-394-5915

Amah MutsunTribal Band of Mission San Juan Bautista
Michelle Zimmer
789 Canada Road Ohlone/Costanoan
Woodside , CA 94062
amahmutsuntribal@gmail.com
(650) 851-7747 - Home

650-332-1526 - Fax

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ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Jakki Kehl
720 North 2nd Street
Patterson, CA 95363

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Jakki:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

The purpose of the study is to identify cultural resources that could be affected by the proposed project, as required by applicable cultural resources and environmental laws and regulations. As part of this study, ECORP would like to identify archaeological, historic resources, or locations that are of cultural importance to the local Native American community. At this time cultural resources investigations are being conducted for project planning purposes only.

We encourage you to participate in this process, so that potential impacts to Native American resources can be proactively addressed and minimized to the greatest extent feasible. We would like to receive a response from you about this project within the next two weeks. If we have not heard from you within 30 days of the receipt of this letter, we will assume that you do not wish to comment on this project. If you have any questions, please feel free to call me at (916) 782-9100 or via email at spappas@ecorpconsulting.com. Thank you for your assistance and participation in this project.

Sincerely,



Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Linda G. Yamane
1585 Mira Mar Ave.
Seaside, CA 93955

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Linda:

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Amah Mutsun Tribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA 95632

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Valentin:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Amah Mutsun Tribal Band
Edward Ketchum
35867 Yosemite Ave.
Davis, Ca 95616

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Edward:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Amah Mutsun Tribal Band
Irene Zwierlein, Chairperson
789 Canada Road
Woodside, CA 94062

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Irene:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, CA 95024

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Ann Marie:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Trina Marine Ruano Family
Ramona Garibay, Representative
30940 Watkins Street
Union City, CA 94587

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Ramona:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

The purpose of the study is to identify cultural resources that could be affected by the proposed project, as required by applicable cultural resources and environmental laws and regulations. As part of this study, ECORP would like to identify archaeological, historic resources, or locations that are of cultural importance to the local Native American community. At this time cultural resources investigations are being conducted for project planning purposes only.

We encourage you to participate in this process, so that potential impacts to Native American resources can be proactively addressed and minimized to the greatest extent feasible. We would like to receive a response from you about this project within the next two weeks. If we have not heard from you within 30 days of the receipt of this letter, we will assume that you do not wish to comment on this project. If you have any questions, please feel free to call me at (916) 782-9100 or via email at spappas@ecorpconsulting.com. Thank you for your assistance and participation in this project.

Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Ohlone/Coastanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
PO Box 1301
Monterey, CA 93942

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Louise:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Ohlone/Coastanoan-Esselen Nation
Christianne Arias, Vice Chairperson
PO Box 552
Soledad, CA 93960

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Christianne:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Ohlone/Coastanoan-Esselen Nation
Pauline Martinez-Arias, Tribal Councilwoman
1116 Merlot Way
Gonzales, CA 93926

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Pauline:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 E, 1st Street
Pomona, CA 91766

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Tony:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Amah Mutsun Tribal Band of Mission San Juan Bautista
Michelle Zimmer
789 Canada Road
Woodside, CA 94062

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Michelle:

ECORP Consulting, Inc. is currently conducting a cultural resources inventory of a 16.9-acre parcel located in Monterey County. The study is being conducted in advance of approval of the proposed Veterans Cemetery Fort Ord project. The project area is situated in an unsectioned portion of Township 15 South, Range 2 East MDBM. For your reference, the boundaries of the project area are marked on the enclosed 1983 U.S. Geological Survey Marina, California 7.5' topographic quadrangle.

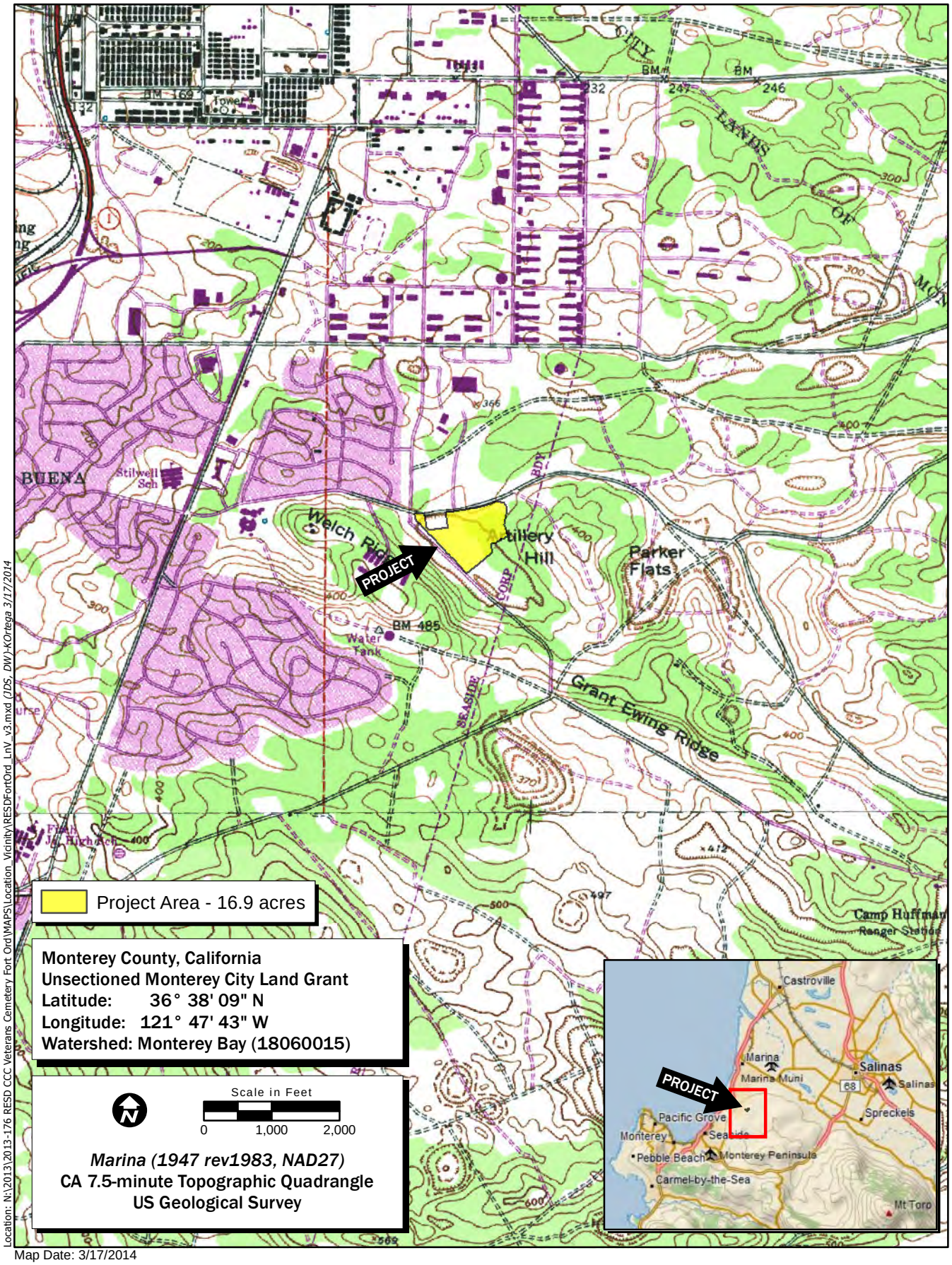
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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated



Location: N:\2013\2013-176 RESD CCC Veterans Cemetery Fort Ord\MAPS\Location_Vicinity\RESDFortOrd_LnV_v3.mxd (JDS, DW)-KOrtega 3/17/2014

Map Date: 3/17/2014

Service Layer Credits: Copyright:© 2013 DeLorme

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Location and Vicinity

2013-176 RESD CCC Veterans Cemetery Fort Ord

Ohlone/Costanoan-Esselen Nation

Previously acknowledged as
The San Carlos Band of
Mission Indians
The Monterey Band
And also known as
O.C.E.N. or Esselen Nation
P.O. Box 1301
Monterey, CA 93942
www.ohlonecostanoanesselennation.org.

April 28, 2014

Stephen Pappas
Field Director/Staff Archaeologist
2525 Warren Drive
Rocklin, CA 95677

Re: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Saleki Atsa,

Ohlone/Costanoan-Esselen Nation is the legal tribal government representative for over 600 enrolled members of Esselen, Carmeleno, Monterey Band, Rumsen, Chalon, San Carlos Mission and/or Costanoan Mission Indian descent. Though other indigenous people may have lived in the area, the area is the indigenous homeland of our people. Included with this letter please find a territorial map by Taylor 1856; Levy 1973; and Milliken 1990, indentifying Tribal areas. At this time are unable to provide you with cultural resource information but ask that OCEN be contacted upon any findings on this project.

Ohlone/Costanoan-Esselen Nation objects to all excavation in known cultural lands, even when they are described as previously disturbed, and of no significant archaeological value. Please be advised that it is our first priority that our ancestor's remains be protected and undisturbed. We desire that all cultural and sacred items be left with our ancestors on site or where they are discovered. We ask for the respect that is afforded all of our current day deceased, by no other word these burial sites are cemeteries, respect for our ancestors as you would expect respect for your deceased family members in today's cemeteries. **Our definition of respect is no disturbance.**

Aware that despite our objection, disturbance continues, therefore: We request that Ohlone/Costanoan-Esselen Nation be consulted as to any planned projects that might adversely impact known or predicted cultural resources and sacred sites within our aboriginal territory. Furthermore, the Tribal leadership desires to be contacted with: 1) surveys, 2) subsurface testing, 3) presence/absence testing, 4) mitigation and recovery programs, 5) reburial of any of our ancestral remains, 6) placement of all cultural items, and 7) that a Native American Monitor of Ohlone/Costanoan-Esselen Nation, approved by the OCEN Tribal Council be used within our aboriginal territory.

We look forward to hearing more information about this project; please feel free to contact me at (408) 629-5189. Nimasianexelpasaleki. Thank you for your attention to this matter.

Sincerely and Respectfully Yours,

Louise J. Miranda Ramirez, Chairperson
Ohlone/Costanoan-Esselen Nation
(408) 629-5189

Cc: OCEN Tribal Council

Distribution of Ohlone/Costanoan-Esselen Nation Tribal Rancherias, Districts, Landgrants and Historic Landmarks

OCEN DIRECT LINEAL DESCENT

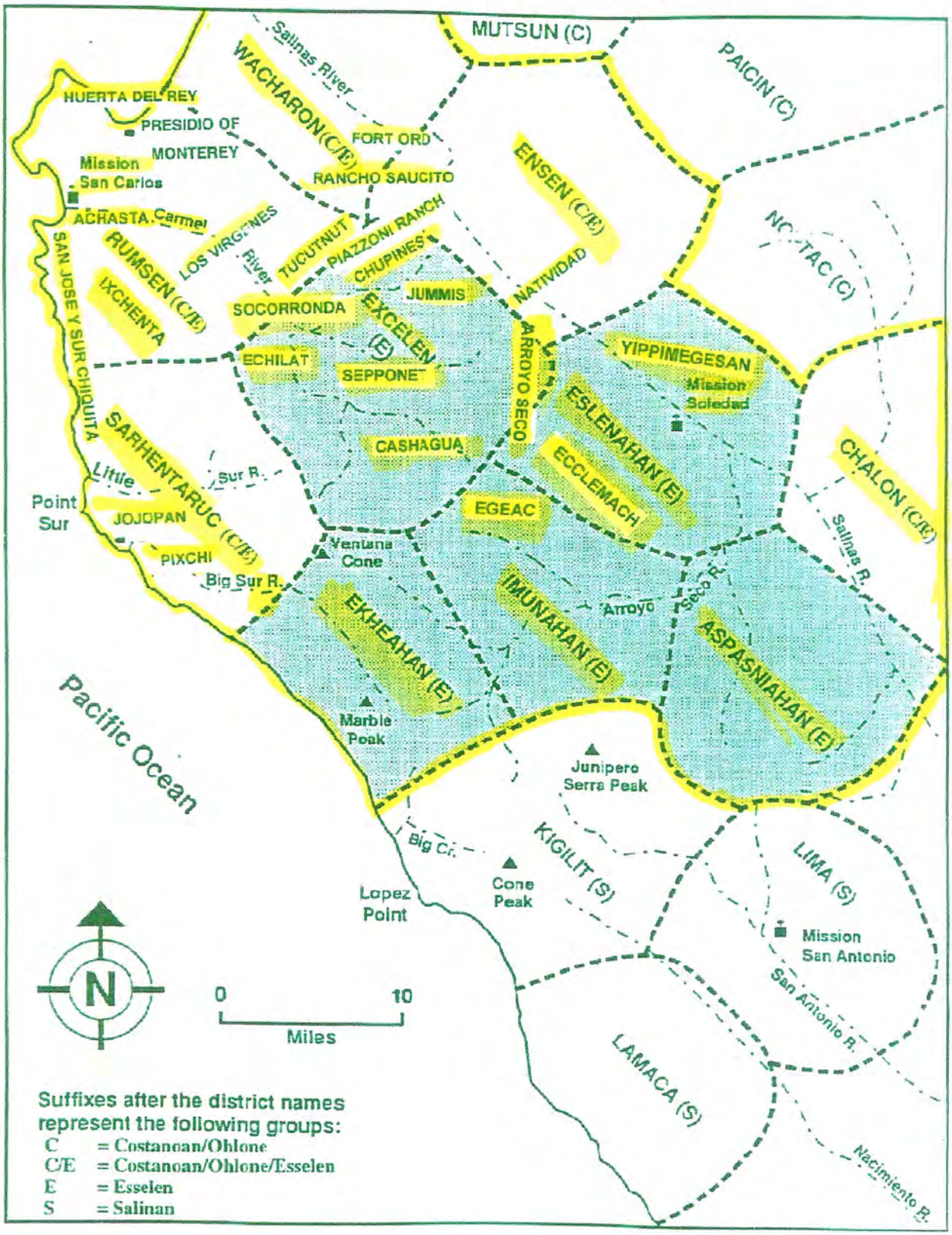


Figure 2:

Map after Taylor 1856; Levy 1973; Hester 1978; Milliken 1990

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

3 April 2014

Ohlone/Coastanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
PO Box 1301
Monterey, CA 93942

RE: Cultural Resources Identification Effort at RESD CCC Veterans Cemetery Fort Ord, Monterey County (ECORP Project No. 2013-176).

Dear Louise:

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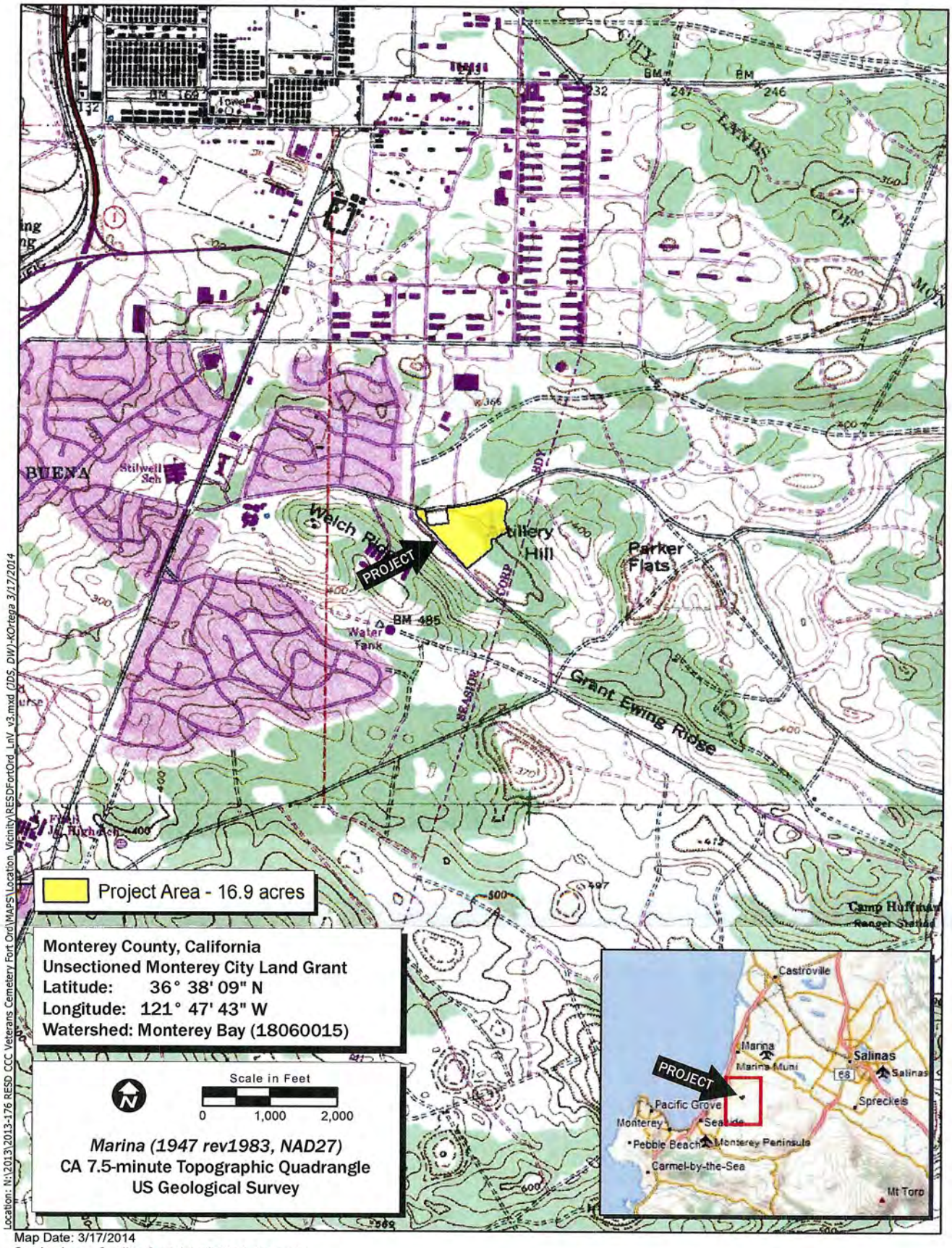
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Sincerely,

Stephen Pappas
Field Director/Staff Archaeologist

Enclosures, as stated



Map Date: 3/17/2014

Service Layer Credits: Copyright:© 2013 DeLorme

DRAFT

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Location and Vicinity

2013-176 RESD CCC Veterans Cemetery Fort Ord

From: Katherine Knapp
To: "aerieways@aol.com"
Subject: Fort Ord Military Installation
Date: Tuesday, April 29, 2014 9:19:00 AM

Mr. Ketchum,

We recently sent you a letter describing the proposed veteran's cemetery on the former Fort Ord military installation. I am writing to ask if you have any comments or concerns that you would like to express about the project. If you do, please feel free to email in return or call at the number listed in my signature line.

Very Respectfully,

Katherine Knapp, M.S., RPA
Senior Archaeologist
ECORP Consulting, Inc.
ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
2525 Warren Drive, Rocklin, CA 95677
Ph: 916.782.9100 ♦ Cell: 916.878.6829 ♦ Fax: 916.782.9134
kknapp@ecorpconsulting.com ♦ www.ecorpconsulting.com

ATTACHMENT C

APE Photographs

State of California — The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

PHOTOGRAPH RECORD

Trinomial

Page 1 **of** 1 **Resource/Project Name:** RESD CCC Veterans Cemetery Fort Ord **Year** 2014
Film Type and Speed: Digital (Cannon Powershot SX280 HS) Negatives Kept at: ECORP Consulting, Inc.

Mo.	Day	Time	Exp./Frame	Subject/Description	View Toward	Accession #
3	17			Fort Ord display map at NW corner of project	SE	001
3	17			Street sign of P. Flat and P. Flat cut-off roads	NW	002
3	17			Future cemetery sign	NE	003
3	17			P. Flat cut-off road from south end of project	NW	004
3	17			Overview of overgrown vegetation south of project	East	005
3	17			Overview of overall vegetation in SW portion	North	006
3	17			concrete fragments	North	007
3	17			concrete fragments	SE	008
3	17			Bare patch within center of project	NE	009
3	17			South end of project under tree canopy	NW	010
3	17			[redacted]	NE	011
3	17			pit (south of project)	NW	012
3	17			pit (south of project)	North	013
3	17			Gooseberry plant	North	014
3	17			[redacted]	SE	015
3	17			[redacted]	NW	016
3	17			[redacted]	SE	017
3	17			[redacted]	NW	018
3	17			SE end of project w/ dead oaks (boundary stake)	North	019
3	17			SE boundary stakes	NE	020
3	17			Parker Flats Road from NE end of project	West	021
3	17			North end of project overview	South	022
3	17			[redacted]	SE	023
3	17			Area north of project	NW	024
3	17			P. Flats Road overview (road closure signs)	East	025
3	17			Project area overview from P. Flats Road	South	026
3	17			Intersection of P. Flats/P. Flats cut-off road	SW	027



027



001



002



003



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025



026












MARINA
MONTEREY COUNTY
SEASIDE
Fort Ord National Monument
ARMY/BLM CONTROLLED
ARMY CONTROLLED
Fort Ord National Monument
Trespassing Will Be Enforced Per Penal Code 602
For additional information on the FORA ESCA RP visit: www.fora-esca-rp.com


PARKER FLATS ROAD
SUBJECT TO CLOSURE DUE TO
MUNITIONS REMEDIATION WORK
7:00 AM TO 5:00 PM M-F




FUTURE SITE OF
CENTRAL COAST STATE VETERANS' CEMETERY
Honoring those who have served
to preserve our freedom
For More Information contact:
Central Coast State Veterans' Cemetery Foundation
(831) 384-9400
www.ccvcf.com
Cemetery Project Partners
California Department of Veterans Affairs
Fort Ord Reuse Authority
County of Monterey/ Military & Veterans Affairs Office
City of Seaside
ARCADIS
CHARTIS
WESTON
TRUCKSIS




PARKER FLATS RD
CUT-OFF

































ATTACHMENT D

Confidential Cultural Resource Site Locations and Site Records

This Attachment contains information on the specific location of cultural resources. This information is not for publication or release to the general public. It is for planning, management, and research purposes only. Information on the specific location of prehistoric and historic sites is exempt from the Freedom of Information Act and California Public Records Act.

NATIVE AMERICAN CONSULTATION
(2019)

LETTER	Request to Native American Heritage Commission
LETTER	Response from Native American Heritage Commission
LETTERS	Request to Native Americans Identified by the Native American Heritage Commission
LETTERS	Native American Responses

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION

1556 Harbor Boulevard, STE 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: California Central Coast Veterans Cemetery Project, Phase 2

County: Monterey County

USGS Quadrangle Name: USGS Marina, Calif. 1983

Address: 2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Township: 15S, **Range**: 2E, unsectioned

Company/Firm/Agency: Basin Research Associates

Contact Person: Colin I. Busby, PhD, RPA

Street Address: 1933 Davis Street, STE 210

City/Zip: San Leandro, CA 94577

Phone: (510) 430-8441 x202

Fax: (510) 430-8443

Email: basinres1@gmail.com

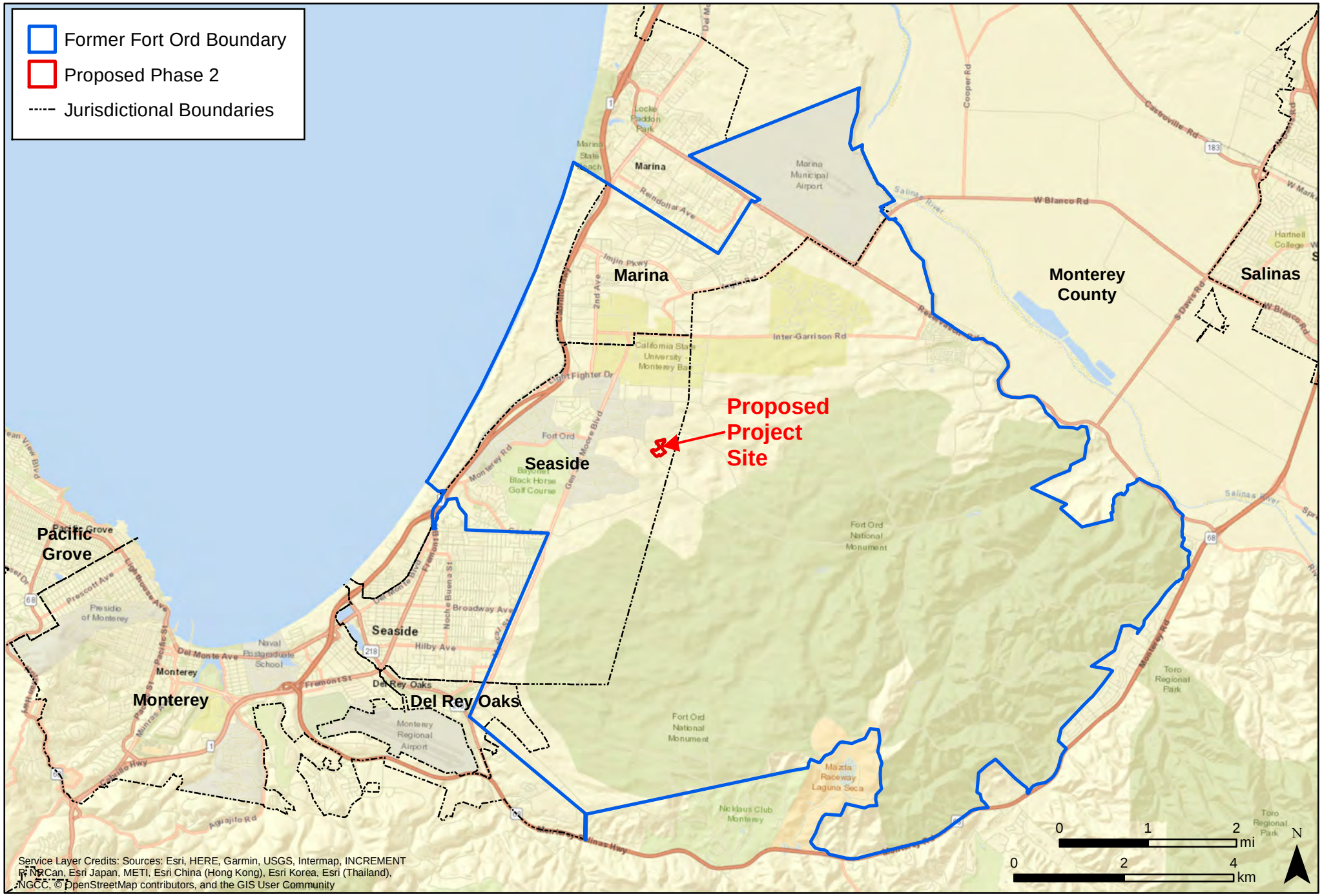
Project Description:

Complete Phase 2 of CCC Veterans Cemetery to supplement already constructed Phase 1. The Phase 2 objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans for the next 10 years;
- Increase burial options by providing in-ground crypts; and
- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing topography and open areas with existing native vegetation as much as possible, while meeting the programmatic needs.

The Phase 1 and area for Phase 2 and surrounding areas were previously subject to Native American consultation. No known archaeological or historic sites are within the project boundary.

3/4/19





Title:

Vicinity Map

Date: 03/04/2019

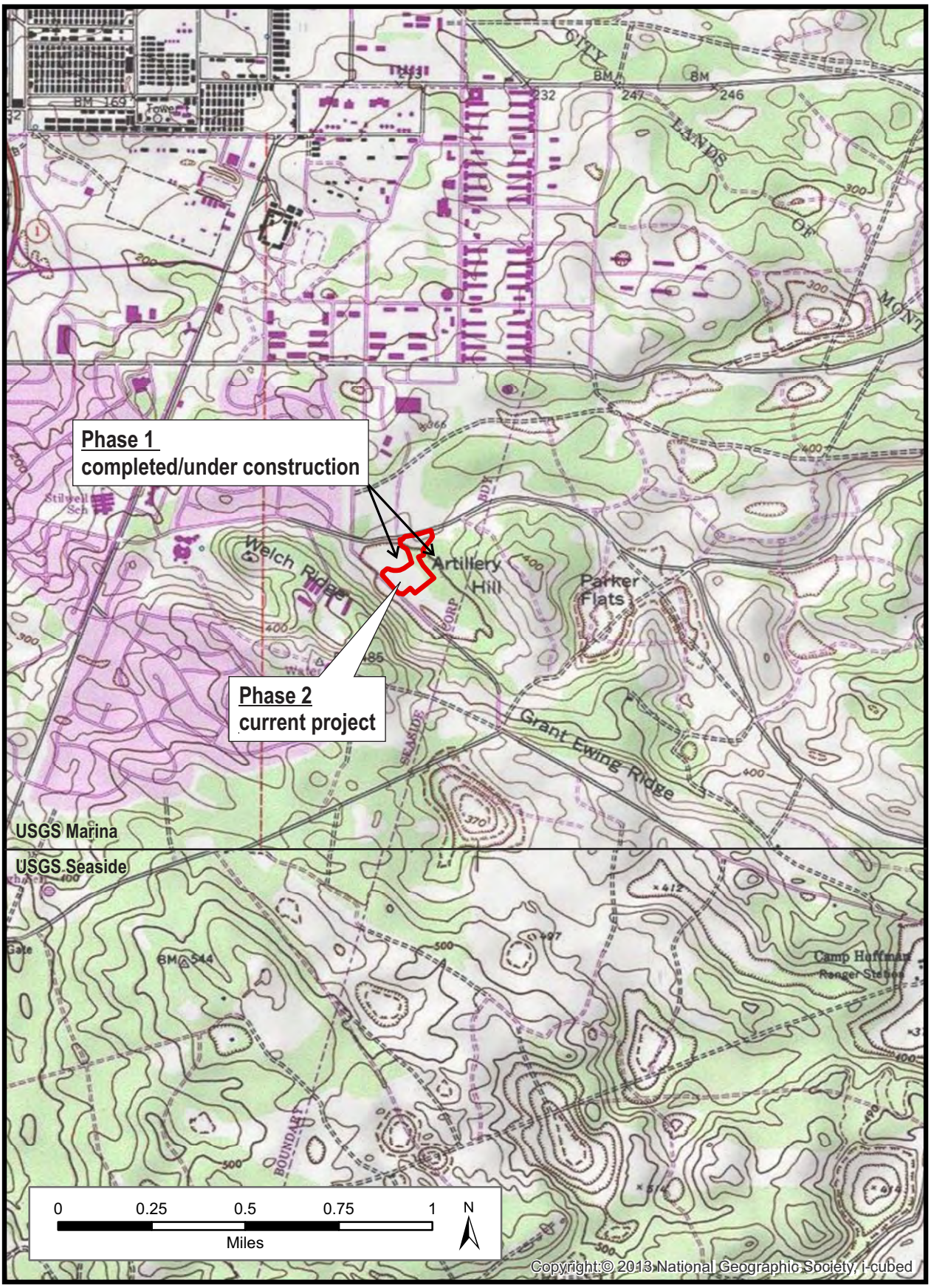
Scale: 1 inch = 1.4 miles

Project: 2018-67

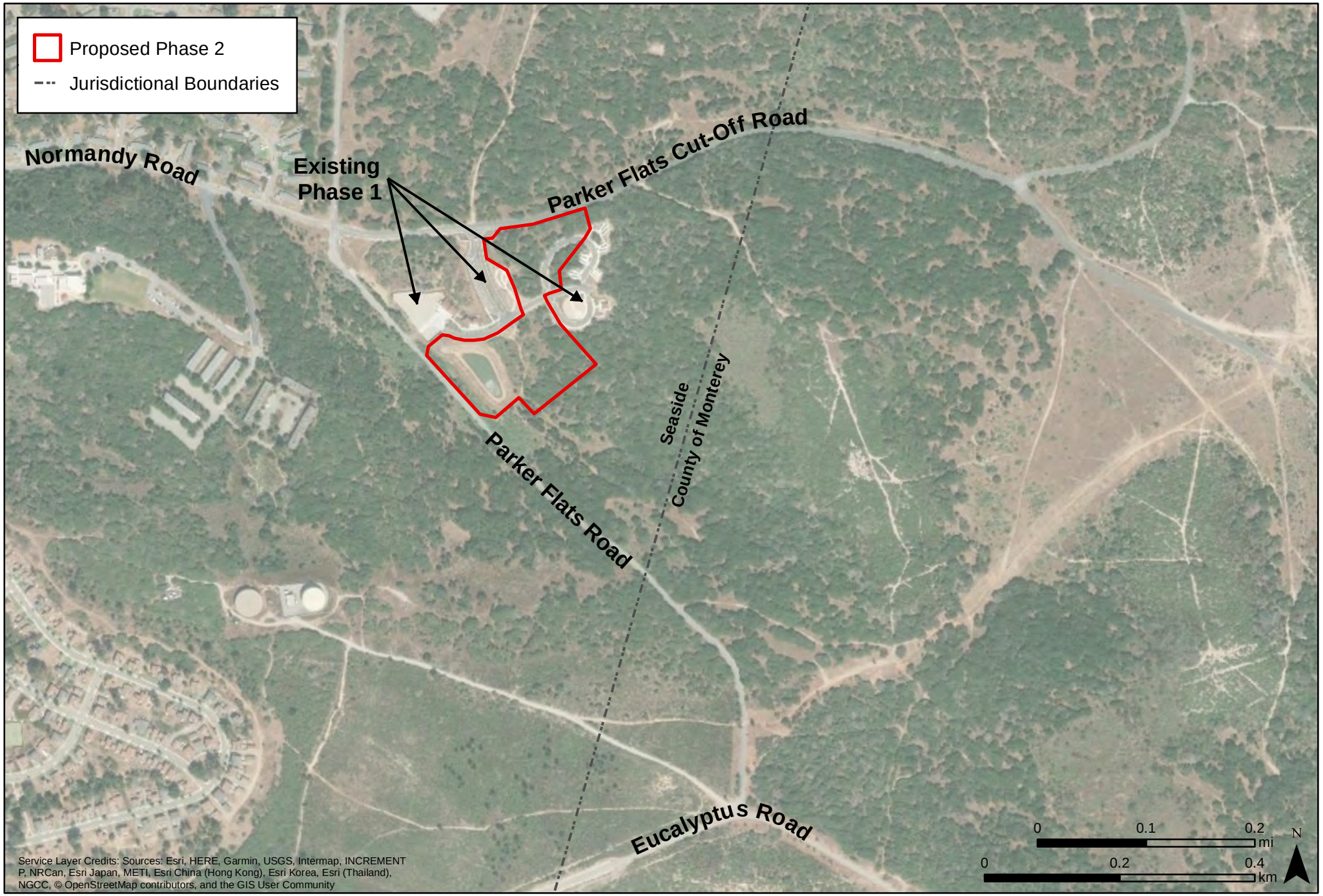
Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure

1



Project Location T15S R2E unsectioned (USGS Marina, Calif. 1983 and Seaside, Calif. 1983)





Title:

Proposed Project Site

Date: 03/04/2019

Scale: 1 inch = 0.11 miles

Project: 2018-67

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure

2

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

March 6, 2019

Dr. Colin Busby
Basin Research Associates

VIA Email to: basinres1@gmail.com

RE: California Central Coast Veterans Cemetery Phase 2 Project, Community of Seaside; Marina USGS Quadrangle, Monterey County, California.

Dear Dr. Busby:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, B.S., M.A., Ph.D.
Associate Governmental Program Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Monterey County
3/6/2019

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA, 95632
Phone: (916) 743 - 5833
vlopez@amahmutsun.org

Costanoan
Northern Valley
Yokut

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road
Woodside, CA, 94062
Phone: (650) 851 - 7489
Fax: (650) 332-1526
amahmutsuntribal@gmail.com

Costanoan

Costanoan Ohlone Rumsen-Mutsun Tribe
Patrick Orozco, Chairman
644 Peartree Drive
Watsonville, CA, 95076
Phone: (831) 728 - 8471
yanapvoic97@gmail.com

Costanoan

Costanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
244 E. 1st Street
Pomona, CA, 91766
Phone: (909) 629 - 6081
Fax: (909) 524-8041
rumsen@aol.com

Costanoan

Esselen Tribe of Monterey County
Tom Nason, Chairman
P. O. Box 95
Carmel Valley, CA, 93924
Phone: (831) 659 - 2153
TribalChair@EsselenTribe.com

Costanoan
Esselen

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, CA, 95024
Phone: (831) 637 - 4238
ams@indiancanyon.org

Costanoan

Ohlone/Costanoan-Esselen Nation
Louise Miranda-Ramirez, Chairperson
P.O. Box 1301
Monterey, CA, 93942
Phone: (408) 629 - 5189
ramirez.louise@yahoo.com

Costanoan
Esselen

Ohlone/Costanoan-Esselen Nation
Christanne Arias, Vice Chairperson
519 Viejo Gabriel
Soledad, CA, 93960
Phone: (831) 235 - 4590

Costanoan
Esselen

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed California Central Coast Veterans Cemetery Phase 2 Project, Monterey County.



March 6, 2019

BASIN
RESEARCH
ASSOCIATES
1933 DAVIS STREET
SUITE 215
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Valentin Lopez, Chairperson
Amah Mutsun Tribal Band
P.O. Box 5272
Galt, CA, 95632

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Val,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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- Provide burial space for, but not limited to, Monterey County Region veterans for the next 10 years;
- Increase burial options by providing in-ground crypts; and,
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We look forward to hearing from you. I can be reached at (510) 430-8441 x101 or via email at basinres1@gmail.com. Our client, Erin Harwayne, Senior Project Manager, Denise Duffy & Associates, Inc. can be contacted at (831) 373-4341 x19 eharwayne@ddaplanning.com.

Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA



March 6, 2019

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ASSOCIATES
1933 DAVIS STREET
SUITE 215
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Irenne Zwierlein, Chairperson
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Irenne,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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FAX (510) 430-8443

Patrick Orozco, Chairmain
Costanoan Ohlone Rumsen-Mutsun Tribe
644 Peartree Drive
Watsonville, CA 95076

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Mr. Orozco,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Colin I. Busby, Ph.D., RPA



March 6, 2019

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FAX (510) 430-8443

Tony Cerda, Chairperson
Costanoan Rumsen Carmel Tribe
244 E. 1st Street
Pomona, CA 91766

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Mr. Cerda,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA



March 6, 2019

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VOICE (510) 430-8441
FAX (510) 430-8443

Tom Nason, Chairman
Esselen Tribe of Monterey County
P.O. Box 95
Carmel Valley, CA 93924

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Mr. Nason,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA



March 6, 2019

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SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Ann Marie,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA



March 6, 2019

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SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Louise Miranda-Ramirez, Chairperson
Ohlone/Costanoan-Esselen Nation
P.O. Box 1301
Monterey, CA 93942

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Ms. Miranda-Ramirez,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA



March 6, 2019

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SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Christanne Arias, Vice Chairperson
Ohlone/Costanoan-Esselen Nation
519 Viejo Gabriel
Soledad, CA 93960

RE: Request for Information – California Central Coast Veterans Cemetery Project, Phase 2
2900 Parker Flats Cutoff Road, Seaside (within former Ford Ord)

Dear Ms. Arias,

The Native American Heritage Commission has provided your name as a person who may have further information on Native American resources within the California Central Coast Veterans Cemetery Project located within the former Ford Ord (maps attached). Phase 1 has been completed and this portion of the cemetery has been constructed and is in use. Previous comment was received from Native American individuals and groups for Phase 1. No known archaeological or historic sites are within the project boundary based on several surveys over the past 10 years.

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Thanking you in advance for any assistance.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA

Record of Native American Contacts
California Central Coast Veterans Cemetery Project Phase 2, Monterey County

3/4/19 Letter to Native American Heritage Commission (NAHC), Sacramento. Regarding: Request for Review of Sacred Lands Inventory for project.

3/6/19 Letter response by Gayle Totton, B.S., M.A., PhD., NAHC

3/6/19 Letters sent to all parties recommended by NAHC

Letters to: (1) Valentin Lopez, Chairperson, Amah Mutsun Tribal Band, Galt; (2) Irenne Zwierlein, Amah Mutsun Tribal Band of Mission San Juan Bautista, Woodside; (3) Patrick Orozco, Chairmen, Coastanoan Ohlone Rumsen-Mutsun Tribe, Watsonville; (4) Tony Cerda, Chairperson, Coastanoan Rumsen Carmel Tribe, Pomona; (5) Tom Nason, Chairman, Esselen Tribe of Monterey County, Carmel Valley; (6) Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan, Hollister; (7) Louise Miranda-Ramirez, Chairperson, Ohlone/Coastanoan-Esselen Nation, Monterey; and, (8) Christanne Arias, Vice Chairperson, Ohlone/Coastanoan-Esselen Nation, Soledad.

3/15/19 Telephone calls and/or emails made by Basin Research Associates (Christopher Canzonieri) in the late morning to non-responding parties.

Valentin Lopez – responded via email on 3/6/19. Mr. Lopez stated "the project is outside our traditional tribal territory, we have no comment."

Irenne Zwierlein – called at 11:07 AM; Ms. Zwierlein recommends that all construction crew receive cultural sensitivity training in areas with the potential of prehistoric cultural materials and any archaeologists on the project have experience with northern and central California archaeology. The retention of a qualified and trained Native American Monitor is recommended in the event of a discovery of Native American cultural materials.

Patrick Orozco - called at 11:30 AM, unable to leave a message, mailbox is not set up.

Tony Cerda – called at 11:31 AM; unable to leave a message, just continued to ring.

Tom Nason – called at 11:33 AM, left a message at his office with administrative assistant.

Ann Marie Sayers – called at 11:35 AM, left a detailed message.

Louise Miranda-Ramirez - called at 11:37; unable to leave a message.

Christanne Arias – called at 11:38 AM; unable to leave a message.

Subject: Re: Request for Information - California Central Coast Veterans Cemetery Project Phase 2
From: Val Lopez <vlopez@amahmutsun.org>
Date: 3/6/2019, 4:38 PM
To: canz@basinresearch.com

This project is outside our traditional tribal territory, we have no comment.

Valentin Lopez, Chair
Amah Mutsun Tribal Band

On Wed, Mar 6, 2019 at 10:49 AM Chris Canzonieri <basinres1@gmail.com> wrote:

Dear Val,

The Native American Heritage Commission has provided your name as a person who may have additional information on Native American resources for the California Central Coast Veterans Cemetery Project, Phase 2. Please note that Phase 1 of the cemetery is already in use.

Could you please let us know if you have any information or concerns regarding the proposed project. Please send an email to Christopher Canzonieri at Basin Research Associates (canz@basinresearch.com).

Thanking you in advance for your assistance.

Christopher Canzonieri

--
Christopher Canzonieri, M.A., RPA
Lead Physical Anthropologist and Project Archaeologist
Basin Research Associates, Inc.
1933 Davis Street, Suite 215
San Leandro, CA 94577-1258
Office: (510) 430-8441 ext 107
Fax: (510) 430-8443
Primary Cell: (925) 548-1002
Cell: (510) 220-1822
canz@basinresearch.com
www.basinresearch.com

Virus-free. www.avast.com

Subject: Read: RE: Request for Information - California Central Coast Veterans Cemetery Project Phase 2
From: Tom Little Bear Nason <tribalchairman@esselentribe.org>
Date: 3/7/2019, 9:38 AM
To: Chris Canzonieri <canz@basinresearch.com>

Your message

To: Tom Little Bear Nason
Subject: RE: Request for Information - California Central Coast Veterans Cemetery Project Phase 2
Sent: Wednesday, March 6, 2019 10:55:52 AM (UTC-08:00) Pacific Time (US & Canada)

was read on Thursday, March 7, 2019 9:38:20 AM (UTC-08:00) Pacific Time (US & Canada).

```
Final-recipient: RFC822; tribalchairman@esselentribe.org
Disposition: automatic-action/MDN-sent-automatically; displayed
X-MSExch-Correlation-Key: jHMq5n+ifkCb+dknMio4ow==
Original-Message-ID: <6d545a36-f4e6-624e-7ec1-0d8905915a77@basinresearch.com>
X-Display-Name: Tom Little Bear Nason
```

Appendix F

Geotechnical Investigations

KLEINFELDER
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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

Prepared For: Whitson Engineers
9699 Blue Larkspur Lane, Suite 105
Monterey, California 93940

Attention: Mr. Richard Weber

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THIS STUDY WAS PREPARED UNDER CONTRACT WITH THE FORT ORD REUSE AUTHORITY, CALIFORNIA, WITH FINANCIAL SUPPORT FROM THE OFFICE OF ECONOMIC ADJUSTMENT, DEPARTMENT OF DEFENSE. THE CONTENT REFLECTS THE VIEWS OF THE FORT ORD REUSE AUTHORITY AND DOES NOT NECESSARILY REFLECT THE VIEWS OF THE OFFICE OF ECOMOMIC ADJUSTMENT

ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.

September 17, 2010
Revised October 7, 2010
File No.: 111946

KLEINFELDER
Bright People. Right Solutions.

40 Clark Street, Suite J
Salinas, CA
93901

p| 831.755.7900
f| 831.755.7909

kleinfelder.com

September 17, 2010
Revised October 7, 2010
File No.: 111946

Whitson Engineers
9699 Blue Larkspur Lane, Suite 105
Monterey, California 93940

Attention: Mr. Richard Weber

SUBJECT: Geotechnical Investigation and Percolation Testing for the Proposed California Central Coast Veterans Cemetery, State Cemetery Site, Monterey County, California

Dear Mr. Weber:

We are pleased to submit our geotechnical investigation report for the proposed California Central Coast Veterans Cemetery, State Cemetery Site in the City of Seaside and Monterey County, California. The accompanying report provides the results of our field investigation, percolation testing, laboratory testing, and engineering analyses. Geotechnical design recommendations for site earthwork, foundations, pavements, concrete slabs-on-grade, and site drainage, are presented.

Based on the results of our investigation and from a geotechnical standpoint, the site may be developed as planned provided the recommendations presented in our report are incorporated into the design and construction of the project. The primary geotechnical concerns at the site include excavation and fill stability of the on-site sandy soils and the presence of near-surface loose soil. Also of concern are areas of unexploded ordinance (UXO) where clearing has not been finalized such as under existing on-site pavements. Please refer to the report for detailed recommendations.

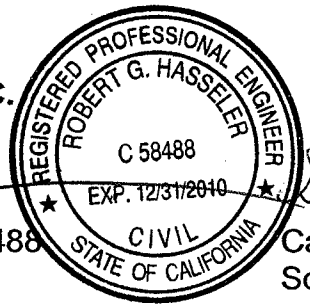
As noted in our report, Kleinfelder should be retained to review project plans and specifications prior to the start of construction, and to observe and test during earthwork and foundation construction. This will allow us to compare conditions exposed during construction with those encountered during our investigation and to present supplemental recommendations if warranted by different site conditions.

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We appreciate the opportunity of providing our services to you on this project. If any questions should arise regarding the interpretation of the contents of this report, please contact us at (831) 755-7900.

Respectfully Submitted,

KLEINFELDER WEST, INC.



Robert G. Hasseler, CE 58488
Project Engineer

Stephanie Sanchez FOR:
Catherine H. Ellis, CE, GE 2650
South Bay Area Manager

Copies: Addressee (2)

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KLEINFELDER 40 Clark Street, Unit J, Salinas, CA 93907 **p** | 831.755.7900 **f** | 831.755.7909

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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

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APPENDIX D Percolation Test Results

APPENDIX E Summary of Compaction Recommendations

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Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

1. INTRODUCTION

This report presents the results of our geotechnical investigation and percolation testing for the proposed California Central Coast Veterans Cemetery (CCCVC) project on the former Fort Ord in the City of Seaside and in Monterey County, California. The approximate location of the project is shown on the Vicinity Map, Plate 1. The locations of our borings are shown on the Site Plans, Plates 2a and 2b. This geotechnical investigation and percolation testing study was performed in support of Additive Bid Item for Task 4 – Soils/hydrology testing at the approximately 80-acre State Cemetery Site, as additional deliverable for the CCCVC project. Our work was performed for the Fort Ord Reuse Authority (FORA) and Whitson Engineers.

The conclusions and recommendations presented in this report are based on the subsurface soil conditions encountered at the locations of our exploration and the provisions and requirements outlined in the Limitations section of this report. The findings, conclusions and recommendations presented herein should not be extrapolated to other areas or be used for other projects without our review.

1.1 PROJECT DESCRIPTION

The California Central Coast Veterans Cemetery Infrastructure Planning project consists of the development of preliminary infrastructure plans in support of the proposed California Central Coast Veterans Cemetery. The planning area consists of approximately 178 acres on the former Fort Ord. The study area consists of an approximately 80-acre State Cemetery site and three roadway corridors. The three roadway corridors are: the existing Parker Flats Cutoff, the existing Parker Flats Road, and the future Eastside Road (from Eucalyptus Road to Intergarrison Road).

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In support of the study, geotechnical and percolation testing was performed for the State Cemetery site and for the three roadway corridors for the development of storm water retention plans and grading plans. In addition, in support of the study, site characteristics for construction and burial and new utility construction on the State Cemetery site is needed.

Geotechnical recommendations for the three roadway corridors are presented in separate reports. In addition, utility service needs for the CCCVC and adjacent developments will be needed, but are specifically not included in Kleinfelder's scope of work. Deliverables include a separate report for the State Cemetery site and a separate report for each of the three roadway corridors (i.e. four reports). This report is for the State Cemetery Site portion of the project.

The State Cemetery site facilities will include traditional casket burial sites, casket burial sites in crypts, in-ground cremains, cremains in Columbarium wall niches, cremains in terrace niches, site buildings, parking and roads, and a storm water infiltration basin. Geotechnical considerations include site grading to prepare subgrades for engineered fills and improvements, new foundations, interior and exterior concrete slabs-on-grade, pavements, excavations for burial, excavation and backfill for site utilities, and site drainage. Other improvements will include landscaping. The site is currently occupied by the existing asphalt concrete paved roadways along the northern and southwestern sides of the State Cemetery site and undeveloped lot covered with grasses brush and scrub trees within the site. Cuts and fills are anticipated to be up to 30 feet deep in some of the off-site roadway areas to prepare the subgrade soils. Excavations for burial are anticipated to be up to 8 feet deep.

Structural loading information was not available when this investigation was completed. We have assumed column loads on the order of 50 to 200 kips of dead plus live load and wall loads on the order of 8 kips per linear foot.

If the project differs significantly from that described above, we should be contacted to review and potentially revise our recommendations.

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1.2 PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical investigation, as presented in our proposal 01202PROP (SAL10P025), dated April 28, 2010; and work order, WO-07 (Document: SAL10C025), dated April 28, 2010; was to explore and evaluate the subsurface soil conditions at the site and to provide recommendations for the geotechnical aspects of the design and construction of the proposed CCCVC improvements. After review by Whitson Engineers and discussion with us, our proposed subsurface investigation was modified. This was primarily to adjust the subsurface exploration and percolation testing coverage to better meet the designer's needs, and also to avoid drilling in areas that were off limits due to unexploded ordinance (UXO) (i.e. where UXO clearing had not been finalized). This included a prohibition on drilling through the existing site pavements. Therefore, we did not drill through the existing pavement sections, and instead drilled adjacent to the roads in the affected areas.

Our investigation was structured to perform all field work and percolation testing for the State Cemetery and three roads concurrently. Our scope of services included UXO training from Weston Solutions, Inc., for Kleinfelder staff and our vendors, a site reconnaissance by a member of our engineering staff, marking the site and notification for Underground Services Alert (USA), clearing the site with an independent utility locator Norcal Underground Locating, subsurface exploration by means of twenty-one (21) exploratory borings, and twelve (12) percolation test holes, field percolation testing, laboratory testing of selected soil samples recovered from the borings, engineering analysis, and preparation of our reports. Additionally, four (4) samples of the near-surface soils were sent to Cerco Analytical for preliminary corrosivity screening. The data obtained and the analyses performed were for the purpose of providing design and construction recommendations for earthwork, surface and subsurface drainage, building foundations (for the State Cemetery portion), excavations, and utility trench excavation and backfill, pavements, and concrete slabs-on-grade.

Environmental services such as evaluation and chemical analysis of the soil and groundwater for hazardous materials were not included in our scope of services.

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2. SITE INVESTIGATION

2.1 SITE DESCRIPTION

The California Central Coast Veterans Cemetery project site is located on the central and eastern portions of the previous Fort Ord in the City of Seaside and Monterey County, California as shown on the Vicinity Map, Plate 1. The improvement areas are depicted on the Site Plans, Plates 2a and 2b. Site surface conditions consist of asphalt concrete paved roads, unpaved trails and undeveloped land. The ground surface ranges from flat to low hills. Vegetation includes grass, weeds and scattered brush and scrub trees.

The State Cemetery Site improvements included within our study area are located on a roughly triangular shaped undeveloped lot on the former Fort Ord, in the City of Seaside, Monterey County, California. Parker Flats Cutoff is located on the southwestern border of the site, and Parker Flats Road (Normandy Road) forms the northern border of the site. The proposed Eastside Road will extend from the intersection of Parker Flats Road and Eucalyptus Road in a roughly northerly direction and intersect with Parker Flats Road on the northeastern corner of the site. The site slopes downward generally to the north and west. The site is currently an undeveloped lot covered in grass, brush and scrub trees. The Site Plan, Plate 2a shows a detail of the site and includes the locations of our borings and percolation test holes.

2.2 SUBSURFACE INVESTIGATION

Our field investigation consisted of a site reconnaissance, and a subsurface exploration program. Prior to drilling on the site we contacted Underground Service Alert (USA) and an independent locator, Norcal Underground Locating, to clear our drilling locations. The subsurface exploration program included drilling a total of twenty-one (21) exploratory borings and twelve (12) percolation test holes on July 26, through July 28, 2010, using a truck mounted B-53 drill rig equipped with 8-inch diameter hollow-stem augers and a hydraulic hammer, a minuteman portable drill rig equipped with 3½ inch solid stem augers equipped with a rope and cathead hammer, and a hand auger. The borings were drilled to depths of between about 5 to 50 feet below the

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existing ground surface. Due to limited site access two of the percolation test holes P-1 and P-2 were excavated by hand to a depth of 12 inches and a width of 12 inches using a shovel.

Our borings for the CCCVC project were numbered B-1 through B-21 and our percolation test holes were numbered P-1 through P-12. The borings pertinent to the State Cemetery Site are Boring B-1 near the intersection of Parker Flats Cutoff and Parker Flats Road, Boring B-4 off of Parker Flats Cutoff, Boring B-5 in the northeastern portion of the State Cemetery Site, Boring B-7 on the southern portion of the site, and Boring B-8 off of the proposed Eastside Road alignment. Percolation tests pertinent to the Parker Flats Cutoff are percolation test holes P-1 and P-2 on the State Cemetery site adjacent to Parker Flats Cutoff, and P-3 on the southeastern side of the site near the proposed Eastside Road.

Visual classification of the soils encountered in our exploratory borings was made in general accordance with the Unified Soil Classification System (ASTM D 2488) by our engineering staff. The results of the laboratory tests were used to refine the field classifications based on ASTM D 2487. A key for the classification of the soil is presented in Appendix A as the Boring Log Legend, Plate A-1. The logs of the borings are presented on Plates A-2 through A-22 in Appendix A.

Samples of subsurface soils were obtained from the borings as drilling progressed. Samples were obtained from the borings by driving either a 2-inch inside diameter Modified California tube sampler or a 1-3/8-inch inside diameter Standard Penetration split-spoon sampler up to a depth of 18 inches into the underlying soil with a 140-pound hydraulic hammer falling 30 inches, or bulk samples of the drilling spoils for R-value testing. The number of blows required to drive the sampler was recorded for each 6-inch penetration interval, and the number of blows required to drive the sampler the last 12 inches, is shown as blows per foot on the boring logs at the approximate sample depth. The blowcounts noted on our boring logs are field measured blowcounts and have not been corrected for energy efficiency or other parameters. The borings were backfilled with drilling spoils. The approximate locations of the borings are shown on Plates 2a and 2b. These locations were mapped using Global Positioning System (GPS) equipment, and are estimated to be accurate to approximately 20 horizontal feet.

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2.3 LABORATORY TESTING

Soil samples were obtained from the exploratory borings at selected depths. The samples were returned to our laboratory for further evaluation. Laboratory tests were performed on selected soil samples to evaluate the natural moisture content, in-place density, plasticity (Atterberg Limits), particle size analysis, direct shear, and resistance value (R-value) testing,. Most of the laboratory test results are presented on the individual boring logs. The results of the Atterberg Limits test is shown on Plate B-1, the particle size analysis test results are shown on Plates B-2and B-3, the direct shear test results are shown on Plate B-4, and the R-value test results are shown on Plates B-5 through B-8.

In addition, four (4) samples were sent to CERCO Analytical for corrosion testing. The results of the corrosivity analysis are presented in Appendix C.

2.4 SUBSURFACE CONDITIONS

The borings were drilled in undeveloped areas of the open lots along the project site. Borings were drilled adjacent to paved roadways and unpaved trails. Soils encountered across the CCCVC project site consisted of various shades of brown to gray, moist, non-plastic, poorly graded sand with silt, sand with silt, silty sand, and sandy silt to the maximum depth of exploration of about 50 feet below existing grade. Coarse grained soils were typically loose to very dense. Fine grained soils were typically hard in consistency.

Groundwater was not encountered in any of our borings drilled for this investigation to a maximum depth of about 50 feet below existing grade. It must be noted that seasonal fluctuations in the groundwater level may occur due to variations in rainfall, temperature, groundwater withdrawal, and possibly other factors that were not evident at the time of our investigation.

The above is a general description of the subsurface conditions encountered in our exploratory borings at the project site. The table below presents a summary of the borings and near-surface soils encountered. Borings B-1, B-4, B-5, B-7 and B-8 are applicable to the State Cemetery Site portion of the project. Additional information is

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provided on the Logs of Borings in Appendix A. Soil and groundwater conditions can deviate from those conditions encountered at the boring locations. Should this be revealed during construction, Kleinfelder should be notified immediately for possible revisions to the recommendation that follow.

Boring Subgrade Summary
California Central Coast Veterans Cemetery

Boring Number	Section	Location		Soil Type	R-Value*
		Latitude (Degrees North)	Longitude (Degrees West)		
B-1	Parker Flats Cutoff, Parker Flats Road & State Cemetery	36.637096	121.797791	Dark Yellow Brown SILTY SAND	(59)
B-2	Parker Flats Cutoff	36.634396	121.795824	Dark Brown SILTY SAND	(59)
B-3	Parker Flats Road	36.637805	121.794197	Dark Brown SILTY SAND	(59)
B-4	Parker Flats Cutoff & State Cemetery	36.633369	121.794166	Brown SILTY SAND	(61)
B-5	State Cemetery	36.637008	121.791745	Light Brown SILTY SAND	(61)
B-6	Parker Flats Cutoff & Eastside Road	36.629672	121.791446	Dark Brown SILTY SAND	(59)
B-7	State Cemetery	36.631802	121.790940	Poorly Graded SAND with SILT & Dark Brown SILTY SAND	(59)
B-8	Eastside Road & State Cemetery	36.636002	121.789899	Light Brown SILTY SAND	61
B-9	Parker Flats Road & Eastside Road	36.638779	121.790244	Red Brown SILTY SAND	(62)
B-10	Eastside Road	36.645885	121.780925	Light Brown SILTY SAND	66
B-11	Eastside Road	36.643789	121.783929	Red Brown SILTY SAND	(62)
B-12	Eastside Road	36.647929	121.780132	Light Brown SILTY SAND	(66)
B-13	Eastside Road	36.648597	121.773811	Red Brown SILTY SAND	(62)
B-14	Eastside Road	36.648691	121.769403	Gray Brown SILTY SAND	(66)
B-15	Eastside Road	36.650387	121.764515	Red Brown SILTY SAND	62
B-16	Eastside Road	36.652184	121.762333	Gray Brown SILTY SAND	(66)
B-17	Eastside Road	36.653911	121.760826	Gray Brown SILTY SAND	(66)
B-18	Eastside Road	36.655410	121.758021	Very Dark Brown & Red Brown SILTY SAND	(59)
B-19	Eastside Road	36.655478	121.754059	Dark Brown SILTY SAND	59
B-20	Eastside Road	36.655473	121.750100	Very Dark Brown SILTY SAND	(59)
B-21	Eastside Road	36.655407	121.746003	Dark Brown SILTY SAND	(59)

*R-Values in parenthesis are based on comparison with samples from Borings B-8, B-10, B-15 and B-19

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3. PERCOLATION TESTING

The approximate locations of the percolation test holes are shown on the Site Plans, Plates 2a and 2b. The percolation test holes were drilled to a depth of approximately 5 feet below the existing ground surface, except for percolation test holes P-1 and P-2 which were hand excavated to a depth of 12 inches below the existing ground surface. Hole depths and diameters at the time of the percolation testing are presented on the table below.

Immediately after drilling the percolation test holes, Kleinfelder installed a 3-inch diameter perforated drainpipe into the holes and backfilled the annular space with ¾ inch drain rock, except for percolation test holes P-1 and P-2 which were fitted with wooden stakes and a drain rock bedding to support rulers to measure the water depths, and percolation test hole P-8 which was fitted with a 2-inch diameter perforated drainpipe and drain rock. The percolation test holes were pre-saturated the day prior to our scheduled percolation tests. The percolation test holes were filled with water to grade when presoaked.

Percolation testing was performed on August 13, 24, and 25, 2010. A 10 minute test interval was used. The adjusted percolation test rates ranged from about 33 inches per hour to 0.7 inches per hour across the State Cemetery site and three roadway corridors. On the State Cemetery site itself, the adjusted percolation test rates ranged from about 13.6 inches per hour to 7.5 inches per hour. The table below provides a summary of the percolation test results. Percolation test holes P-1 and P-2 are applicable to the State Cemetery Site portion of the project. A record of the field measured percolation test results is located in Appendix D. The values presented in Appendix D are raw rates, uncorrected for rock, pipe and hole size. The table below presents a summary of the percolation test results with the raw and adjusted rates. The percolation tests were performed for evaluation of the storm water retention/infiltration features and should not be used for septic systems, which would require the holes to be drilled in the leach field areas under the direction of the Monterey County Environmental Heath Department. The drain pipes and stakes were removed from the percolation test holes, and the holes were backfilled with drain rock and spoils upon completion of percolation testing. Our

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scope of work was limited to field percolation testing and did not include design of the storm water retention/infiltration system.

Percolation Test Summary
California Central Coast Veterans Cemetery

Hole No.	Section	Location Latitude (Degrees North)	Location Longitude (Degrees West)	Soil Type	Hole Depth (feet)	Hole Dia. (inches)	Perc. Rate min/inch	Adjusted Perc. Rate min/inch	Adjusted Perc. Rate inch/hour
P-1	Parker Flats Cutoff & State Cemetery	36.635754	121.796814	(SM-ML)	1.0	12	4.4	4.4	13.6
P-2	Parker Flats Cutoff & State Cemetery	36.634605	121.795161	(SM-ML)	1.0	12	8.0	8.0	7.5
P-3	Eastside Road	36.632695	121.789212	(SM-ML)	5.0	8	20.0	45.3	1.3
P-4	Parker Flats Road	36.638698	121.791987	(SM)	5.0	8	4.4	10.0	6.0
P-5	Parker Flats Road & Eastside Road	36.639078	121.790234	(SM)	4.1	8	1.5	3.4	17.7
P-6	Eastside Road	36.645109	121.781575	(SM-ML)	5.0	8	40.0	90.6	0.7
P-7	Eastside Road	36.643813	121.783266	(SM)	1.2	8	8.0	18.1	3.3
P-8	Eastside Road	36.647597	121.777209	(SM)	5.0	4	7.3	14.2	4.2
P-9	Eastside Road	36.648571	121.767961	(SP-SM)	5.0	8	5.7	12.9	4.6
P-10	Eastside Road	36.655375	121.757958	(SM)	4.0	8	4.0	9.1	6.6
P-11	Eastside Road	36.655477	121.752598	(SM)	4.7	8	0.8	1.8	33.1
P-12	Eastside Road	36.655476	121.747415	(SM)	2.8	8	4.0	9.1	6.6

Notes: (SM) = Silty Sand
(SM-ML) = Sand with Silt
(SP-SM) = Poorly Graded Sand with Silt

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4. DISCUSSION AND CONCLUSIONS

Based upon the data collected during this investigation and the results of our engineering analysis, it is our opinion the site may be developed as proposed provided our recommendations are incorporated in the design and construction of the project. The opinions, conclusions and recommendations presented herein are based on our field and office studies, the properties of the soils encountered in our borings, and the results of our laboratory testing program. Geotechnical recommendations addressing site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade are presented in the remaining portions of this report.

4.1 LOOSE SOILS

Based on the results of our field exploration and laboratory testing, the near surface soils in portions of the proposed State Cemetery are loose in their current condition and could compress under the new building loads. These near surface soils should be excavated and recompacted as engineered fill to be suitable for support of structures sensitive to settlement, such as buildings. In addition, the on-site sandy soils consist of sands with little or no cohesion which are prone to sudden collapse in vertical cut areas. This could present excavation difficulties for in-ground burial areas. Excavations extending into the on-site granular soils will require substantial shoring to protect personnel and to provide temporary stability. Recommendations for excavations, subgrade preparation and engineered fill construction are presented in the section on "Earthwork," herein.

4.2 SETTLEMENT

Provided the foundations are designed and constructed in accordance with our recommendations, we estimate that total post-construction settlements will be less than about 1 inch, and post construction differential settlements will be less than about ½ inch. Dynamic compaction settlements would be in addition to the above immediate settlements and are discussed in the section on, "Liquefaction and Seismic Settlement," below.

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4.3 LIQUEFACTION AND SEISMIC SETTLEMENT

Soil liquefaction is a phenomenon in which saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure during cyclic loading such as that induced by earthquakes. The primary factors affecting the liquefaction potential of a soil deposit include: 1) intensity and duration of earthquake shaking; 2) soil type and relative density; 3) overburden pressures; and 4) depth to groundwater. Soils most susceptible to liquefaction are clean, loose, fine-grained sands, and silts that are saturated and uniformly graded. Silty sands have also been proven to be susceptible to liquefaction. Groundwater is located at least 50 feet below existing grade at the site and deeper soils were typically dense to very dense, therefore, the potential for liquefaction is considered to be low.

Dynamic compaction is the densification of granular soils as the result of earthquake shaking. This generally occurs in loose to medium dense sand above groundwater. The potential impact of dynamic compaction is settlement of the ground surface. We evaluated the potential for dynamic compaction of the sandy soils located above the groundwater elevation in the borings drilled for this study. Based on our analysis, we estimate that total and differential ground settlement as a result of dynamic compaction would be less than ½ inch.

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5. RECOMMENDATIONS

We recommend that Kleinfelder be retained to provide observation and testing services during site earthwork and foundation construction. This will allow us the opportunity to compare conditions exposed during construction with those inferred in our investigation and, if necessary, to expedite supplemental recommendations if warranted by the exposed subsurface conditions. We also recommend that Kleinfelder be retained to review your final foundation and grading plans and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings prior to the start of construction. Geotechnical recommendations addressing site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade are presented herein.

5.1 EARTHWORK

5.1.1 Site Clearing and Stripping

Prior to the start of construction, obstacles and deleterious material should be removed from the construction areas. The existing asphalt concrete pavement if pulverized into fragments no larger than 2 inches in maximum size may be mixed with the underlying aggregate base and the mixture may be used as fill. Active utilities to be reused should be carefully located and protected during site clearing and construction.

All abandoned or underground utilities designated for removal, any concrete slabs-on-grade, foundations, and other obstacles and deleterious material encountered should be removed from the construction areas. Excavations from removal of foundations, underground utilities or other below ground obstructions should be cleaned of loose soil and deleterious material, and backfilled with compacted engineered fill compacted to the requirements given in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. All clearing and backfill work should be performed under the observation of a representative from Kleinfelder.

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Surface vegetation present at the time of construction should be stripped together with the organic-laden topsoil. Soils containing more than 3 percent of organic matter by weight or excessive visible organics as determined by a representative of Kleinfelder should be considered organic. The actual stripping depth should be determined at the time of construction. For planning purposes, the average stripping depth may be assumed to be approximately 3 inches in vegetated areas. Stripped material should be removed from the site or stockpiled for use in landscaping areas if approved by the project landscape architect.

5.1.2 Over-excavations

To provide adequate support for the proposed buildings and above-ground improvements, any undocumented fill and loose soils under the proposed improvements should be removed, the bottom of the excavation prepared as recommended in the section on "Subgrade Preparation," and then the excavation backfilled to finished subgrade elevation with engineered fill. Over-excavations in building and above-ground improvement areas should extend a minimum of 1 footing width below the bottoms of the proposed foundations up to a maximum of 5 feet deep under the footings, and should extend at least 5 feet horizontally beyond building perimeters (not including the construction excavation slopes, which would be additional width) and adjacent sidewalks. Excavations in pavement and in sidewalk areas not adjacent to the building pads should extend a minimum of 1 foot below the bottoms of the pavement sections or sidewalk subgrade elevation, and should extend at least 2 feet horizontally beyond the back of curb, or edge of pavements, and sidewalks unless obstructed by improvements to remain. In addition, within 5 feet horizontally of infiltration features, the bottom of the excavation should also be at least as deep as the bottom of the drain rock layer at the bottom of the infiltration feature.

After excavation is completed, the exposed subgrade should be evaluated by Kleinfelder for competency. Where competent soils are exposed, the subgrade may be prepared as recommended in the section on "Subgrade Preparation," and backfilled with engineered fill, as discussed previously. If soil conditions are soft at the bottom of the excavation, the soft material should be removed and replaced with backfill consisting of engineered fill. The overexcavation may then be backfilled with

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engineered fill. The backfill should be compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E.

5.1.3 Subgrade Preparation

Upon completion of site clearing and excavations, the exposed soil subgrades should be properly prepared prior to placement of fill or other construction activities. In areas to receive engineered fill or concrete slabs-on-grade, the upper 12 inches of soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. For the proposed buildings, the areas to be processed should include the entire building pads, extending no less than 5 feet beyond the limits of the buildings and any adjoining sidewalk areas. In exterior walkways not adjacent to building areas, and in pavement areas, subgrade preparation should extend laterally no less than 2 feet beyond the back of curb, or edge of pavements, and sidewalks unless obstructed by improvements to remain. After the subgrades are properly prepared, the areas may be raised to design grades by placement of engineered fill.

All loose or wet subgrade soil encountered during construction should be stabilized prior to placement of new fill and further construction. The method of stabilization should be evaluated by a representative of Kleinfelder at the time of construction depending on the exposed conditions. Moisture conditioning of subgrade and fill soils will consist of adding water if the soils are too dry and allowing the soils to dry if the soils are too wet.

5.1.4 Material for Fill

Inorganic on-site or imported soils approved by a representative of Kleinfelder may be used as engineered fill. Inorganic soils may be defined as soils containing less than 3 percent of organic matter by weight or free of visible organic matter deemed excessive by a representative of Kleinfelder. In general, material for use as engineered fill should be free of deleterious or oversized material, debris, or hazardous substances; should not contain rocks or lumps larger than 3 inches in greatest dimension; should not contain more than 15 percent of material larger than 1½ inches; and should contain sufficient fines (8% to 40% fines) to allow excavations to be made without caving.

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Imported soils should be "non-expansive" and meet the above requirements, should be predominantly granular, and should have a plasticity index of 15 or less.

All proposed import fill must be approved by the project geotechnical engineer prior to delivery to the site. At least five (5) working days prior to importing to the site, a representative sample of the proposed import fill should be delivered to our laboratory for evaluation and possible testing.

5.1.5 Fill Placement and Compaction

Fill materials should be placed and compacted in horizontal lifts, each not exceeding 8 inches in uncompacted thickness. Compaction of fill should be performed by mechanical means only. Due to equipment limitations, thinner lifts may be necessary to achieve the recommended level of compaction. Relative compaction or compaction is defined as the in-place dry density of the compacted soil divided by the laboratory-compacted maximum dry density as determined by ASTM Test Method D 1557 (latest edition), expressed as a percentage. A summary of our compaction recommendations is included in Appendix E.

Permanent cut slopes should be constructed no steeper than 3:1 (horizontal:vertical).

Permanent fill slopes should be fully keyed and benched into the back slope. Fill slopes should be keyed at least 8 feet width and 2 feet deep below adjacent grade. The bottom of the keyway should be sloped at least 2 percent downwards back into the slope. Benches should be level or slope back into the back slope and should be no more than 3 feet in vertical separation and wide enough to allow compaction equipment. All fill slopes to be compacted to 95 percent relative compaction full height. Compacted engineered fill for slopes shall have a minimum remolded cohesion of 100 pounds per square foot and a minimum remolded phi angle of 32 degrees. Fill slopes that are at least 3:1 (Horizontal: Vertical) or flatter may be constructed up to 35 feet in height. If higher slopes are planned, Kleinfelder should be consulted for additional recommendations. Fill slopes that are up to 2:1 (Horizontal: Vertical) may be constructed up to 20 feet in height in building areas and up to 30 feet in height for road embankments. If 2:1 (Horizontal: Vertical) fill slopes are planned that are higher than this, they will need to be reinforced with Mirafi 2XT geogrid or equivalent extending at

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least 25 feet back into the embankment, starting at the toe of the embankment and at a minimum of 4 feet vertical spacing for the full embankment height. This is due to the physical characteristics of the on-site sandy soils. Alternatively, consideration may be given to the use of import fill materials with better characteristics, or treatment of the on-site soils with cement to improve the soil's strength. Some surficial slumping will occur; proper erosion control and timely maintenance will need to be mandatory. Setback distances are essential and are generally based on slope height and the sensitivity of the structure (building or road). Kleinfelder should perform a detailed review, if the proximity of the structure (from the improvement to the top of the slope) is less than the slope height.

Maximum Recommended Embankment Fill Heights
California Central Coast Veterans Cemetery

Slope (Horizontal :Vertical)	Reinforcement	Building Areas	Roadway Embankments
3:1	Unreinforced	Up to 35 feet	Up to 35 feet
2:1	Unreinforced	Up to 20 feet	Up to 30 feet
	Reinforced	Over 20 feet and up to 35 feet	Over 30 feet and up to 35 feet

1) All fill slopes to be compacted to 95 percent relative compaction full height. Compacted engineered fill for slopes shall have a minimum remolded cohesion of 100 pounds per square foot and a minimum remolded phi angle of 32 degrees. Some surficial slumping will occur and periodic maintenance will be required.
2) Reinforcement to consist of Mirafi 2XT geogrid or equivalent extending at least 25 feet back into the embankment, starting at the toe of the embankment and at a minimum of 4 feet vertical spacing for the full embankment height.

Grading operations during the wet season or in areas where the soils are saturated may require provisions for drying prior to compaction. If the project necessitates fill placement and compaction in wet conditions, Kleinfelder can provide alternatives for drying the soil. Conversely, additional moisture may be required during the dry months. Water trucks should be available in sufficient number to provide adequate watering during subgrade preparation, fill placement and compaction.

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5.1.6 Excavations and Utility Trench Backfill

Excavations for utility trenches and foundations, as well as excavations for in-ground burial, should be readily made with either a conventional backhoe or excavator. The on-site soil consists of sands with little or no cohesion which are prone to sudden collapse. Excavations extending into the on-site granular soils will require substantial shoring to protect personnel and to provide temporary stability. Alternatively, temporary trenches may be constructed using sloping trench sidewalls. Sloping trench sidewalls should be constructed no steeper than 1.5:1 (horizontal: vertical). In addition, excavations should be located so that no structures are located above a plane project 1.5 horizontal to 1 vertical upward from any point in an excavation, regardless of whether it is shored or unshored. Trench stability should be evaluated prior to occupation by construction personnel. All trenches should be constructed in accordance with OSHA and Cal-OSHA Safety Standards. Safety in and around utility trenches is the responsibility of the underground contractors.

Since groundwater is at least 50 feet below existing grade, we do not anticipate the need for extensive dewatering of excavations. Wet weather can impact construction, especially where on-site soils have been compacted or where imported material is used. Please see the section on "Wet Weather Construction." If different soil or groundwater conditions are encountered during construction than those encountered during our subsurface exploration, Kleinfelder should be contacted to provide additional recommendations.

Utility trench pipe zone backfill, extending from the bottom of the trench to at least 1 foot above the top of pipe, should consist of free-draining sand unless lean concrete is specified. This may consist of on-site poorly graded sand with silt soils, provided the owner is willing to accept a slightly higher than standard silt content for the bedding and shading sand. Above the pipe zone, underground utility trenches should be backfilled with compacted engineered fill. Either approved on-site soil or imported sand may be used for backfilling utility trenches. Trench backfill should be capped with at least 12 inches of compacted, on-site soil similar to that of the adjoining subgrade. A summary of our compaction recommendations is included in Appendix E. Compaction should be performed by mechanical means only. Water-jetting or flooding to attain compaction of backfill should not be permitted.

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5.1.7 Surface Drainage

Final site grading should provide surface drainage away from existing and new buildings, concrete slabs-on-grade and pavements to reduce the percolation of water into the underlying soils. Ponding of surface water should not be allowed adjacent to structures and on exterior flatwork and pavements. The ground surface should be sloped away from the buildings a minimum of 4 percent in landscaped areas and 2 percent in paved areas. Rainwater collected on the roofs of buildings should be transported through gutters, downspouts and closed pipes, which discharge on pavements or lead directly to the site storm sewer system. If discharging onto the pavement, safety of pedestrian traffic should be considered.

On-site soils are highly erodible and should be planted with erosion resistant vegetation as soon as practicable. The erosion control vegetation should be planted early enough before the winter rainy season to allow the vegetation to take root before the rainy season. Ground cover will require periodic maintenance and a maintenance schedule should be developed. Specific details regarding erosion control should be determined by the Civil Engineer.

5.1.8 Seepage Control

We do not anticipate any significant seepage problems due to the porous sandy nature of the on-site soils, provided water is not allowed to pond near proposed pavements, foundations and slabs-on-grade. Features that do not impound water for extended periods of time, such as drainage swales or where water sheets over embankments do not require setbacks from road areas provided they drain away from the pavements and do not trap water adjacent to the pavements. However, water erosion of such features will need to be addressed. We also understand that several storm water retention/infiltration features are planned for the project. These features will act as impoundment areas for on-site storm water and water will concentrate in these areas for extended time periods. We recommend that these features be located to minimize the impact of the storm water on the nearby pavements and foundations. To minimize impact on pavements, we recommend infiltration features be located with the pavement soil subgrade elevation (i.e. bottom of the aggregate base layer, or the bottom of the asphalt concrete layer where aggregate base is not used) located at least 2 feet above

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a plane projected 5:1 (horizontal: vertical) downward from the highest retained water elevation (design water surface) of the adjacent impoundment area. Assuming level ground we anticipate that this would result in off sets of about 10 to 15 feet from the pavements, or closer where the bottoms of the features are excavated or lowered below the adjacent grade. To minimize impact on foundations, we recommend infiltration features be located so that the bottoms of the footings are at least 1 footing width or at least 2 feet, whichever is greater length, above a plane projected 5:1 (horizontal:vertical) downward from the highest retained water elevation (design water surface) of the adjacent impoundment area.

In areas of the site where infiltration features must be located adjacent to areas of extended flat pavements, such as in parking areas with bioswales, consideration should be given to deepening curbs at the edges of the infiltration features to the bottom of the drain rock layer. This will reduce the potential for rotation of the curb at the edge of the feature due to infiltrating water softening the supporting soils.

5.1.9 Wet Weather Construction

If site grading and construction is to be performed during or shortly after the winter rainy months, the owner and contractors should be fully aware of the potential impact of wet weather. Rainstorms can cause delay to construction and damage to previously completed work, such as saturating a compacted pad or subgrade, or flooding an excavation. Runoff can also cause erosion.

Earthwork during rainy months will require extra effort and caution by the contractors. The soils may be too wet to compact which will require processing to dry the soil. The grading contractor should be responsible to protect his work to avoid damage by rainstorms, including smooth rolling to seal off a pad or subgrade surface to facilitate drainage and to reduce rain damage, and covering the trenches with plastic sheeting. Ponded water should be pumped out immediately. Construction in wet weather, if a possibility for project construction, should be addressed in the project construction bid documents and/or specifications. We recommend the grading contractor submit a wet weather construction plan outlining procedures they will employ to protect their work and to reduce damage to their work by rainstorms.

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5.1.10 Construction Observation

Variations in soil types and conditions are possible and may be encountered during construction. In order to permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, we recommend that Kleinfelder be retained to provide observation and testing services during site earthwork and foundation construction. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to expedite supplemental recommendations if warranted by the exposed conditions. All earthwork should be performed in accordance with the recommendations presented in this report, or as recommended by Kleinfelder during construction. Kleinfelder should be notified at least two working days prior to the start of construction and prior to when observation and testing services are needed.

We also recommend that Kleinfelder be retained to review your final foundation and grading plans and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings prior to the start of construction.

5.2 STRUCTURE FOUNDATIONS

5.2.1 Spread Footings

The proposed buildings may be supported on continuous and/or isolated spread footings bearing on engineered fill prepared as discussed in the section on "Over-excavations." Footings should be embedded at least 18 inches below pad grade or lowest adjacent finished grade, whichever provides a deeper embedment. Footings may be designed for an allowable bearing pressure of 2,500 pounds per square foot due to dead plus live loads, with a one-third increase when including transient loads such as seismic or wind. Continuous footings should have a minimum width of 12 inches. Isolated spread footings should have a minimum width of 24 inches.

To maintain the desired support, footing foundations adjacent to utility trenches or other existing footings should be deepened during the design of the project so that their bearing surfaces are below an imaginary plane having an inclination of 1.5 horizontal to

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1 vertical, extending upward from the bottom edge of the adjacent footings or utility trenches.

It is important that foundation excavations not be allowed to dry before placement of concrete. The excavations should be thoroughly moisture-conditioned prior to placement of concrete. It is also important that the base of excavations not be allowed to become excessively wet, which may result in soft soils. Water should not be allowed to pond in the bottom of foundation excavations. Areas which become water damaged should be over-excavated to a firm base. The foundation excavations should be monitored by a representative of Kleinfelder for compliance with appropriate moisture control and to confirm that the soils at the bearing level are similar to those contemplated at the time this report was prepared.

5.2.2 Lateral Load Resistance

Lateral loads may be resisted by a combination of friction between the foundation bottom and the supporting engineered fill subgrade and passive resistance of the engineered fill acting against the vertical faces of the foundations. An allowable coefficient of friction of 0.45 between the foundation and supporting subgrade may be used. For calculating passive resistance, an allowable equivalent fluid weight of 400 pounds per cubic foot acting against the footings may be used. The passive pressure can be assumed to act starting at the top of the lowest adjacent grade in paved areas and at a depth of 1 foot below grade in unpaved areas. It should be noted that the lateral load resistance values discussed above are only applicable where the concrete for footings is either placed directly against undisturbed engineered fill soils or the voids created from the use of forming are backfilled with properly compacted soil.

5.2.3 Drilled Pier Foundations

Drilled, cast-in-place, reinforced concrete piers may be used to support awnings, light standards, or other light weight exterior structures. Drilled piers may be designed to derive their vertical supporting capacity by end bearing. For dead plus live loading, a net allowable end bearing capacity of 5,000 pounds per square foot due to dead plus live loads may be used. The allowable end bearing capacity may be increased by one-third by the structural engineer when considering transient loads such as seismic or

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wind loads. Drilled piers should be at least 12 inches in diameter and at least 10 feet in depth below lowest adjacent finish grade to penetrate the loose near-surface soils. Drilled piers should be located no closer together than three pier diameters, center-to-center.

For calculation of resistance to lateral loads using the balance of force and moment method, an allowable lateral passive resistance of 400 pcf effective fluid weight acting over 1.5 pier diameters may be used. The structural engineer should determine the actual embedded depth based on the lateral loads transmitted to the foundations.

5.3 SEISMIC CONSIDERATIONS - 2007 CBC

The site is located in the seismically active Monterey Bay area, but not within any of the Alquist-Priolo Earthquake Fault Zones established by the Alquist-Priolo Earthquake Fault Zoning Act of 1972. Therefore, the risk of ground rupture occurring across the site is low.

The known active faults that are close to the site include: the Rinconada fault, which is located approximately 5 kilometers (km) northeast of the site; the Monterey Bay-Tularcitos fault which is located approximately 8 km southwest of the site; the San Gregorio-Palo Colorado (Sur Region) fault which is located approximately 22 km southwest of the site; the Zayante-Vergeles fault which is located approximately 25½ km northeast of the site; and the San Andreas fault (Pajaro), which is located approximately 32 km northeast of the site. A major seismic event on these faults could cause severe ground shaking at the site. Some degree of structural damage due to stronger seismic shaking should be expected, but the risk can be reduced through adherence to seismic design codes. As a result, structures to be constructed on the site should be designed in accordance with applicable seismic provisions contained in the 2007 California Building Code (CBC).

The Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (S_S and S_1) were estimated using Section 1613.5 of 2007 CBC and the ground motion parameter calculator developed by the U.S. Geological Survey. The mapped acceleration values and associated soil amplification

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factors (F_a and F_v) based on 2007 CBC are presented in the table below. Corresponding design spectral accelerations (S_{DS} and S_{D1}) are also presented in the table below.

SEISMIC PARAMETERS BASED ON 2007 CBC – SITE CLASS D

Parameter	Value	2007 CBC Reference
S_S	1.283g	Section 1613.5.1
S_1	0.557g	Section 1613.5.1
F_a	1.0	Table 1613.5.3(1)
F_v	1.5	Table 1613.5.3(2)
S_{MS}	1.283g	Section 1613.5.3
S_{M1}	0.835	Section 1613.5.3
S_{DS}	0.855	Section 1613.5.4
S_{D1}	0.577	Section 1613.5.4

According to Section 1802.2.7 of 2007 CBC, PGA can be estimated using a site-specific study. Alternately, PGA can be taken as $S_{DS}/2.5$, where S_{DS} is determined using Section 1613. Therefore, a PGA of 0.34g can be used.

5.4 SLABS-ON-GRADE

Concrete slabs-on-grade for this project will include the building floor slabs and exterior flatwork. New concrete slabs-on-grade should be supported on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation."

5.4.1 Building Floor Slabs

In cases where the floors will be surfaced by moisture sensitive coverings, concrete floors should be supported on at least 6 inches of angular gravel or crushed rock to enhance subgrade support for the slab. The capillary break material should be 3/4-inch maximum size with no more than 10 percent by weight passing the #4 sieve. Slabs-on-grade supported on at least 6 inches of angular gravel or crushed rock may be designed using a modulus of subgrade reaction (K_{V1}) of 200 pounds per cubic inch. A

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vapor retarder should be placed between the bottom of the slab and capillary break material to reduce the potential impact of future introduced moisture.

Alternatively, in cases where the floors will not be surfaced by moisture sensitive coverings, the concrete floors may be supported directly on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation." Slabs-on-grade supported as described above may be designed using a modulus of subgrade reaction (K_{V1}) of 170 pounds per cubic inch. A vapor retarder should be placed between the bottom of the slab and subgrade soils to reduce the potential impact of future introduced moisture.

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this subsurface moisture will collect. To reduce the impact of the subsurface moisture and potential impact of future introduced moisture (such as landscape irrigation or precipitation) the current industry standard is to place a vapor retarder on the compacted crushed rock layer. This membrane typically consists of visqueen or polyvinyl plastic sheeting at least 10 mil in thickness. It should be noted that although vapor barrier systems are currently the industry standard, this system may not be completely effective in preventing floor slab moisture problems. These systems typically will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels be appropriate to inhibit mold growth. The design and construction of such systems are totally dependent on the proposed use and design of the proposed building and all elements of building design and function should be considered in the slab-on-grade floor design. Building design and construction have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may produce excessive moisture in a building and affect indoor air quality.

Various factors such as surface grades, adjacent planters, the quality of slab concrete and the hydraulic conductivity of the on-site soils affect slab moisture and can control future performance. In many cases, floor moisture problems are the result of either improper curing of floors slabs or improper application of flooring adhesives. We recommend contacting a flooring consultant experienced in the area of concrete slab on-grade floors for specific recommendations regarding your proposed flooring applications.

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Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) manual.

It is emphasized that we are not floor moisture proofing experts. We make no guarantee nor provide any assurance that use of capillary break/vapor retarder system will reduce concrete slab-on-grade floor moisture penetration to any specific rate or level, particularly those required by floor covering manufacturers. The builder and designers should consider all available measures for floor slab moisture protection.

5.4.2 Exterior Concrete Slabs-On-Grade

New exterior concrete slabs-on-grade may be supported directly on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation." Slabs-on-grade supported as described above may be designed using a modulus of subgrade reaction (K_{V1}) of 170 pounds per cubic inch. Exterior concrete slabs-on-grade exposed to more than occasional light vehicle traffic should be designed as rigid pavements.

5.5 PAVEMENT RECOMMENDATIONS

5.5.1 New Flexible Pavements

Flexible pavements for this project are expected to consist of site access roads and parking areas for the State Cemetery Site. Resistance (R)-value tests were performed on four (4) bulk samples of the near surface soil collected from the CCCVC site during our field investigation. The results of our laboratory testing indicate R-values of between 59 and 66. A design R-value of 60 was used to develop the recommended pavement sections presented in the Table below. Note that Caltrans "Highway Design Manual" typically limits the R-Value to 50 (Section 614.3 "California R-Value"). Based on our experience and other geotechnical investigations in the site vicinity, we recommend using a design R-Value of 60. The design is based on the Caltrans design

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method, which includes a factor of safety applied to the asphalt thickness. Based on our experience with similar projects, we have provided a typical range of Traffic Indices for evaluation. Based on our experience with similar projects, we suggest using a Traffic Index (TI) of at least 4.5 for automobile parking areas, a TI of at least 5.5 for automobile and light truck traffic lanes, and a TI of at least 6.5 for garbage truck areas. However, the design traffic index should be determined by the project Civil Engineer. For heavy vehicle areas, a minimum asphalt concrete section of 3 inches is recommended.

Flexible Pavement Sections
Asphalt Concrete Pavement Design
State Cemetery Site
California Central Coast Veterans Cemetery
R-Value = 60

Traffic Index (TI)	Alternative 1 (Full Depth Asphalt Concrete)	Alternative 2 (Asphalt Concrete and Class 2 Aggregate Base)	
	AC (inches)	AC (inches)	AB (inches)
4.5	3.5	2.5	4.0
5.0	4.0	2.5	4.0
5.5	4.5	3.0	4.0
6.0	5.0	3.0	4.0
6.5	6.0	3.5	4.0
7.0	6.0	4.0	4.0
7.5	7.0	4.5	4.0
8.0	7.5	4.5	4.0
8.5	8.0	5.0	4.0
9.0	8.5	5.5	4.0
9.5	9.5	6.0	4.0
10.0	10.0	6.0	4.0
10.5	11.0	6.5	4.5
11.0	11.5	7.0	4.5
11.5	12.0	7.5	5.0
12.0	12.5	7.5	5.5

Notes: Thicknesses shown are in inches.
AC = Type A or B Asphalt Concrete
AB = Aggregate Base (Minimum R-Value = 78)

The anticipated traffic and the alternate pavement sections presented above should be reviewed by the project civil engineer in consultation with the owner during the development of the final grading and paving plans. We have made our pavement designs based on the pavement subgrade soil consisting of existing on-site native materials consisting of silts with various amounts of sand. If site grading exposes soil other than that utilized in our analysis, we should perform additional tests to confirm or

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revise the recommended pavement sections to reflect the actual field conditions. Note that on-site aggregate base materials are expected to be reusable as aggregate base under new pavement areas. If it is desired to reuse these materials as aggregate base or subbase, these materials should be tested for suitability based on Caltrans standards for aggregate base or subbase.

The upper 12 inches of exposed subgrade soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. Compacted pavement subgrade should be non-yielding. Removal and subsequent replacement of some material (i.e., areas of excessively wet materials, unstable subgrade, or pumping soils) may be required to obtain the required compaction.

Asphalt concrete should meet the requirements for 1/2- or 3/4-inch maximum, medium Type A or Type B asphalt concrete in vehicle areas. Asphalt concrete should comply with the specifications presented in Section 39 of the Caltrans Standard Specifications, latest edition. Class 2 aggregate base materials should conform to Section 26 of the Caltrans Standard Specifications, latest edition. Class 2 aggregate base and aggregate subbase materials should be compacted to at least 95 percent relative compaction at near the optimum moisture content. Asphalt concrete should be compacted to a minimum of 96 percent of the maximum laboratory compacted (Hveem) unit weight. ASTM test procedures should be used to assess the percent relative compaction of the pavement subgrade soils, aggregate base and asphalt concrete.

Pavement surface should be sloped at a minimum of 2 percent and drainage gradients maintained to carry all surface water off the site due to the slightly porous or permeable nature of asphalt concrete. Surface water ponding should not be allowed anywhere on the site during or after construction.

5.5.2 Rigid Concrete Pavements

Rigid pavements consisting of Portland cement concrete may be considered for use along portions of the project. We understand that Portland cement concrete pavements will be limited to approaches and aprons at driveways, or limited areas of flatwork subject to vehicle traffic.

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The upper 12 inches of exposed subgrade soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. Compacted pavement subgrade should be non-yielding. Portland cement concrete pavements should be supported on a minimum of 6 inches of Class 2 aggregate base compacted to at least 95 percent relative compaction at near the optimum moisture content.

Using the results of our laboratory R-value test and the Portland Cement Association Simplified Design Procedure; we recommend the use of a minimum concrete pavement thickness of 5.5 inches in areas subjected to frequent heavy truck traffic; and 4.5 inches in areas where only light cars and pickup trucks, or infrequent truck traffic will occur. Our design is based on a modulus of subgrade reaction of 200 pci at the top of a 6-inch layer of aggregate base, with doweled joints or aggregate-interlock joints, with a concrete shoulder or curb, and a modulus of rupture for the concrete of 600 pounds per square inch. If there is no concrete shoulder or curb, the above recommended minimum concrete pavement thicknesses should each be increased by 1 inch. It should be noted that the modulus of rupture for concrete is based on flexural strength, not compressive strength, and should be specified accordingly. Concrete with a compressive strength of 3,000 psi is not expected to provide the desired flexural strength. Our experience is that the compressive strength will be on the order of 4,500 to 5,000 psi to achieve the required flexural strength. Laboratory testing to evaluate the design strength is recommended. Alternatives to this design may be considered, based on the final design of the site grading plans and more accurate traffic data.

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6. LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

The scope of services was limited to site reconnaissance and subsurface exploration by means of twenty-one (21) exploratory borings and twelve (12) percolation test holes. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on subsurface exploration including borings drilled to a maximum depth of about 50 feet, laboratory testing of soil moisture and dry density, plasticity, particle size analysis, direct shear, and resistance value (R-value) testing, and our geotechnical engineering analyses.

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Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil, rock or groundwater conditions could vary between or beyond the points explored. If soil, rock or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated structural loads, and the design depths or locations of the foundations, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

As the Geotechnical Engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project, and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify our recommendations if variations in the soil conditions are encountered. As a minimum Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications;

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- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, pavements, storm water retention, slabs-on-grade, cuts and placement of engineered fill;
- Confirm engineered fill for the structures, pavements, and other improvements is placed and compacted per the project specifications; and
- Observe foundation bearing soils to confirm conditions are as anticipated.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

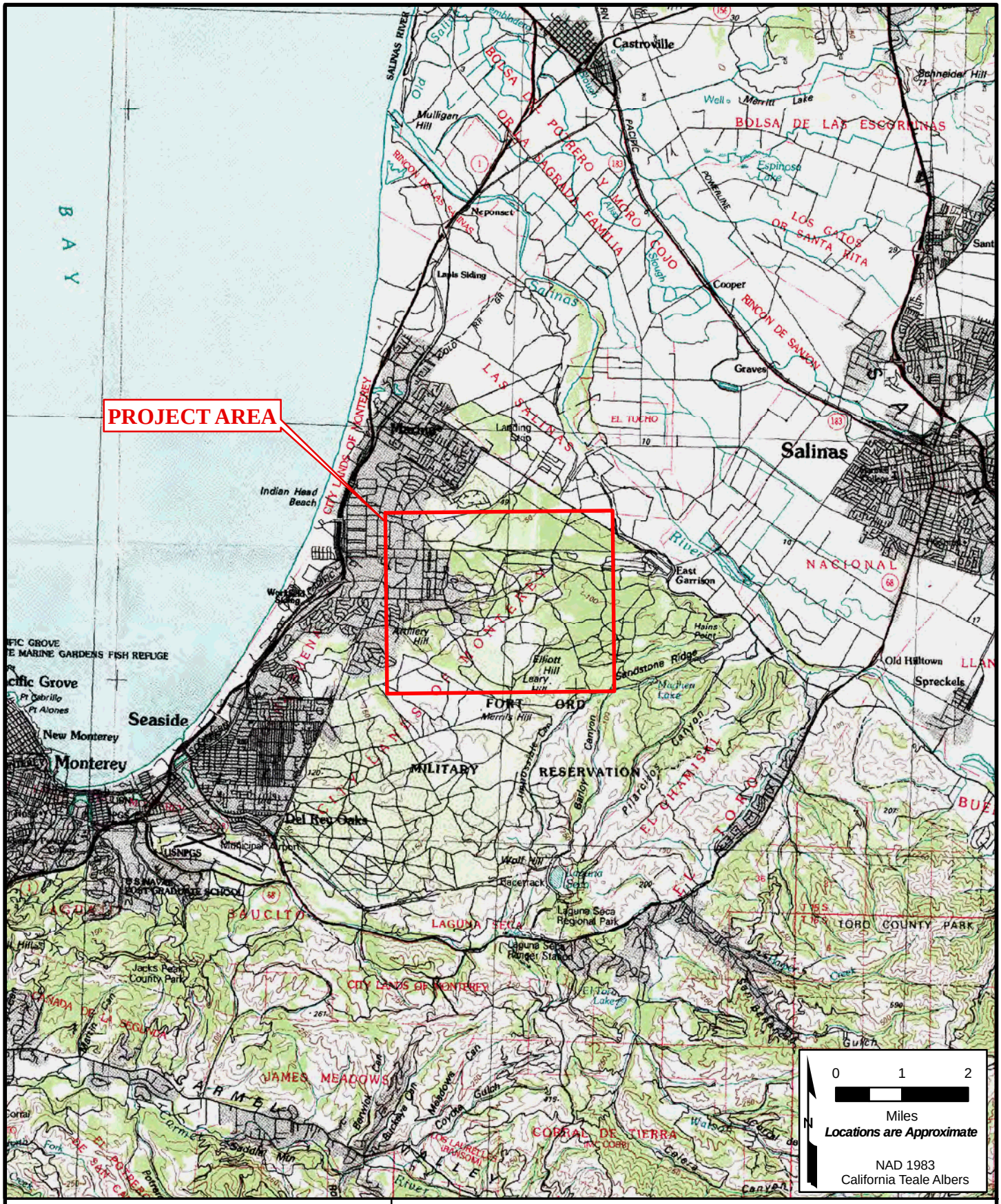
Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, cuts and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil, rock and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that

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Kleinfelder's Geotechnical Engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. Furthermore, the contractor should be prepared to handle contamination conditions if encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers.

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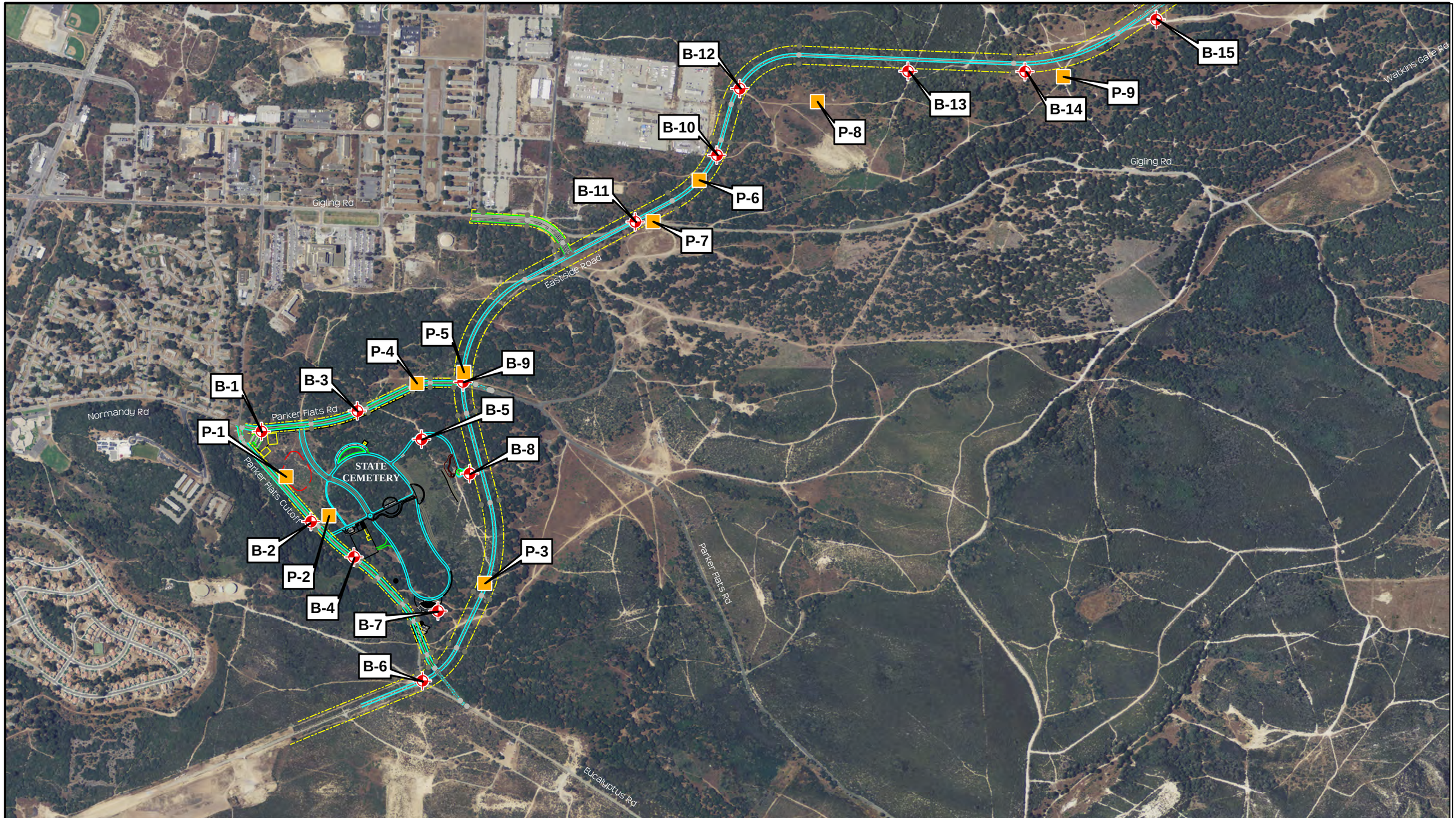
VICINITY MAP

KLEINFELDER
40 Clark Street, Unit J
Salinas, California, 93901
Ph: (831) 755-7900 Fax: (831) 755-7909

Central Coast California Veterans Cemetery
Monterey County, California

Plate
1

Drawn By: KFH	Reviewed By: RH	Date: 08/31/10	Project Number: 111946	File: E:\...\GIS\111946...\Plate1.mxd



0 500 1,000 Feet

N

Locations are Approximate

NAD 1983 StatePlane
California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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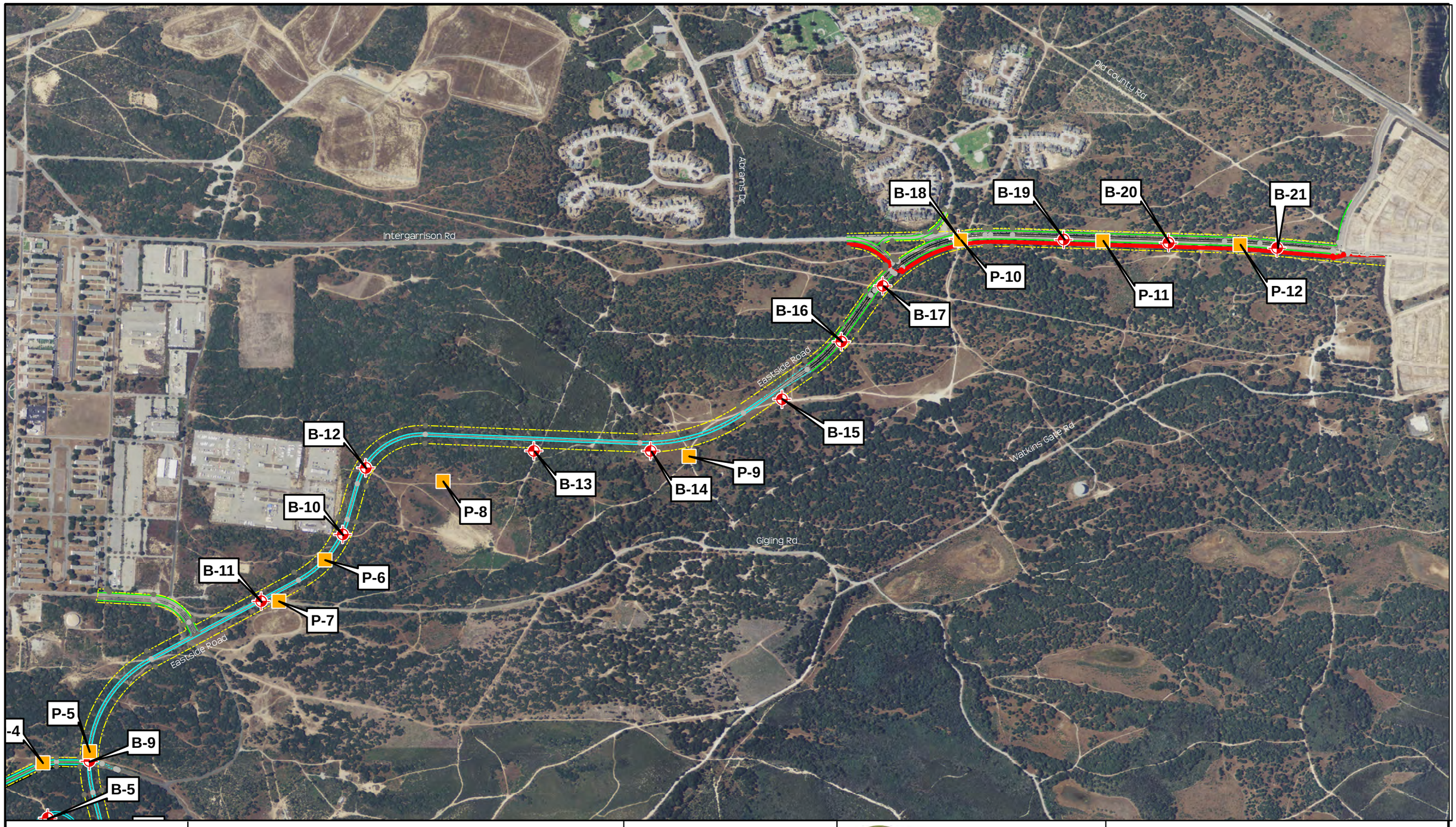
Drawn By: KFH | Checked By: RH | Date: 09/27/10

SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2a**



0 500 1,000 Feet

N

Locations are Approximate

NAD 1983 StatePlane
California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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Drawn By: KFH | Checked By: RH | Date: 09/27/10

SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

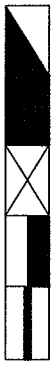
Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2b**

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW		Well-graded gravels or gravel with sand, little or no fines.
		GP		Poorly-graded gravels or gravel with sand, little or no fines.
		GM		Silty gravels, silty gravel with sand mixture.
		GC		Clayey gravels, clayey gravel with sand mixture.
	SAND AND SANDY	SW		Well-graded sands or gravelly sands, little or no fines.
		SP		Poorly-graded sands or gravelly sands, little or no fines.
		SM		Silty sand.
		SC		Clayey sand.

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS	ML		Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity.
		CL		Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL		Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS	MH		Inorganic elastic silts, micaceous or diatomaceous or silty soils.
		CH		Inorganic fat clays (high plasticity).
		OH		Organic clays of medium high to high plasticity.
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils.



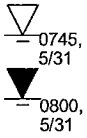
Standard Penetration Split Spoon Sampler 2.0 inch O.D., 1.4 inch I.D.

Modified California Sampler 2.5 inch O.D., 2.0 inch I.D.

Bulk Sample

California Sampler, 3.0 inch O.D., 2.5 inch I.D.

Shelby Tube 3.0 inch O.D.



Approximate water level first observed in boring. Time recorded in reference to a 24 hour clock.

Approximate water level observed in boring following drilling

PEN Pocket Penetrometer reading, in tsf

TV:Su Torvane shear strength, in ksf

LL	LIQUID LIMIT	TX	TRIAXIAL SHEAR
PI	PLASTICITY INDEX	CONSOL	CONSOLIDATION
%-#200	SIEVE ANALYSIS (#200 SCREEN)	R-Value	RESISTANCE VALUE
DS	DIRECT SHEAR	SE	SAND EQUIVALENT
C	COHESION (PSF)	EI	EXPANSION INDEX
PHI	FRICTION ANGLE	FS	FREE SWELL (U.S.B.R.)

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

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PROJECT NO. 111946/ PWGEO

BORING LOG LEGEND

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-1

9/7/2010 9:10:17 AM

Date Completed: 7/26/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 309 feet (MSL)**
0		41	104	5.6		LL=0; PI=0		**SILTY SAND (SM)** - dark yellow-brown, moist, dense, fine to medium grained sand
5		9				SA Passing #200=14%		-loose
								-red-brown
10		20		13.0				-medium dense
15		16		8.5				
20		23		12.7				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, medium dense, fine grained sand
25		31						-dense
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 1

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-2

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9/7/2010 9:12:22 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		21						**POORLY GRADED SAND WITH SILT (SP-SM)** - continued, medium dense
35		26						
40		37						-dense
45		50						-dense to very dense
		59						-very dense
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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PROJECT NO. **111946/ PWGEO**

LOG OF BORING NO. B- 1

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-2
(cont'd)

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9/7/2010 9:12:22 AM

Date Completed: 7/26/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 296 feet (MSL)**
	X							**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 2

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-3

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9/7/2010 9:12:30 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 322 feet (MSL)**
								SILTY SAND (SM) - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 3

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-4

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9/7/2010 9:12:35 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 308 feet (MSL)**
		21	99	4.0		LL=0; PI=0		**SILTY SAND (SM)** - brown, moist, medium dense, fine grained sand
5		17	110	10.7				
10		4		6.9				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, loose, fine grained sand
15		46		10.9				-dense
20		30						-medium dense to dense
25		26						-medium dense
30								

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LOG OF BORING NO. B- 4

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-5

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9/7/2010 9:12:36 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		35						**POORLY GRADED SAND WITH SILT (SP-SM)** - continued, dense
35		35						
40		32						
45		34						
		43						
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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LOG OF BORING NO. B- 4

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-5
(cont'd)

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9/7/2010 9:12:36 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 373 feet (MSL)**
								SILTY SAND (SM) - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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LOG OF BORING NO. B- 5

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-6

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9/7/2010 9:12:38 AM

Date Completed: 7/26/10

Logged By: R. Hasseler

Total Depth: Approximately 20.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 446 feet (MSL)**
0								**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								-red-brown
								-yellow-brown
10								-red-brown
15	X							-yellow-brown
20								Bottom of boring at 20 feet Groundwater not encountered Boring backfilled with cuttings
25								
30								

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LOG OF BORING NO. B- 6

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-7

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9/7/2010 9:12:40 AM

Date Completed: 7/27/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 353 feet (MSL)**
								POORLY GRADED SAND WITH SILT (SP-SM) - yellow-brown, moist, loose, fine grained sand
		8	84	4.4		direct shear c=0, ø = 24° LL=0; PI=0		**SILTY SAND (SM)** - dark brown, moist, loose, fine grained sand
5		19	95	4.3				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, medium dense, fine grained sand
						SA		
10		22				Passing -#200=50%		**SANDY SILT (ML)** - olive-brown, moist, hard, fine to medium grained sand, low plasticity silt
15		45		3.5				
20		29		8.2				
25		25		8.2				
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 7

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-8

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9/7/2010 9:12:42 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		29		12.4				**SANDY SILT (ML)** - continued
35		28						-red-brown
40		21						
45		33						
		49						
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 7

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-8
(cont'd)

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9/7/2010 9:12:42 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 15.0 ft

Drilling method: Minuteman 3.5" solid stem auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 409 feet (MSL)**
0								**SILTY SAND (SM)** - light brown, moist, fine grained sand
5								-yellow-brown
10								
15	X					R-Value = 61		
								Bottom of boring at 15 feet Groundwater not encountered Boring backfilled with cuttings
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 8

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-9

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9/7/2010 9:12:44 AM

Date Completed: 7/27/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 321 feet (MSL)**
						LL=0; PI=0		**SILTY SAND (SM)** - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 9

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-10

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9/7/2010 9:12:45 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 353 feet (MSL)**
						R-Value = 66		**SILTY SAND (SM)** - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-10

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-11

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9/7/2010 9:12:47 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 334 feet (MSL)**
								SILTY SAND (SM) - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-11

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-12

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9/7/2010 9:12:49 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 347 feet (MSL)**
								SILTY SAND (SM) - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-12

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-13

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:50 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 364 feet (MSL)**
								SILTY SAND (SM) - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-13

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-14

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9/7/2010 9:12:52 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 298 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-14

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-15

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9/7/2010 9:12:53 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 311 feet (MSL)**
						R-Value = 62		**SILTY SAND (SM)**- red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-15

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-16

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:55 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 306 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-16

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-17

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:57 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 280 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-17

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-18

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:58 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 237 feet (MSL)**
								SILTY SAND (SM) - very dark brown and red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-18

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-19

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9/7/2010 9:13:00 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 226 feet (MSL)**
						R-Value = 59		**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-19

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-20

\\192.168.35.1\VOL1\USERS\GINTPROJECTS\111946\111946.GPJ

9/7/2010 9:13:01 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 229 feet (MSL)**
								SILTY SAND (SM) - very dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-20

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-21

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9/7/2010 9:13:03 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 233 feet (MSL)**
								SILTY SAND (SM) - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-21

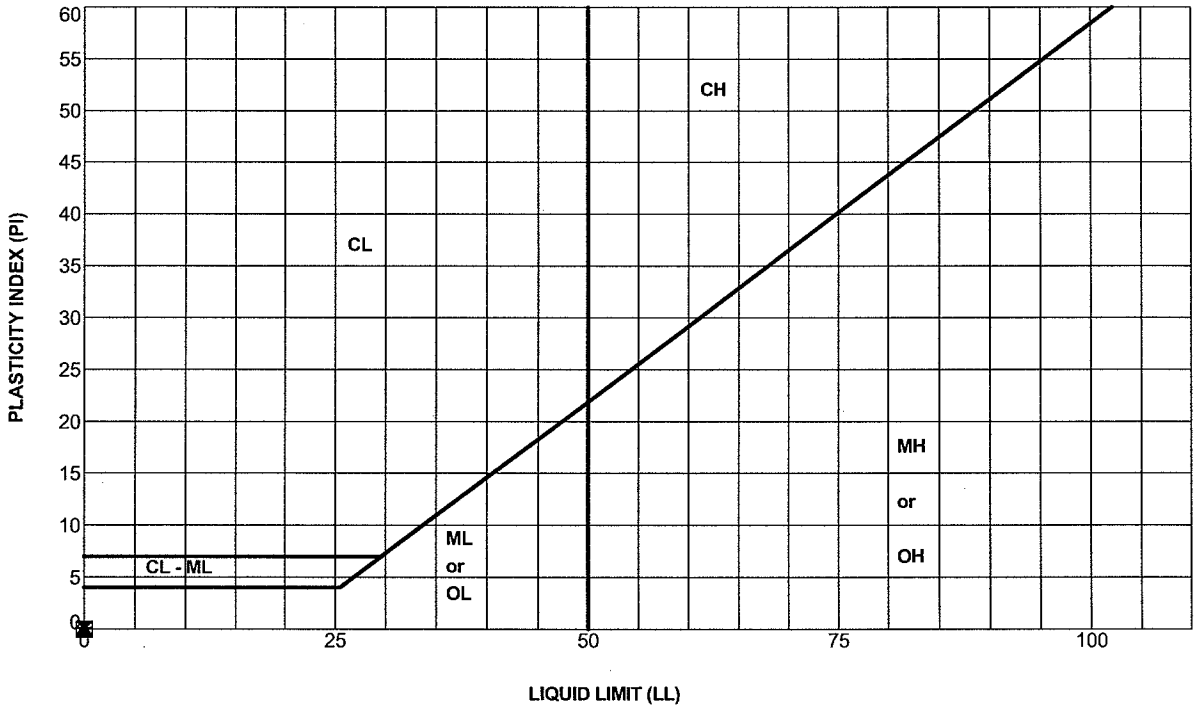
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-22

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9/7/2010 9:13:05 AM



SYMBOL	BORING	DEPTH, ft	LL	PL	PI	SAMPLE DESCRIPTION
□	B- 1	1.5	NP	NP	NP	Dark Yellow-Brown Silty Sand
⊠	B- 4	1.5	NP	NP	NP	Brown Silty Sand
▲	B- 7	2.0	NP	NP	NP	Dark Brown Silty Sand
★	B- 9	0.0	NP	NP	NP	Red Brown Silty Sand

Unified Soil Classification

Fine Grained Soil Groups

Symbol	LL < 50	Symbol	LL > 50
ML	Inorganic clayey silts to very fine sands of slight plasticity	MH	Inorganic silts and clayey silts of high plasticity
CL	Inorganic clays of low to medium plasticity	CH	Inorganic clays of high plasticity
OL	Organic silts and organic silty clays of low plasticity	OH	Organic clays of medium to high plasticity, organic silts

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318 (WET PREP)

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

ATTERBERG LIMITS*

Central Coast California Veterans Cemetery
Monterey County, California

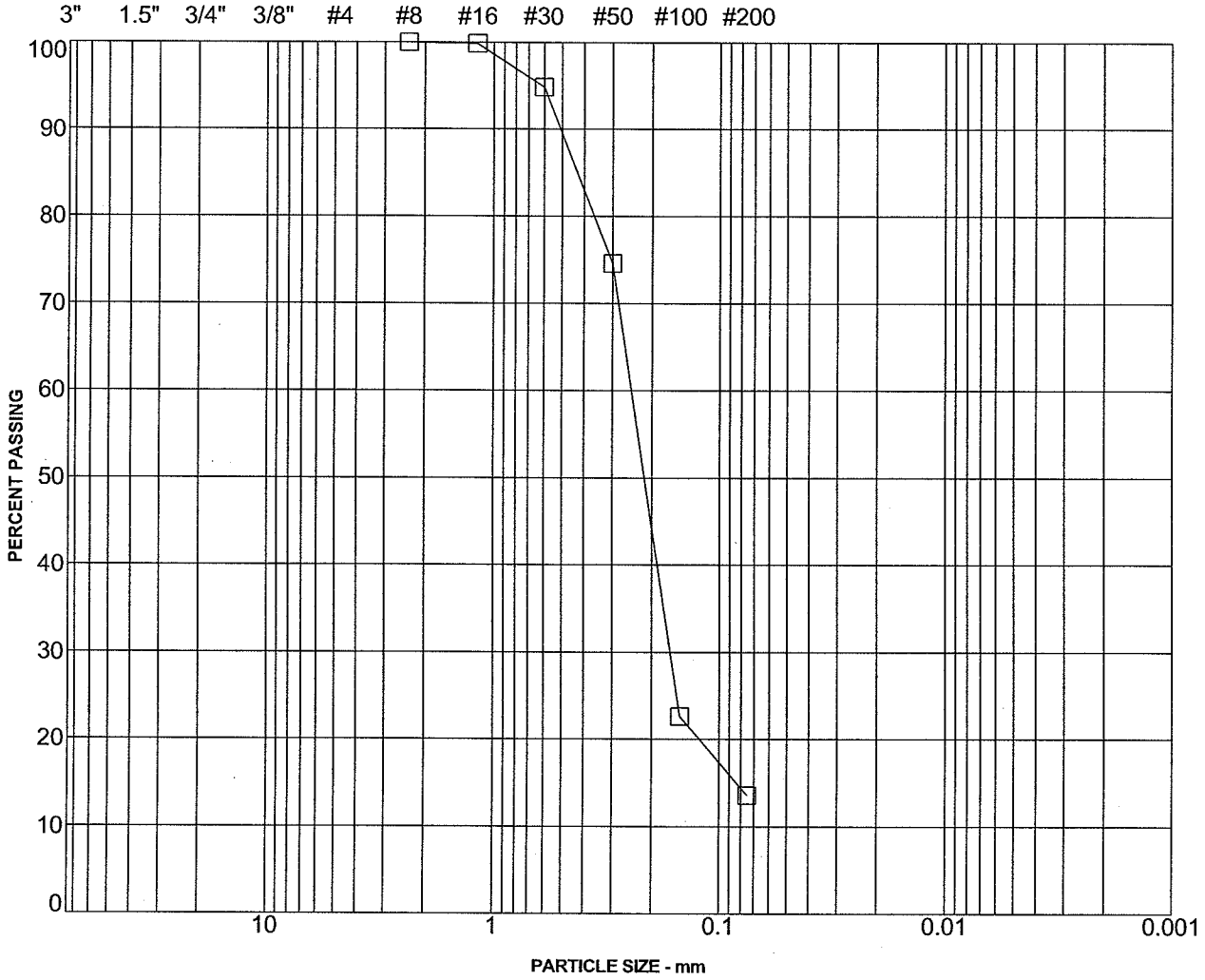
PLATE

B-1

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9/7/2010 9:24:47 AM

SIEVE ANALYSIS	HYDROMETER



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
☐	B- 1	6.0	Dark Yellow-Brown Silty Sand

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

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PROJECT NO. 111946/ PWGEO

PARTICLE SIZE ANALYSIS*

Central Coast California Veterans Cemetery
Monterey County, California

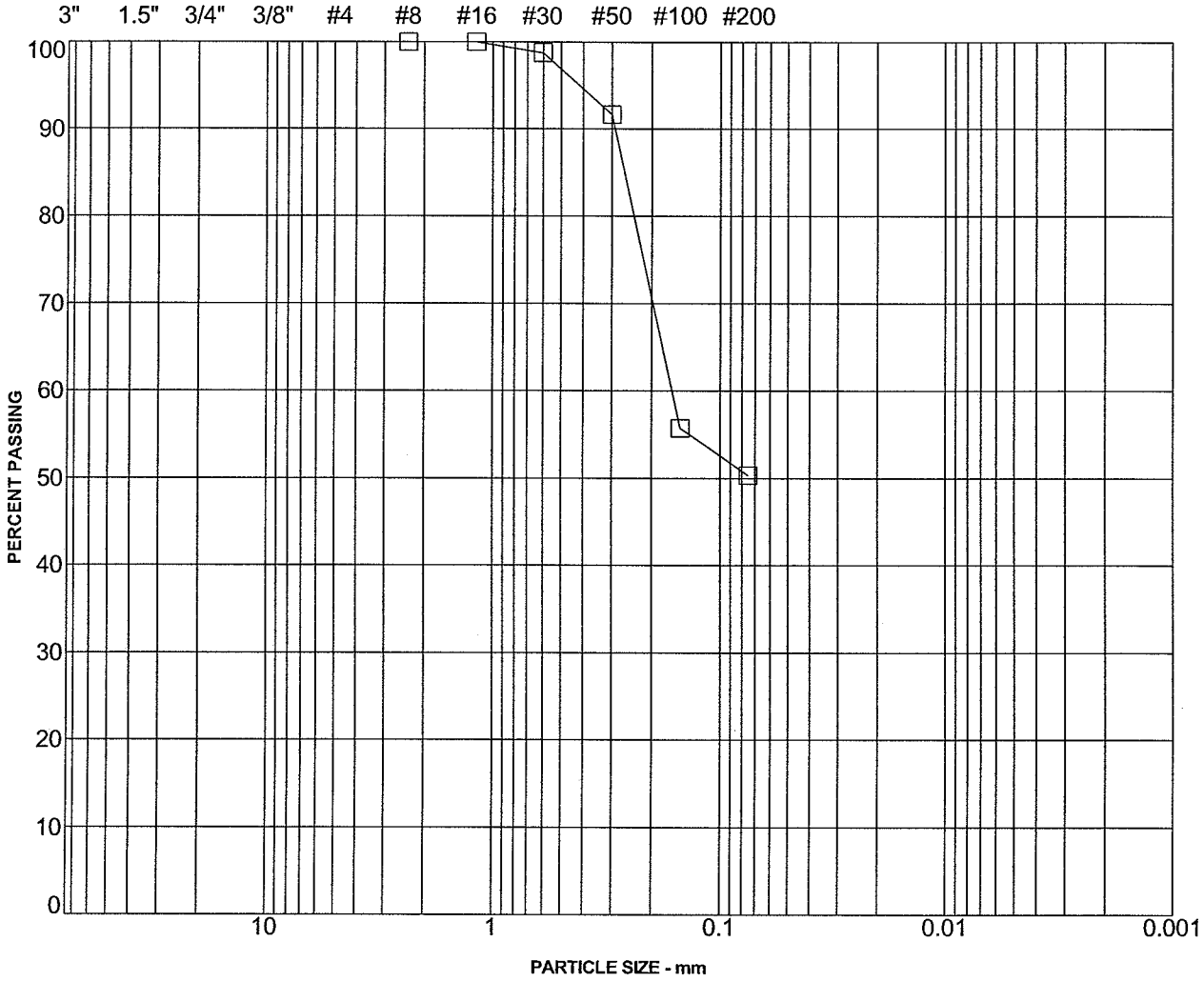
PLATE

B-2

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9/7/2010 9:30:09 AM

SIEVE ANALYSIS	HYDROMETER



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
☐	B- 7	10.0	Olive-Brown Sandy Silt

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

PARTICLE SIZE ANALYSIS*

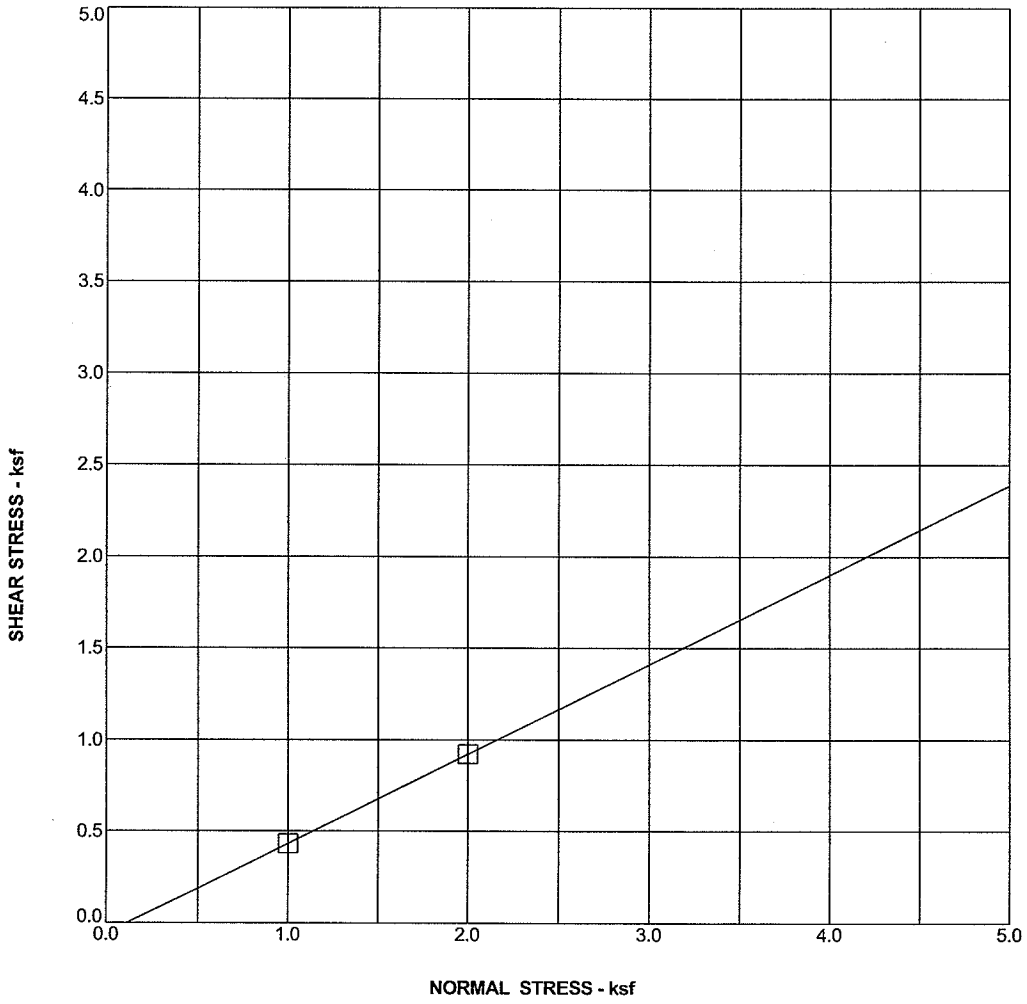
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-3

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9/7/2010 9:30:15 AM



BORING NO: B- 7

DEPTH: 1.5 ft

SAMPLE DESCRIPTION: Dark Brown Silty Sand

TEST TYPE: CD/WET/STAGED

RATE OF SHEAR: .004 in/min.

DRY DENSITY - pcf	84		
INITIAL WATER CONTENT - %	4		
FINAL WATER CONTENT - %	25		
NORMAL STRESS - psf	1000	2000	
MAXIMUM SHEAR - psf	432	921	

FRICTION ANGLE = 24 degrees

COHESION= 0.00 ksf

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 (MODIFIED FOR STAGED TEST)

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

DIRECT SHEAR*

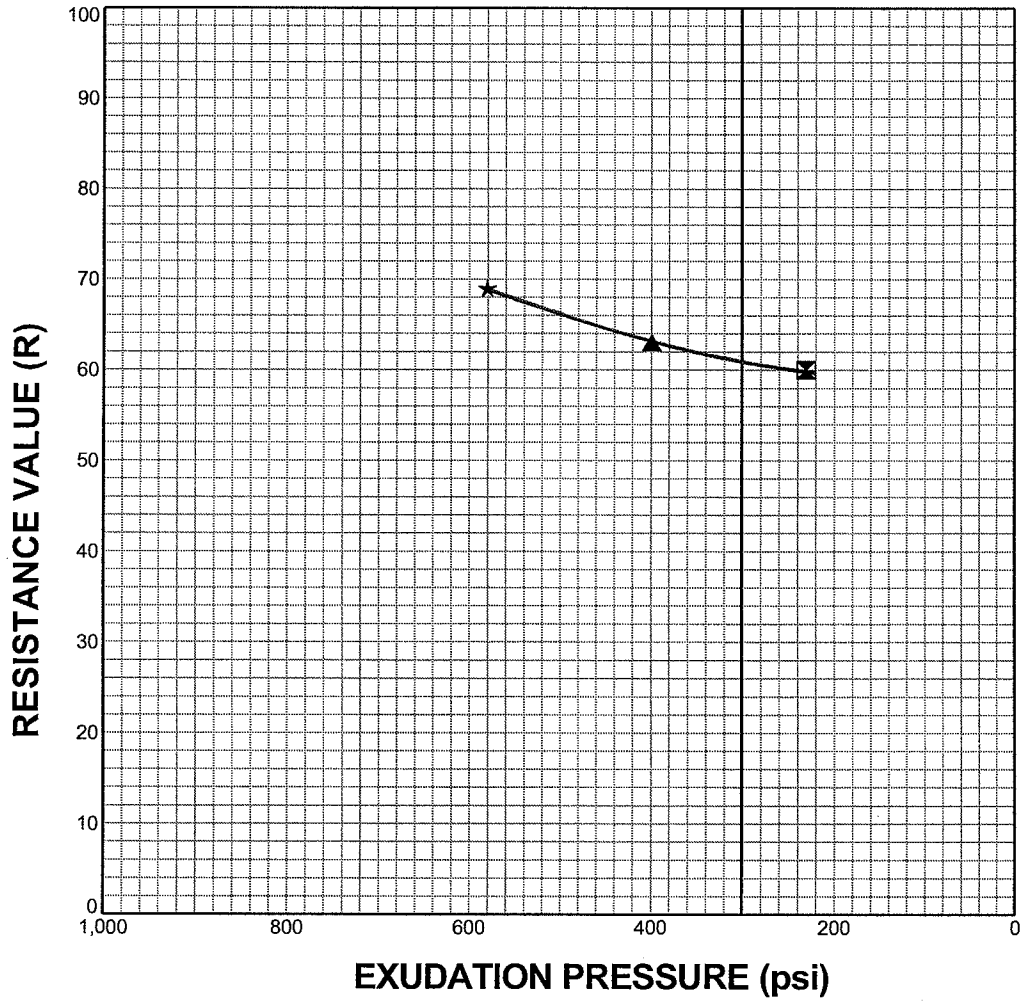
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-4

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9/7/2010 9:32:02 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	13.3	10.8	9.1
DRY DENSITY (PCF)	110.2	113.9	116.9
EXUDATION PRESSURE (PSI)	230	399	580
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	60	63	69

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B- 8)	Light Brown Silty Sand	---	---	**61**

NOTE: Bulk Sample from 13 to 15 feet

ASTM D 2844, Cal Test 301

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

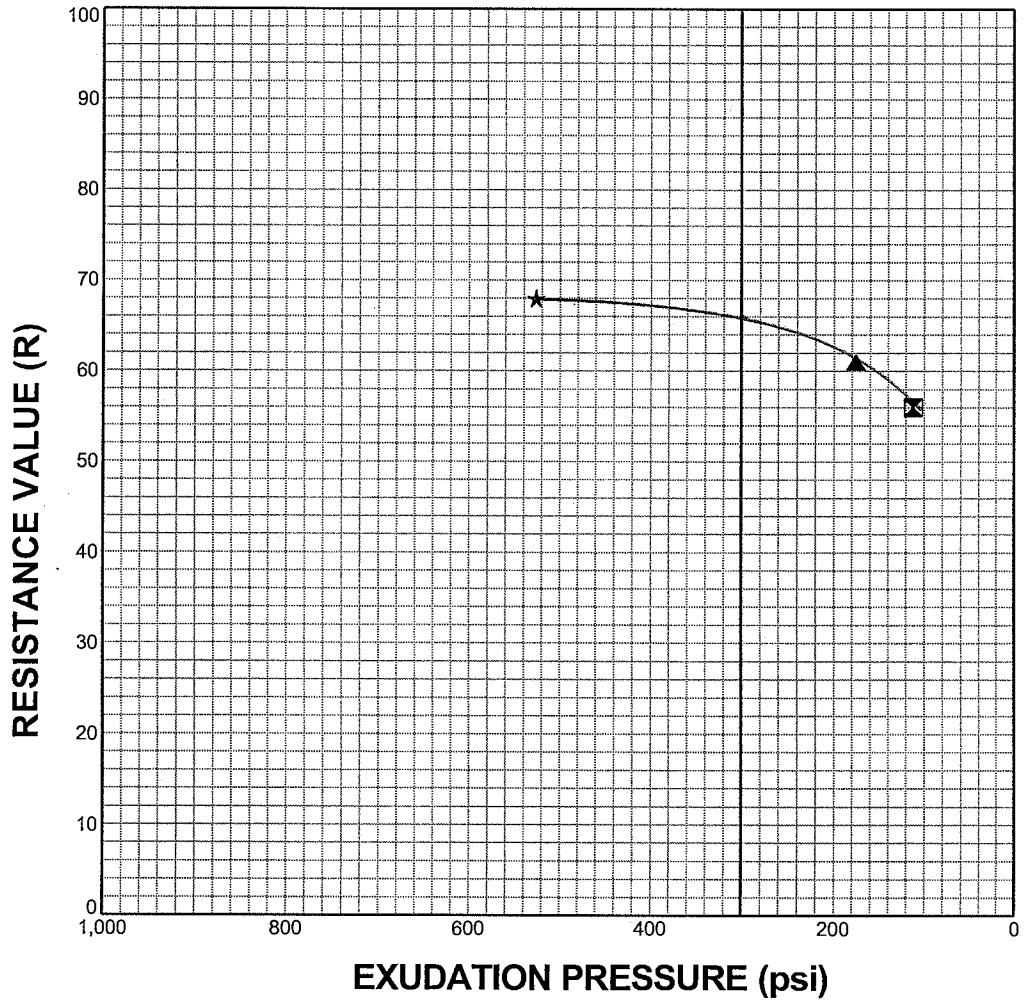
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-5

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9/7/2010 9:45:46 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	12.8	11.5	10.2
DRY DENSITY (PCF)	109.4	111.9	111.9
EXUDATION PRESSURE (PSI)	112	175	526
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	56	61	68

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-10)	Light Brown Silty Sand	---	---	**66**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

KLEINFELDER
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PROJECT NO. 111946/ PWGEO

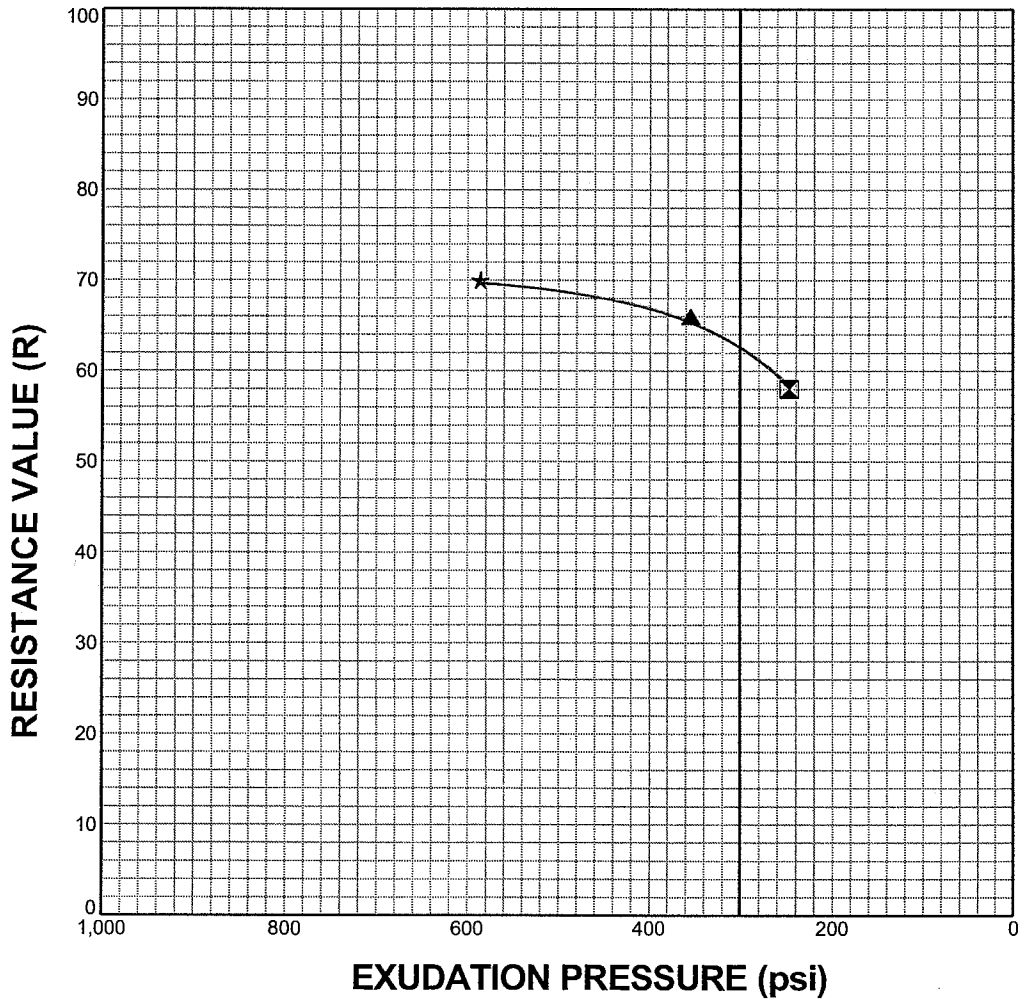
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-6

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9/7/2010 9:45:53 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	11.7	10.9	10.0
DRY DENSITY (PCF)	113.6	114.8	113.8
EXUDATION PRESSURE (PSI)	247	354	586
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	58	66	70

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-15)	Red-Brown Silty Sand	---	---	**62**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

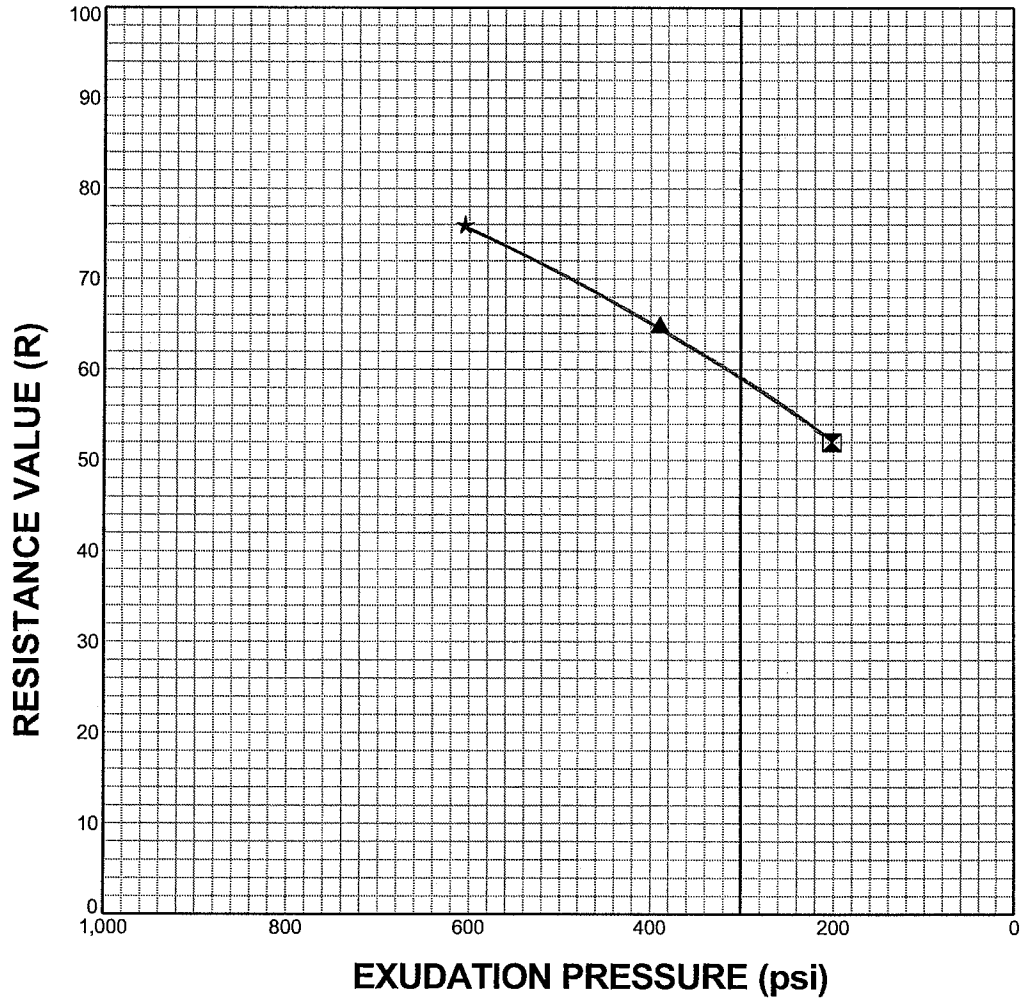
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-7

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9/7/2010 9:45:58 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	10.2	9.4	8.5
DRY DENSITY (PCF)	123.4	125.4	125.2
EXUDATION PRESSURE (PSI)	201	389	604
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	52	65	76

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-19)	Dark Brown Silty Sand	---	---	**59**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-8

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9/7/2010 9:45:59 AM

California State Certified Laboratory No. 2153

CERCO analytical

1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

24 August, 2010

Job No.1008046
Cust. No.11454

Mr. Robert Hasseler
Kleinfelder
40 Clark Street, Suite J
Salinas, CA 93901

Subject: Project No.: 111946/PWGEO
Project Name: Fora Veterans Cemetery (CCCVC)
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hasseler:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on August 05, 2010. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are classified as "negligibly corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are none detected. Because the chloride ion concentrations are less than 300 mg/kg, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations are none detected and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils range from 6.2 to 7.1 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 450 to 460-mV and are indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call JDH Corrosion Consultants, Inc. at (925) 927-6630.

We appreciate the opportunity of working with you on this project. If you have any questions, or if you required further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax: 925 462 2775
www.cercoanalytical.com

Client: Kleinfelder
Client's Project No.: 111946
Client's Project Name: Fora Veterans Cemetary (CCCVC)
Date Sampled: 07/27-28/10
Date Received: 5-Aug-10
Matrix: Soil
Authorization: Signed Chain of Custody and P.O.#R10516

Date of Report: 24-Aug-2010

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1008046-001	B-7, 7-2-2 @ 5.5'	460	6.2	-	70,000	-	N.D.	N.D.
1008046-002	B-1, 1-2-2 @ 5.5'	450	7.1	-	69,000	-	N.D.	N.D.
1008046-003	B-4, 4-2-2 @ 5.5'	450	6.7	-	41,000	-	N.D.	N.D.
1008046-004	B-9, B-9 @ 0-5'	460	6.9	-	23,000	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Detection Limit:	-	-	10	-	50	15	15
Date Analyzed:	23-Aug-2010	23-Aug-2010	-	20-Aug-2010	-	23-Aug-2010	23-Aug-2010

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits.**

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/24-25/2010
		REHS:	

HOLE #:	P-1		PRESATURATE DATE/TIME:	4:30 PM	8/24/2010
DIAMETER:	12 inches		PRESATURATE WATER DEPTH:	full	feet 4:30 pm 8/24
HOLE DEPTH:	1.00 feet	24-Aug	HOLE DEPTH (Next Day) /TIME:	1.00	feet 9:15 am 8/25
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/25/2010	9:22	9:32	0.00	2.75	10	2.750	3.6
2	8/25/2010	9:32	9:42	2.75	4.25	10	1.500	6.7
3	8/25/2010	9:42	9:52	4.38	5.88	10	1.500	6.7
4	8/25/2010	9:52	10:02	0.00	3.00	10	3.000	3.3
5	8/25/2010	10:02	10:12	3.00	5.88	10	2.875	3.5
6	8/25/2010	10:12	10:22	5.88	6.50	10	0.625	16.0
7	8/25/2010	10:22	10:32	0.00	2.50	10	2.500	4.0
8	8/25/2010	10:32	10:42	2.50	4.75	10	2.250	4.4

RATE: 4.4 min/in

HOLE #:	P-2		PRESATURATE DATE/TIME:	3:45 PM	8/24/2010
DIAMETER:	12 inches		PRESATURATE WATER DEPTH:	full	feet 3:45 pm 8/24
HOLE DEPTH:	1.00 feet	24-Aug	HOLE DEPTH (Next Day) /TIME:	1.00	feet 10:50 am 8/25
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/25/2010	10:55	11:05	0.00	2.75	10	2.750	3.6
2	8/25/2010	11:05	11:15	2.75	4.25	10	1.500	6.7
3	8/25/2010	11:15	11:25	0.00	2.13	10	2.125	4.7
4	8/25/2010	11:25	11:35	2.13	3.88	10	1.750	5.7
5	8/25/2010	11:35	11:45	3.88	5.25	10	1.375	7.3
6	8/25/2010	11:45	11:55	5.25	6.13	10	0.875	11.4
7	8/25/2010	11:55	12:05	0.00	2.88	10	2.875	3.5
8	8/25/2010	12:05	12:15	2.88	4.13	10	1.250	8.0

RATE: 8.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-3		PRESATURATE DATE/TIME:	3:30 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 3:30 pm 8/23
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 8:45 am 8/24
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	8:50	9:00	0.00	3.75	10	3.750	2.7
2	8/24/2010	9:00	9:10	3.75	5.25	10	1.500	6.7
3	8/24/2010	9:10	9:20	5.25	6.38	10	1.125	8.9
4	8/24/2010	9:20	9:30	6.38	7.13	10	0.750	13.3
5	8/24/2010	9:30	9:40	7.13	8.13	10	1.000	10.0
6	8/24/2010	9:40	9:50	8.13	8.88	10	0.750	13.3
7	8/24/2010	9:50	10:00	8.88	9.50	10	0.625	16.0
8	8/24/2010	10:00	10:10	9.50	10.00	10	0.500	20.0

RATE: 20.0 min/in

HOLE #:	P-4		PRESATURATE DATE/TIME:	1:40 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 3:30 pm 8/12
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 3:40 pm 8/13
SOIL TYPE:	Dark Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	3:45	3:55	11.75	24.50	10	12.750	0.8
2	8/13/2010	3:55	4:05	24.50	34.75	10	10.250	1.0
3	8/13/2010	4:05	4:15	34.75	39.25	10	4.500	2.2
4	8/13/2010	4:15	4:25	39.25	42.88	10	3.625	2.8
5	8/13/2010	4:25	4:35	42.88	45.38	10	2.500	4.0
6	8/13/2010	4:35	4:45	45.38	47.63	10	2.250	4.4

RATE: 4.4 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/25/2010
		REHS:	

HOLE #:	P-5		PRESATURATE DATE/TIME:	1:20 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 1:20 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.08	feet 2:25 pm 8/13
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	2:30	2:40	0.00	11.00	10	11.000	0.9
2	8/13/2010	2:40	2:50	11.00	20.00	10	9.000	1.1
3	8/13/2010	2:50	3:00	20.00	32.00	10	12.000	0.8
4	8/13/2010	3:00	3:10	32.00	38.00	10	6.000	1.7
5	8/13/2010	3:10	3:20	0.00	8.88	10	8.875	1.1
6	8/13/2010	3:20	3:30	8.88	15.75	10	6.875	1.5

RATE: 1.5 min/in

HOLE #:	P-6		PRESATURATE DATE/TIME:	4:15 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 4:15 pm 8/23
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 10:50 am 8/24
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	10:25	10:35	0.00	4.50	10	4.500	2.2
2	8/24/2010	10:35	10:45	4.50	8.00	10	3.500	2.9
3	8/24/2010	10:45	10:55	8.00	10.50	10	2.500	4.0
4	8/24/2010	10:55	11:05	10.50	11.88	10	1.375	7.3
5	8/24/2010	11:05	11:15	11.88	12.38	10	0.500	20.0
6	8/24/2010	11:15	11:25	12.38	12.63	10	0.250	40.0
7	8/24/2010	11:25	11:35	12.63	12.88	10	0.250	40.0
8	8/24/2010	11:35	11:45	12.88	13.13	10	0.250	40.0

RATE: 40.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-7		PRESATURATE DATE/TIME:	1:00 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 1:00 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	1.17	feet 12:55 pm 8/13
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	1:00	1:10	14.00	12.13	10	1.875	5.3
2	8/13/2010	1:10	1:20	12.13	11.00	10	1.125	8.9
3	8/13/2010	1:20	1:30	11.00	9.75	10	1.250	8.0
4	8/13/2010	1:30	1:40	9.75	8.50	10	1.250	8.0
5	8/13/2010	1:40	1:50	8.50	7.38	10	1.125	8.9
6	8/13/2010	1:50	2:00	7.38	6.13	10	1.250	8.0

RATE: 8.0 min/in

HOLE #:	P-8		PRESATURATE DATE/TIME:	4:30 PM	8/23/2010
DIAMETER:	4 inches		PRESATURATE WATER DEPTH:	full	feet 4:30 pm 8/23
HOLE DEPTH	5.00 feet	28-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 12:05 pm 8/24
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	12:10	12:20	0.00	4.75	10	4.750	2.1
2	8/24/2010	12:20	12:30	4.75	6.88	10	2.125	4.7
3	8/24/2010	12:30	12:40	6.88	8.50	10	1.625	6.2
4	8/24/2010	12:40	12:50	8.50	10.13	10	1.625	6.2
5	8/24/2010	12:50	1:00	10.13	11.50	10	1.375	7.3
6	8/24/2010	1:00	1:10	11.50	13.25	10	1.750	5.7
7	8/24/2010	12:58	13:08	13.25	14.38	10	1.125	8.9
8	8/24/2010	13:08	14:18	14.38	15.75	10	1.375	7.3

RATE: 7.3 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-9		PRESATURATE DATE/TIME:	4:45 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 4:45 pm 8/23
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 1:20 pm 8/24
SOIL TYPE:	Poorly Graded SAND w/ SILT (SP-SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	1:25	1:35	0.00	2.75	10	2.750	3.6
2	8/24/2010	1:35	1:45	2.75	4.25	10	1.500	6.7
3	8/24/2010	1:55	2:05	4.00	6.13	10	2.125	4.7
4	8/24/2010	2:05	2:15	6.13	8.88	10	2.750	3.6
5	8/24/2010	2:15	2:25	8.88	10.25	10	1.375	7.3
6	8/24/2010	2:25	2:35	10.25	13.13	10	2.875	3.5
7	8/24/2010	2:35	2:45	13.13	15.88	10	2.750	3.6
8	8/24/2010	2:45	2:55	15.88	17.63	10	1.750	5.7

RATE: 5.7 min/in

HOLE #:	P-10		PRESATURATE DATE/TIME:	2:00 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:00 pm 8/12
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.00	feet 4:55 pm 8/13
SOIL TYPE:	Dark & Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	5:00	5:10	4.50	22.50	10	18.000	0.6
2	8/13/2010	5:10	5:20	22.50	28.00	10	5.500	1.8
3	8/13/2010	5:20	5:30	28.00	32.13	10	4.125	2.4
4	8/13/2010	5:30	5:40	32.13	35.50	10	3.375	3.0
5	8/13/2010	5:40	5:50	35.50	38.13	10	2.625	3.8
6	8/13/2010	5:50	6:00	38.13	40.63	10	2.500	4.0

RATE: 4.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/13/2010
		REHS:	

HOLE #:	P-11		PRESATURATE DATE/TIME:	2:20 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:20 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.70	feet 6:15 pm 8/13
SOIL TYPE:	Gray Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	6:20	6:30	13.00	42.00	10	29.000	0.3
2	8/13/2010	6:30	6:40	42.00	50.50	10	8.500	1.2
3	8/13/2010	6:40	6:50	9.00	37.00	10	28.000	0.4
4	8/13/2010	6:50	7:00	37.00	47.00	10	10.000	1.0
5	8/13/2010	7:00	7:10	10.00	33.50	10	23.500	0.4
6	8/13/2010	7:10	7:20	33.50	46.00	10	12.500	0.8

RATE: 0.8 min/in

HOLE #:	P-12		PRESATURATE DATE/TIME:	2:40 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:40 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	2.83	feet 7:25 pm 8/13
SOIL TYPE:	Dark Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	7:30	7:40	4.50	22.50	10	18.000	0.6
2	8/13/2010	7:40	7:50	22.50	28.00	10	5.500	1.8
3	8/13/2010	7:50	8:00	28.00	32.13	10	4.125	2.4
4	8/13/2010	8:00	8:10	32.13	35.50	10	3.375	3.0
5	8/13/2010	8:10	8:20	35.50	38.13	10	2.625	3.8
6	8/13/2010	8:20	8:30	38.13	40.63	10	2.500	4.0

RATE: 4.0 min/in

Exhibit 1
Summary of Compaction Recommendations

Area	Compaction Recommendation [1,2,3]
General Engineered Fill	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Imported Fill [4]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Trenches [5]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Exterior Flatwork [6]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.
Parking and Access Driveways [6]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.

Notes:

1. All compaction requirements refer to relative compaction as a percentage of the laboratory standard described by ASTM D 1557.
2. All lifts to be compacted shall be a maximum of 8 inches loose thickness, unless otherwise recommended.
3. All compacted surfaces should be firm, stable, and unyielding under compaction equipment.
4. Includes building and/or equipment pads.
5. In landscaping areas, this percent compaction in trenches may be reduced to 85 percent.
6. Depths are below finished subgrade elevation.

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GEOTECHNICAL INVESTIGATION

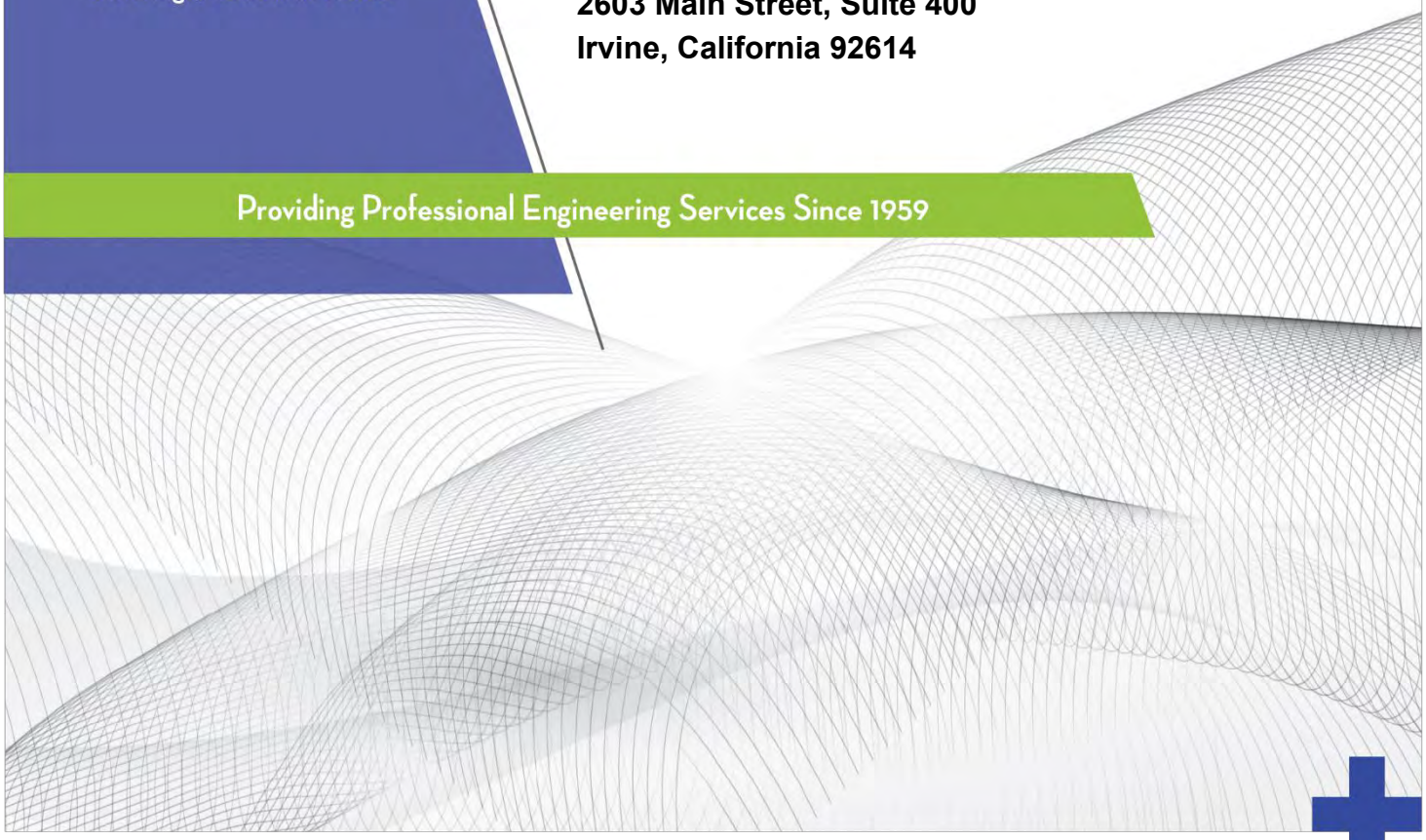
CALIFORNIA CENTRAL COAST VETERANS CEMETERY, PHASE 2

Parker Flats Cut Off Road
Seaside, California

Prepared By:
SCST, LLC
6280 Riverdale Street
San Diego, California 92120

Prepared For:
Mr. Carl Taylor, PE, LEED AP
Huitt-Zollars, Inc.
2603 Main Street, Suite 400
Irvine, California 92614

Providing Professional Engineering Services Since 1959



GEOTECHNICAL INVESTIGATION

December 10, 2018

SCST No. 180402P4
Report No. 1

Mr. Carl Taylor, PE, LEED AP
Vice President
Huitt-Zollars, Inc.
2603 Main Street, Suite 400
Irvine, California 92614

Subject: GEOTECHNICAL INVESTIGATION
CALIFORNIA CENTRAL COAST VETERANS CEMETERY, PHASE 2
PARKER FLATS CUT OFF ROAD
SEASIDE, CALIFORNIA

Dear Mr. Taylor:

SCST, LLC (SCST) is pleased to present our report describing the geotechnical investigation performed for the California Central Coast Veterans Cemetery, Phase 2 project. We conducted the geotechnical investigation in general conformance with the scope of work presented in our proposal dated June 22, 2018. Based on the results of our investigation, we consider the planned development feasible from a geotechnical standpoint, provided the recommendations of this report are followed. If you have any questions, please call us at (619) 280-4321.

Respectfully submitted,
SCST, LLC

REGISTERED PROFESSIONAL ENGINEER
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Appendix I ..... Field Investigation
Appendix II ..... Laboratory Testing
Appendix III ..... Infiltration Testing Results

EXECUTIVE SUMMARY

This report presents the results of the geotechnical investigation SCST, LLC (SCST) performed for the California Central Coast Veterans Cemetery (CCCVC), Phase 2 project. We understand the project will consist of design and construction of a new cemetery on 4.29 acres of land. The phase 2 development will consist of 2,000 in-ground crypts, 1,700 in-ground cremains plots, approximately 400 linear feet of new roadways, and rehabilitation of the existing infiltration basin. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project.

SCST explored the subsurface conditions by drilling ten borings and three percolation test borings to depths between about 8½ and 11½ feet below the existing ground surface using a breakdown tripod rig auger and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations. Additionally, SCST obtained and reviewed previously prepared geotechnical reports for the proposed cemetery (Kleinfelder, 2010 and 2014).

The materials encountered in the borings performed by SCST consists of poorly graded sand with silt and silty sands. These materials are generally consistent with the soils encountered during the previous investigations performed by Kleinfelder. Groundwater was not encountered in the borings. SCST also performed three borehole percolation tests around the existing infiltration basin.

The main geotechnical considerations affecting the proposed construction are the presence of near-surface loose sands. To reduce the potential for settlement, hardscapes, retaining walls, and any other settlement sensitive improvements should be underlain by at least 2 feet of compacted fill materials with an expansion index of 20 or less. The recommendations presented herein may need to be updated once final plans are developed.

1. INTRODUCTION

This report presents the results of the geotechnical investigation SCST, LLC (SCST) performed for the California Central Coast Veterans Cemetery (CCCVC), Phase 2 project. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. Figure 1 presents the site location.

2. SCOPE OF WORK

2.1 FIELD INVESTIGATION

SCST explored the subsurface conditions by drilling ten borings and three percolation test borings to depths between about 8½ and 11½ feet below the existing ground surface using a tripod rig auger and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations.

Our scope of services also included Unexploded Ordinance (UXO) training and an escort by a certified technician by Kemron Environmental during our field investigation. A private utility locator (Safe2Core) was contracted to provide utility clearance for each exploratory boring location in addition to the marking and notification of the site for Underground Services Alert.

2.2 LABORATORY TESTING

Selected samples were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of in situ moisture and density, particle-size distribution, direct shear, R-value, expansion index, and corrosivity. The results of the laboratory tests and brief explanations of the test procedures are presented in Appendix II.

2.3 BOREHOLE PERCOLATION TESTING

We performed borehole percolation testing at three locations (P-1, P-2, and P-3) in general conformance with the Native Soil Assessment for Small Infiltration-Based Stormwater Control Measures Manual (Central Coast Low Impact Development Initiative, 2013). The results of the testing are presented in Appendix III.

2.4 ANALYSIS AND REPORT PREPARATION

The results of the field and laboratory tests were evaluated to develop conclusions and recommendations regarding:

- Subsurface conditions beneath the site
- Potential geologic hazards
- Criteria for seismic design in accordance with the 2016 California Building Code (CBC)
- Site preparation and grading
- Estimated foundation settlements
- Support for flatwork and concrete slabs-on-grade
- Crypt subdrains
- Retaining walls
- Pavement sections
- Soil corrosivity
- Infiltration test results on existing flood basin

3. SITE DESCRIPTION

The CCCVC is located on the previous site of Ford Ord in the city of Seaside, Monterey County, California. It is bound by Normandy Road (previously Parker Flats Road) to the north, Parker Flats Road (previously Parker Flats Cut-Off) to the west, and undeveloped land consisting of dense vegetation, trees, and brush to the east and south. A site vicinity map shows the approximate location of the site on Figure 1.

4. PROPOSED DEVELOPMENT

We understand the project will consist of design and construction of a new cemetery on 4.29 acres of land. Specifically, phase 2 development of the CCCVC will consist of 2,000 in-ground crypts, 1,700 in-ground cremains plots, approximately 400 linear feet of new roadways, and rehabilitation of the existing infiltration basin. Phase 2 consists of three sections that are located on the northwest portion of the CCCVC site. The in-ground cremains plots will be located east of the existing memorial walk at Section 1 of Phase 2. This area will be used to place cremated remains approximately 3 feet below the ground surface. The in-ground crypt plots will be developed on Sections 2 and 3 of Phase 2, south of the existing street. An additional 395 feet of street will be added to access these burial plots and allow for vehicle turnarounds. These sections

will house pre-cast concrete crypts in plots measuring 3 feet by 8 feet as well as some oversize crypts in plots measuring 4 feet by 9 feet.

5. SUBSURFACE SOIL CONDITIONS

The site is located along the central coast of California and is underlain by Quaternary-age sand deposits. A description of the subsurface material encountered is presented below. Figure 3 presents the regional geology in the vicinity of the site.

Sand Deposits (Qs): The dune and drift sand deposits encountered in the borings consists primarily of fine-grained sands with silt to silty sands to the maximum depths explored. The materials were loose in the upper two feet and becoming medium dense to dense with increasing depth.

Groundwater: Groundwater was not encountered in the borings. Historic high groundwater levels at a nearby monitoring well (Monterey Peninsula Water Management District Well #FO-08) indicates the groundwater level is on the order of 400 feet below existing ground surface at the site. The permanent groundwater table is expected to be below a depth that will influence the planned construction. However, groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater rise or seepage is difficult to predict, such conditions are typically mitigated if and when they occur.

6. GEOLOGIC HAZARDS

6.1 FAULTING AND SURFACE RUPTURE

Figure 3 shows the locations of known faults in the region. The closest known active fault is the Rinconada Fault and Monterey Bay Fault located about 3.4 miles (5.5 kilometers) to the northeast and 5.1 miles (8.2 kilometers) to the southwest of the site, respectively. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active faults are known to underlie or project toward the site. Therefore, the probability of fault rupture is low.

6.2 CBC SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is ground shaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and maximum considered earthquake (MCE_R) spectral response acceleration parameters in accordance with the 2016 CBC are presented below:

Site Coordinates: Latitude 36.63591°
Longitude -121.79555°

Site Class: D

Site Coefficients, F_a = 1.000
F_v = 1.500

Mapped Spectral Response Acceleration at Short Period, S_s = 1.478g

Mapped Spectral Response Acceleration at 1-Second Period, S_1 = 0.529g

Design Spectral Acceleration at Short Period, S_{DS} = 0.985g

Design Spectral Acceleration at 1-Second Period, S_{D1} = 0.529g

Site Peak Ground Acceleration, PGA_M = 0.558g

6.3 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, resulting in large total and differential ground surface settlements and possible lateral spreading during an earthquake. Due to the lack of shallow groundwater and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is low.

6.4 LANDSLIDES AND SLOPE STABILITY

Evidence of landslides or slope instabilities was not observed during our investigation. The potential for landslides or slope instabilities to occur at the site is considered low.

6.5 FLOODING, TSUNAMIS, AND SEICHES

The site is not located within a flood zone. The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009). Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water. Therefore, the potential for flooding, tsunamis, or seiches to affect the site is considered low.

6.6 SUBSIDENCE

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered low.

6.7 HYDRO-CONSOLIDATION

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are aeolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater causing the

material to consolidate. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

7. CONCLUSIONS

Based on the results of our investigation, we consider the proposed construction feasible from a geotechnical standpoint, provided the recommendations of this report are followed. The main geotechnical considerations affecting the proposed construction are the presence of near-surface loose sands. Remedial grading will need to be performed to reduce the potential for distress to the proposed improvements. Remedial grading recommendations are provided in the following sections of this report. The recommendations presented herein may need to be updated once final plans are developed.

8. RECOMMENDATIONS

8.1 SITE PREPARATION AND GRADING

8.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation, and debris. Subsurface improvements that are to be abandoned should be removed, and the resulting excavations should be backfilled and compacted in accordance with the recommendations of this report. Pipeline abandonment can consist of capping or rerouting at the project perimeter and removal within the project perimeter. If appropriate, abandoned pipelines can be filled with grout or slurry as recommended by and observed by the geotechnical consultant.

8.1.2 Remedial Grading – Above Ground Improvements

The on-site soils should be excavated to a depth of at least 2 feet below the planned hardscapes, retaining wall footings, and any other settlement sensitive improvements. Localized deeper excavations may be necessary due to loose or otherwise unsuitable materials encountered during grading. Horizontally, the excavations should extend at least 2 feet outside the planned improvements, retaining wall footings, or up to existing improvements, whichever is less. An SCST representative should observe conditions exposed in the bottom of excavations to determine if any additional excavation is required.

8.1.3 Remedial Grading – In Ground Crypts

We anticipate that the construction of the proposed in-ground crypts will involve deeper excavations. Localized deeper excavations may be necessary due to loose or otherwise unsuitable materials encountered during grading. Horizontally, the excavations should

extend at least 2 feet outside the planned improvements or up to any existing improvements, whichever is less. The excavations will require temporary excavations or shoring. The pre-cast concrete crypts in plots should be placed on top of a 6-inch layer of drainage fill consisting of 1-inch crushed rock. An SCST representative should observe conditions exposed in the bottom of excavations to determine if any additional excavation is required.

8.1.4 Expansive Soil

The on-site soil sample tested has an expansion index of very low. To reduce the potential for expansive heave, retaining wall footings and hardscape areas should be underlain by at least 2 feet of material with an expansion index of 20 or less. Horizontally, the low expansion potential material should extend at least 2 feet outside the planned hardscape areas, retaining walls, or up to existing improvements, whichever is less. Based on our laboratory tests results, the on-site soils will meet this expansion index criteria.

8.1.5 Compacted Fill

The exposed bottom of all excavations should be scarified to a depth of 12 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. Fills should be moisture conditioned to near optimum moisture content and compacted to at least 90% relative compaction. Fill should be placed in horizontal lifts at a thickness appropriate for the equipment spreading, mixing, and compacting the material, but generally should not exceed 8 inches in loose thickness. The maximum dry density and optimum moisture content for evaluating relative compaction should be determined in accordance with ASTM D 1557. Utility trench backfill beneath structures, pavements, and hardscape should be compacted to at least 90% relative compaction. The top 12 inches of subgrade beneath pavements should be compacted to at least 95%.

8.1.6 Imported Soil

Imported soil should consist of predominately granular soil, have an expansion index of less than 20, and be free of organic matter and rocks greater than 6 inches. Imported soil should be observed and, if appropriate, tested by SCST prior to transport to the site.

8.1.7 Excavation Characteristics

It is anticipated that excavations can be achieved with conventional earthwork equipment in good working order.

8.1.8 Oversized Material

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, used as landscape material, or disposed of off-site.

8.1.9 Temporary Excavations

Temporary excavations 3 feet deep or less can be made vertically. Deeper temporary excavations in fill should be laid back no steeper than 1:1 (horizontal:vertical). The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing, or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. SCST should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (horizontal:vertical) downward from the outside bottom edge of existing structures or improvements will require shoring. Soldier piles and lagging, internally braced shoring or trench boxes could be used. If trench boxes are used, the soil immediately adjacent to the trench box is not directly supported. Ground surface deformations immediately adjacent to the pit or trench could be greater where trench boxes are used compared to other methods of shoring.

As an alternative to shoring/underpinning, maximum 10-foot-wide slots can be excavated and immediately backfilled adjacent to existing improvements. Care should be taken to not undermine existing improvements. Slot excavations should be filled prior to performing adjacent excavations.

8.1.10 Temporary Shoring

For design of cantilevered shoring with level backfill, an active earth pressure equal to a fluid weighing 35 pounds per cubic foot (pcf) can be used. An additional 20 pcf should be added for shoring with 2:1 sloping ground. The surcharge loads on shoring from traffic and construction equipment working adjacent to the excavation can be modeled by assuming

an additional 2 feet of soil behind the shoring. For design of soldier piles, an allowable passive pressure of 350 pounds per square foot (psf) per foot of embedment over two times the pile diameter up to a maximum of 5,000 psf can be used. Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be required throughout. The soldier piles should be designed for the full anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure can be limited to a maximum value of 400 psf.

8.1.11 Temporary Dewatering

Groundwater seepage may occur locally and should be anticipated in excavations. Temporary dewatering can be accomplished by sloping the excavation bottom to a sump and pumping from the sump. A layer of gravel about 6 inches thick placed in the bottom of the excavation will facilitate groundwater flow and can be used as a working platform.

8.1.12 Slopes

All permanent slopes should be constructed no steeper than 2:1 (horizontal:vertical). Faces of fill slopes should be compacted either by rolling with a sheepsfoot roller or other suitable equipment or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (horizontal:vertical). In our opinion, slopes constructed no steeper than 2:1 (horizontal:vertical) will possess an adequate factor of safety. An engineering geologist should observe all cut slopes during grading to ascertain that no unforeseen adverse geologic conditions are encountered that require revised recommendations. All slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

8.1.13 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should

excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

8.1.14 In-Ground Crypts Drainage

A drainage system is recommended to be provided beneath the in-ground crypts. The drainage system should consist of a 4-inch perforated subdrain pipe (SDR 35 or equivalent) with the perforations faced downward placed at the end of the lowest end crypt field. The crypt field should be graded to allow positive drainage to the system. The subdrain pipe should be enveloped with 3 cubic feet per linear feet of ¾" crushed rock wrapped with a filter fabric (Mirafi 140N or equivalent). The pipe should be designed to have a minimum 1% fall to a suitable outlet.

8.1.15 Grading Plan Review

SCST should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented and that no revised recommendations are needed due to changes in the development scheme.

8.2 CONVENTIONAL RETAINING WALLS

8.2.1 Foundations

Retaining walls can be supported on shallow spread and/or continuous footings with bottoms levels entirely on compacted fill. Footings should extend at least 18 inches below lowest adjacent finished grade and should be at least 24 inches wide. An allowable bearing capacity of 2,500 psf can be used. This bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 5,000 psf. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 7 feet exists between the lower outside footing edge and the face of the slope.

8.2.2 Resistance to Lateral Loads

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. Passive pressure can be computed using an allowable lateral pressure of 350 psf per foot of depth below the ground surface for level ground conditions. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.2.3 Lateral Earth Pressures

The active earth pressure for the design of unrestrained retaining walls with level backfill can be taken as equivalent to the pressure of a fluid weighing 35 pcf. The at-rest earth pressure for the design of restrained retaining walls with level backfills can be taken as equivalent to the pressure of a fluid weighing 55 pcf. These values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain clay soils. An additional 20 pcf should be added to these values for walls with a 2:1 (horizontal:vertical) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If any other surcharge loads are anticipated, SCST should be contacted for the necessary increase in soil pressure.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a backdrain to reduce the accumulation of hydrostatic pressures. The backdrain can consist of a 2-foot-wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided, or a perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide damp proofing specifications and details. Figure 4 presents typical conventional retaining wall backdrain details.

8.2.4 Seismic Earth Pressure

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid weighing 20 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, static active earth pressure. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

8.2.5 Backfill

Wall backfill should consist of granular, free-draining material having a sand equivalent of 20 or more. The backfill zone is defined by a 1:1 plane projected upward from the heel of the wall. Expansive or clayey soil should not be used. Additionally, backfill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in dimension. Backfill should be compacted to at least 90% relative compaction. Backfill should not be placed until walls have achieved adequate structural strength.

Compaction of wall backfill will be necessary to minimize settlement of the backfill and overlying settlement sensitive improvements. However, some settlement should still be anticipated. Provisions should be made for some settlement of concrete slabs and pavements supported on backfill. Additionally, any utilities supported on backfill should be designed to tolerate differential settlement.

8.2.6 Settlement Characteristics

Total foundation settlements are estimated to be less than 1 inch. Differential settlements across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

8.2.7 Foundation Excavation Observations

A representative from SCST should observe the foundation excavations prior to forming or placing reinforcing steel.

8.3 EXTERIOR SLABS-ON-GRADE

Exterior slabs on grade should be underlain by at least 2 feet of material with an expansion index of 20 or less. Exterior slabs should be at least 5 inches thick and reinforced with at least No. 3 bars at 18 inches on center each way for normal loading conditions. However, if heavier loads are anticipated, the slab should be designed using a modulus of subgrade reaction (kV1) value of 180 pounds per cubic inch.

Slabs should be provided with weakened plane joints placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be considered in the concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

8.4 PIPELINES

8.4.1 Thrust Blocks

For level ground conditions, a passive earth pressure of 300 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level if encountered.

8.4.2 Modulus of Soil Reaction

A modulus of soil reaction (E') of 2,000 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

8.4.3 Pipe Bedding

Pipe bedding, as specified in the "Greenbook" Standard Specifications for Public Works Construction, can be used. Bedding material should consist of clean sand having a sand equivalent not less than 30 and should extend to at least 12 inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The on-site materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

8.4.4 Cutoff Walls

Where pipeline inclinations exceed 15 percent, cutoff walls are recommended in trench excavations. Additionally, we do not recommend that open graded rock be used for pipe bedding or backfill because of the potential for piping erosion. The recommended bedding is clean sand having a sand equivalent not less than 30 or 2-sack sand/cement slurry. If sand/cement slurry is used for pipe bedding to at least 1 foot over the top of the pipe, cutoff walls are not considered necessary. The need for cutoff walls should be further evaluated by the project civil engineer designing the pipeline.

8.5 PAVEMENT SECTION RECOMMENDATIONS

The pavement support characteristics of the soils encountered during our investigation are considered favorable. An R-value of 67 was determined for the existing subgrade soils. Based on an R-value of 67, the following preliminary pavement structural sections are provided for the assumed Traffic Indexes.

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Portland Cement Concrete Pavement (inches)
Parking Stalls	5.0	3 AC / 4 AB	6 PCC / 4 AB
Drive Lanes	6.0	3 AC / 4 AB	6 PCC / 6 AB
Fire Lanes	7.5	5 AC / 4 AB	7½ PCC / 6 AB

AC – Asphalt Concrete
AB – Aggregate Base
PCC – Portland Cement Concrete

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. All soft or yielding areas should be stabilized or removed and replaced with compacted fill or aggregate base. Aggregate base and asphalt concrete should conform to the Caltrans Standard Specifications or the "Greenbook" and should be compacted to at least 95% relative compaction. Aggregate base should have an R-value of not less than 78. All materials and methods of construction should conform to good engineering practices and the minimum local standards.

8.6 SOIL CORROSIVITY

Representative samples of the on-site soil were tested to evaluate corrosion potential. The test results are presented in Appendix II. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength, and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations, as required.

8.7 INFILTRATION TESTING

The basin is currently filled with water and appears to have a very low infiltration rate due to the accumulation of silt at the bottom. We probed the bottom of the basin and collected samples to determine the depth of the silt. Based on our field observations, the very fine-grained silt was observed to be approximately 2 to 3 inches in thickness underlain by low permeability fine sand with silt to a depth of approximately 2 feet below the silt layer. To achieve the design rate, minimum 2½ feet of material at the bottom of the basin should be removed to expose the native coarse-grained soils. However, it should be noted that our observations were based on samples obtained at the edges of the basin and that the required removal depths may vary towards the middle portion of the basin.

We performed three borehole percolation tests at the approximate locations shown in Figure 2 to assess the infiltration rate of the native soils below the existing flood basin. Tests were conducted in accordance with the guidelines presented in the *Native Soil Assessment for*

Small Infiltration Based Stormwater Control Measures, Central Coast Low Impact Development Initiative (2013). The holes were drilled to a depth that corresponded to the basin bottom within the native soil strata. Each percolation test hole was logged by our field geologist, and the logs are included in Appendix I. The annulus between each perforated pipe and sidewall was filled with fine gravel. A hose equipped with a water meter was used to measure the volume during the presoak period. Appendix III presents the field data and test results. The table below presents the tested infiltration rates.

Infiltration Rate Test Results

Test Location	Test Depth (feet)	Material Type at Test Depth	Infiltration Rate (inch/hour)
P-1	10	Silty Sand	5.3
P-2	10	Silty Sand	0.6*
P-3	10	Silty Sand	7.4

*** Note: Observed silt intrusion in test hole during the percolation test.**

We observed very fine silt infiltrating the test hole at P-2 during testing. At each instance where the test hole was empty, fine silt layers had accumulated at the bottom of the test hole prior to refilling. Due to this intrusion of silt, it is our opinion that the test results for P-2 (0.6 inches per hour) are inconclusive and should be discarded.

The remaining measured test rates of 5.3 and 7.4 inches per hour are representative of the native soil types encountered in the test holes. The previous study by Kleinfelder (2010) indicates the measured infiltration rates near the basin (Parker Flats Cutoff Road and State Cemetery) ranged from 7.5 to 13.6 inches per hour.

The measured rates do not include a factor of safety, and long-term sustainable infiltration rates will be affected by several factors including the degree of saturation of the adjacent ground and the infiltration of fine-grained soils into the basin. Therefore, to account for these factors, the application of these rates should consider the use of an appropriate factor of safety. The development of the factor of safety should be based upon the more conservative rate obtained during testing and include consideration of the impacts of deteriorated performance, life safety issues and should anticipate that the measured test rates will be reduced over time.

9. GEOTECHNICAL ENGINEERING DURING CONSTRUCTION

The geotechnical engineer should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of the geotechnical engineer during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

10. CLOSURE

SCST should be advised of any changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the test pit locations and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

11. REFERENCES

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California Building Standards Commission, (2016), 2016 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Effective January 1, 2017.

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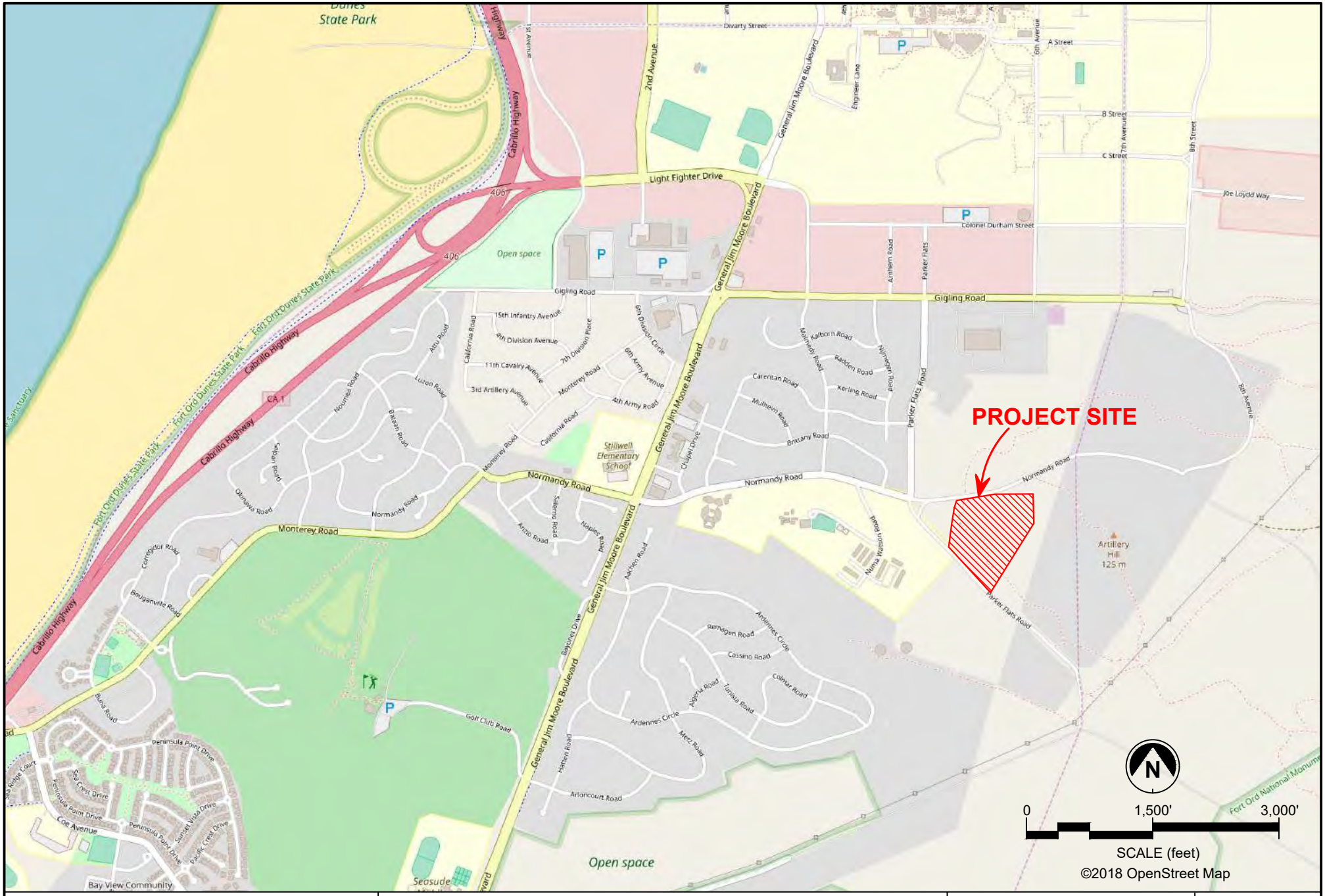
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Jennings, C.W. updated by Gutierrez, C., Bryant, W., Saucedo, G., and Willis, C. (2010), Geologic Map of California, California Geological Survey, scale 1:750,000.

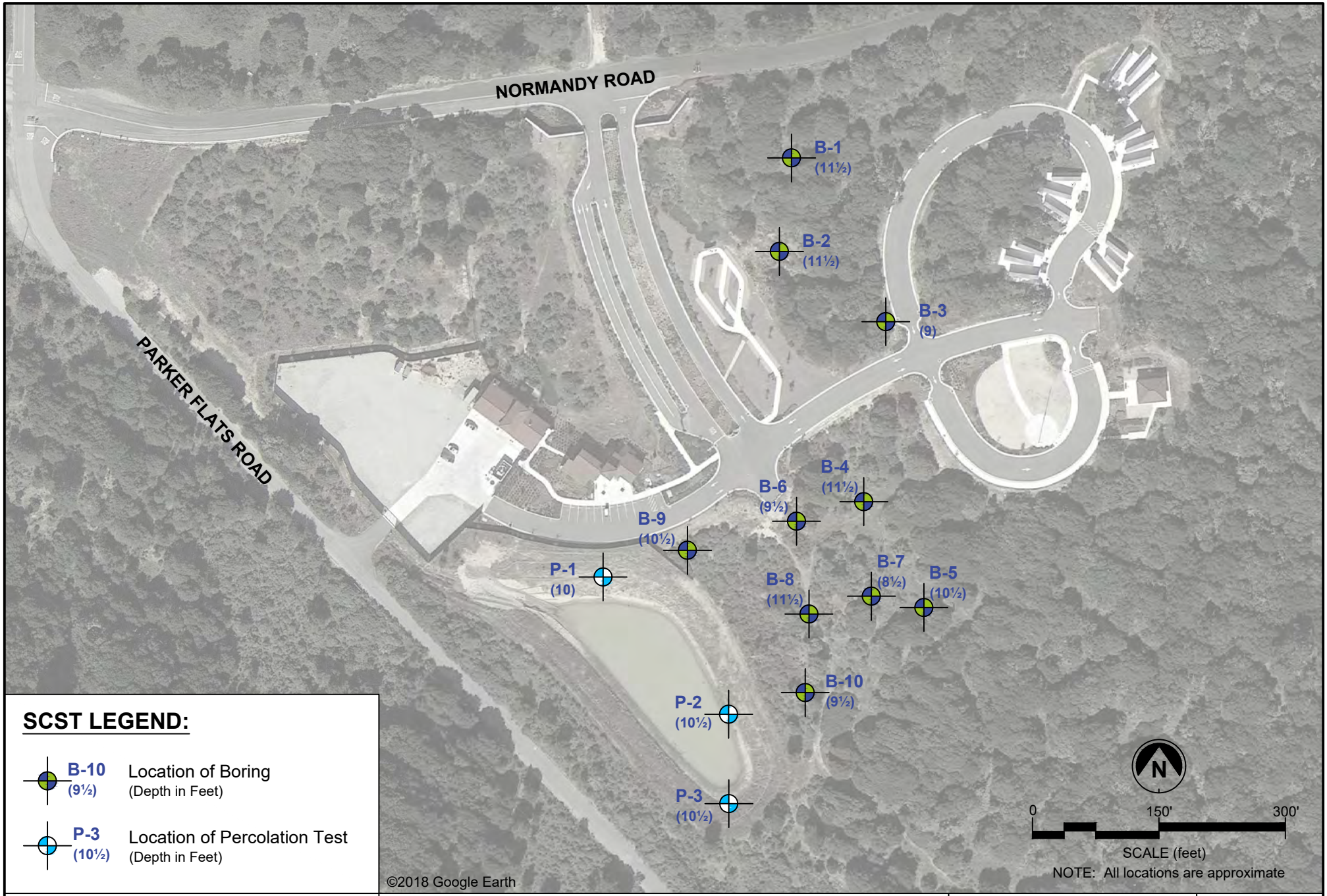
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Kleinfelder (2014), Geotechnical Investigation, Proposed California Central Coast Veterans Cemetery, Seaside, California, dated July 17.

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SCST, LLC	**SITE VICINITY MAP** CCCVC Veterans Cemetery Seaside, California	Date: December, 2018 By: PFL/DTC Job No.: 180402P4-1	Figure: 1



SCST LEGEND:

- B-10 (9½) — Location of Boring (Depth in Feet)
- P-3 (10½) — Location of Percolation Test (Depth in Feet)

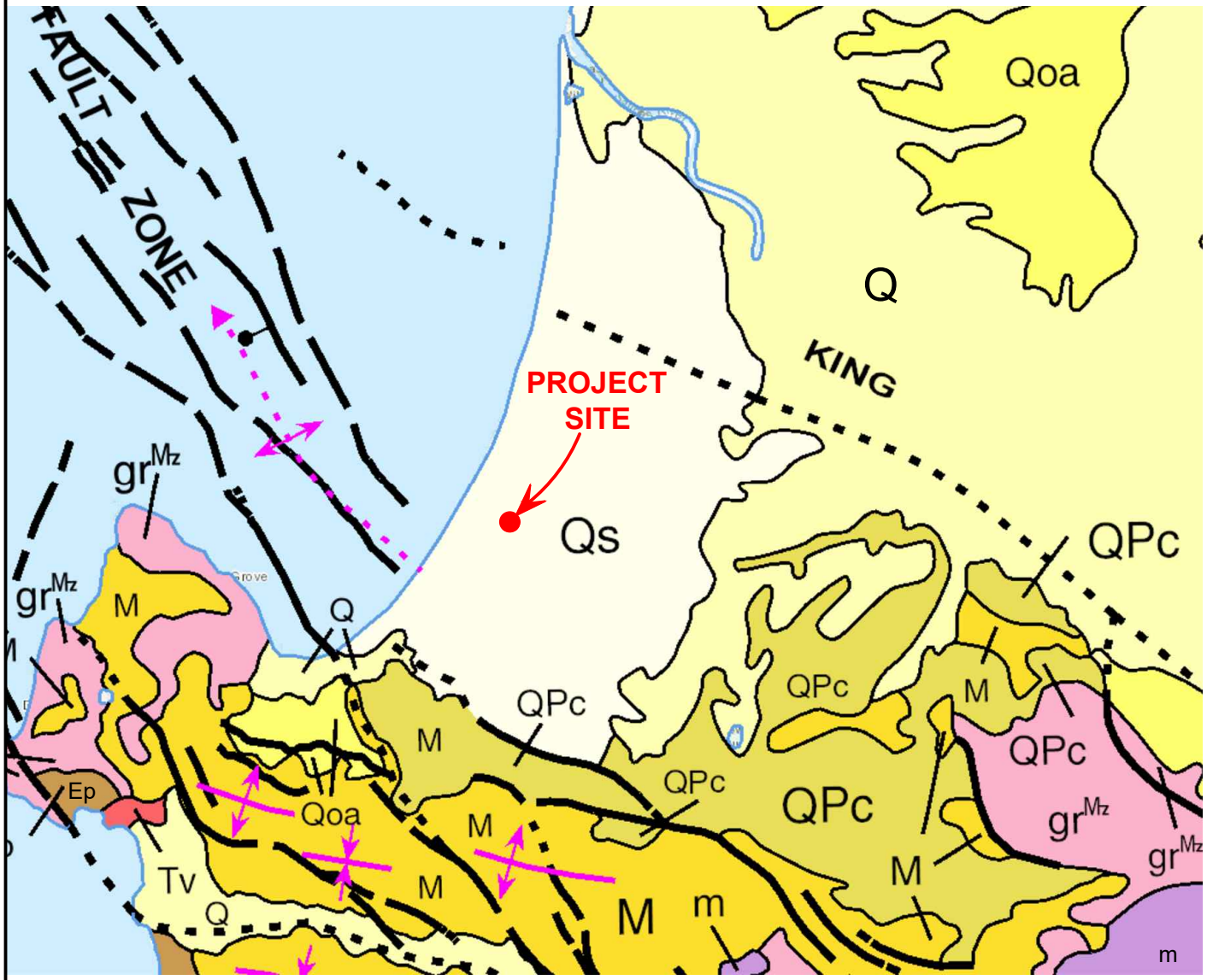
SCST, LLC

SUBSURFACE EXPLORATION MAP

CCCVC Veterans Cemetery
Seaside, California

Date: December, 2018
By: PFL/DTC
Job No.: 180402P4-1

Figure: 2



EXPLANATION:

Qs	Quaternary sand deposits
QPc	Pilo-Pleistocene and Pliocene loosely consolidated deposits
Q	Quaternary alluvium and marine deposits
Qoa	Older alluvial flood plain deposits
Tv	Tertiary volcanic flow rocks
M	Miocene marine rocks
Ep	Paleocene marine rocks
m	Pre-Cenozoic metasedimentary and metavolcanic rocks undivided
gr^{Mz}	Mesozoic granitic rocks

Anticline Fold - Solid where well defined; short dash where inferred

Syncline Fold - Solid where well defined; short dash where inferred

70 U D

Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

N

0 15,000' 30,000'

SCALE (feet)

Reference:
Jennings, C.W., updated by Gutierrez, C., Bryant, W., Saucedo, G., and Willis, C. (2010), Geologic Map of California, California Geologic Survey, Scale 1:750,000

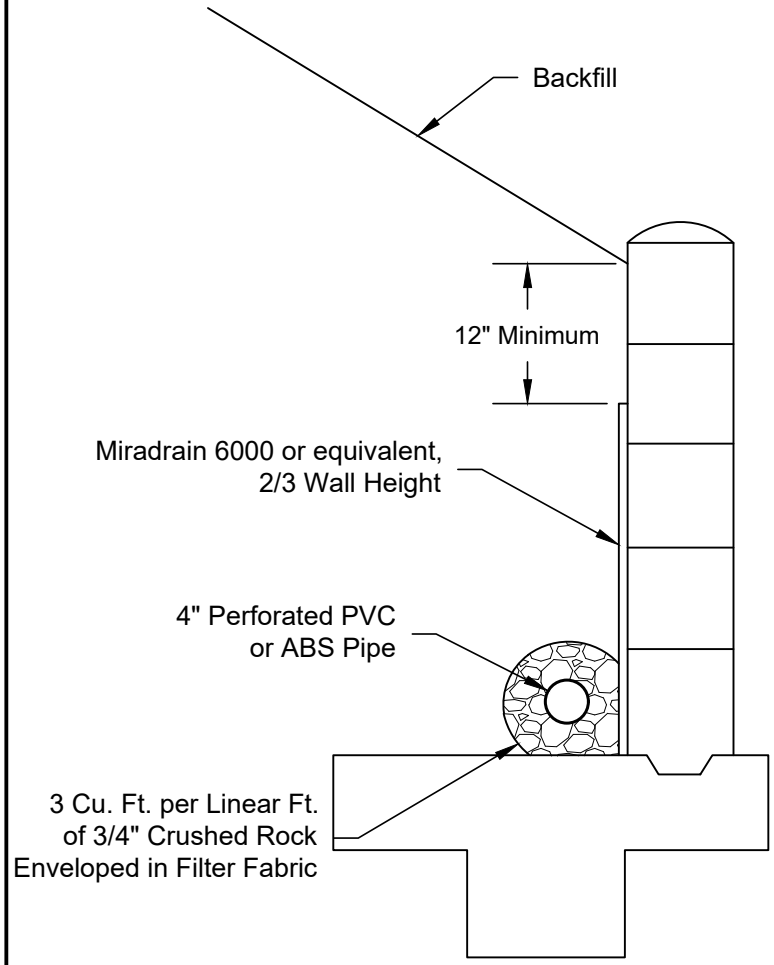
SCST, LLC

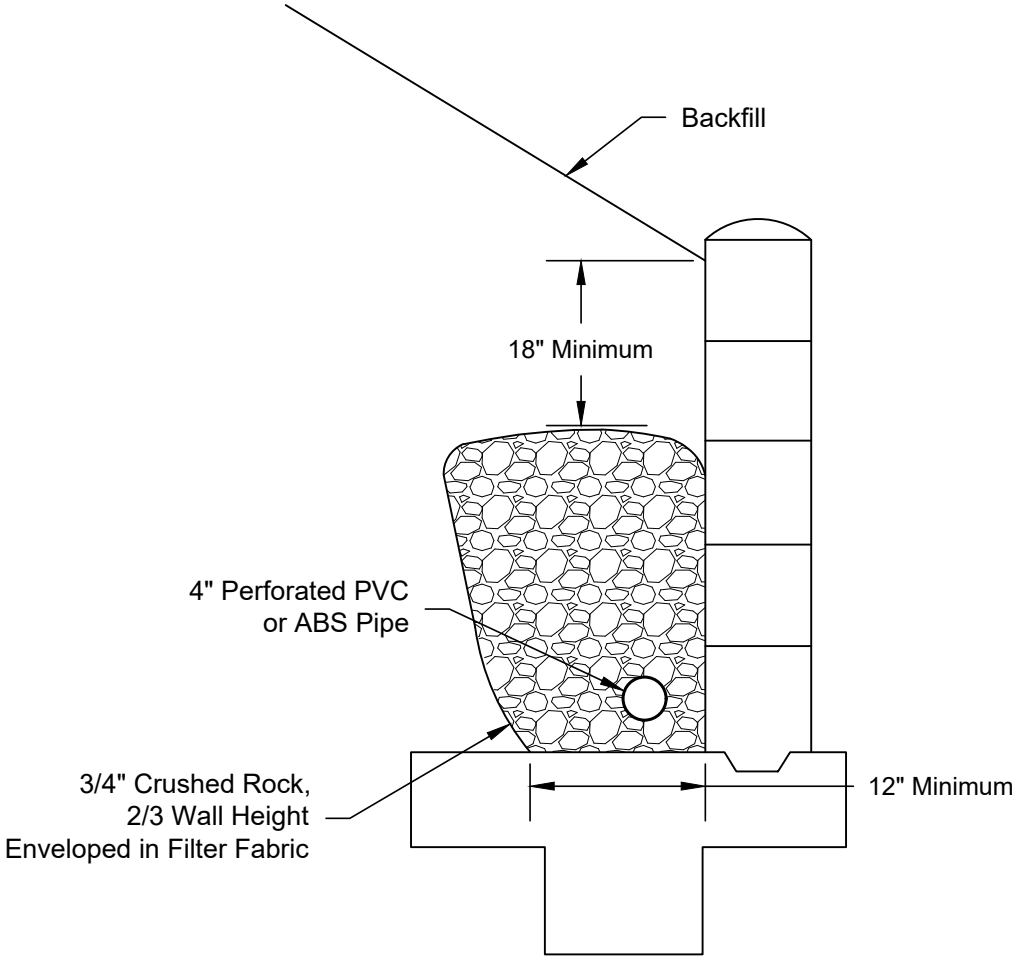
REGIONAL GEOLOGY MAP

CCCVC Veterans Cemetery
Seaside, California

Date: November, 2018
By: PFL/DTC
Job No.: 180402P4-1

Figure: 3





NOT TO SCALE

NOTES:

1) Dampproof or waterproof back of wall following architect's specifications.
2) 4" minimum perforated pipe, SDR35 or equivalent, holes down, 1% fall to outlet. Provide solid outlet pipe at suitable locations.
3) Drain installation and outlet connection should be observed by the geotechnical consultant.

SCST, LLC	**TYPICAL RETAINING WALL BACKDRAIN DETAILS** CCCVC Veterans Cemetery Seaside, California	Date: December, 2018 By: PFL/DTC Job No.: 180402P4-1	Figure: 4

APPENDIX I
FIELD INVESTIGATION

Our field investigation consisted of a visual reconnaissance of the site and drilling ten borings and three percolation test borings to depths between about 8½ and11½ feet below the existing ground surface using a tripod drill rig and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations. Figure 2 presents the approximate locations of the borings and percolation tests. The field investigation was performed under the observation of an SCST geologist who also logged the borings and obtained samples of the materials encountered in the borings.

The soils are classified in accordance with the Unified Soil Classification System as illustrated on Figure I-1. Logs of the borings are presented on Figures I-2 through I-14.

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION		GROUP SYMBOL	TYPICAL NAMES
I. COARSE GRAINED, more than 50% of material is larger than No. 200 sieve size.			
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
	GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
		SP	Poorly graded sands, gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand and silty mixtures.
		SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED, more than 50% of material is smaller than No. 200 sieve size.			
	SILTS AND CLAYS (Liquid Limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays or low plasticity.
	SILTS AND CLAYS (Liquid Limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
III. HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.

SAMPLE SYMBOLS

- ☒ - Bulk Sample
- CAL - Modified California Sampler
- CK - Undisturbed Chunk sample
- MS - Maximum Size of Particle
- ST - Shelby Tube
- SPT - Standard Penetration Test sampler

GROUNDWATER SYMBOLS

- ▽ - Water level at time of excavation or as indicated
- ≈ - Water seepage at time of excavation or as indicated

LABORATORY TEST SYMBOLS

- AL - Atterberg Limits
- CON - Consolidation
- COR - Corrosivity Tests (Resistivity, pH, Chloride, Sulfate)
- DS - Direct Shear
- EI - Expansion Index
- MAX - Maximum Density
- RV - R-Value
- SA - Sieve Analysis

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-1

LOG OF BORING B-1

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 310 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, moist, fine grained.							
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		20	17	2.7	96.3	DS
3									
4									
5									
6		Light yellowish brown.	CAL		23	20	1.0	102.6	
7									
8									
9									
10									
11		Light brown, dense.	CAL		56	48	5.2	105.0	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-2

LOG OF BORING B-2

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 297 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs)**: POORLY GRADED SAND with SILT, loose, light yellowish brown, moist, fine grained.		X					SA EI COR
2									
3	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		15	13	1.8	98.6	
4									
5									
6			CAL		15	13	4.8	97.6	
7									
8									
9									
10									
11			CAL		28	24	6.3	101.4	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-3

LOG OF BORING B-3

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 297 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, brown, dry, fine grained.		X					
2				X					
3		Medium dense, light brown, moist.	CAL	X	25	21	2.1	95.8	
4				X					
5		Dense.		X					
6			CAL		48	41	2.1	101.0	
7									
8		Very dense.							
9			CAL		50/6		4.1	106.1	
10		**BORING TERMINATED AT 9 FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-4

LOG OF BORING B-4

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 283 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.		X					
2				X					
3	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL	X	19	16	3.5	101.2	
4				X					
5				X					
6			CAL		33	28	7.2	110.9	
7									
8									
9									
10		Dense, fine to medium grained.							
11			CAL		49	42	4.8	108.3	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

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Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-5

LOG OF BORING B-5

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 292 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									SA
3		Medium dense, moist.	CAL		26	22	2.4	102.2	EI
4									COR
5	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
6			CAL		16	14	3.2	95.9	
7									
8									
9		Dense.							
10			CAL		42	36	8.9	117.3	
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-6

LOG OF BORING B-6

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 280 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.		X					
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.		X					SA
3			CAL	X	26	22	2.4	100.3	RV
4				X					
5				X					
6			CAL		35	30	2.5	105.1	
7									
8		Very dense.							
9			CAL		59	50	7.2	109.9	
10		**BORING TERMINATED AT 9½ FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-7

LOG OF BORING B-7

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 283 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		20	17	2.1	97.0	SA RV
3									
4									
5		Very dense.	CAL		65	55	3.0	107.8	
6									
7		Dense.							
8			CAL		51	43	5.3	110.6	
9		**BORING TERMINATED AT 8½ FEET**							
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-8

LOG OF BORING B-8

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 279 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2	SM	SILTY SAND, loose, light brown, moist, fine grained.							
3									
4									
5		Medium dense.							
6			CAL		20	17	10.1	110.3	DS
7									
8									
9									
10									
11			CAL		20	17	11.8	114.1	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-9

LOG OF BORING B-9

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 280 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									
3		Dense, grey brown.	CAL		40	34	3.6	101.4	SA EI COR
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		21	18	3.3	97.8	
7									
8									
9									
10		Dense.	CAL		51	43	9.1	99.4	
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-10

LOG OF BORING B-10

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 277 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									
3	SM	SILTY SAND, medium dense, light yellowish brown, moist, fine grained.							
4			CAL		21	18	3.3	102.9	
5		Light brown.							
6			CAL		33	28	6.5	107.2	
7									
8									
9			CAL		34	29	11.8	117.9	
10		**BORING TERMINATED AT 9½ FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-11

LOG OF BORING P-1

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, light yellowish brown, dry to moist, fine grained.		X					SA
2									
3		Light brown.							
4									
5									
6									
7									
8									
9									
10		**BORING TERMINATED AT 10 FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-12

LOG OF BORING P-2

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs)**: SILTY SAND, loose, light yellowish brown, dry, fine grained.		X					SA
2	SP	POORLY GRADED SAND with SILT, loose, dark brown, moist, fine grained.							
3									
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
7									
8									
9									
10									
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

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Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-13

LOG OF BORING P-3

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, light yellowish brown, dry, fine grained.							
2	SP	POORLY GRADED SAND with SILT, loose, dark brown, moist, fine grained.							
3									
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
7									
8									
9									
10									
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

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CCCVC Veterans Cemetery
Seaside, California

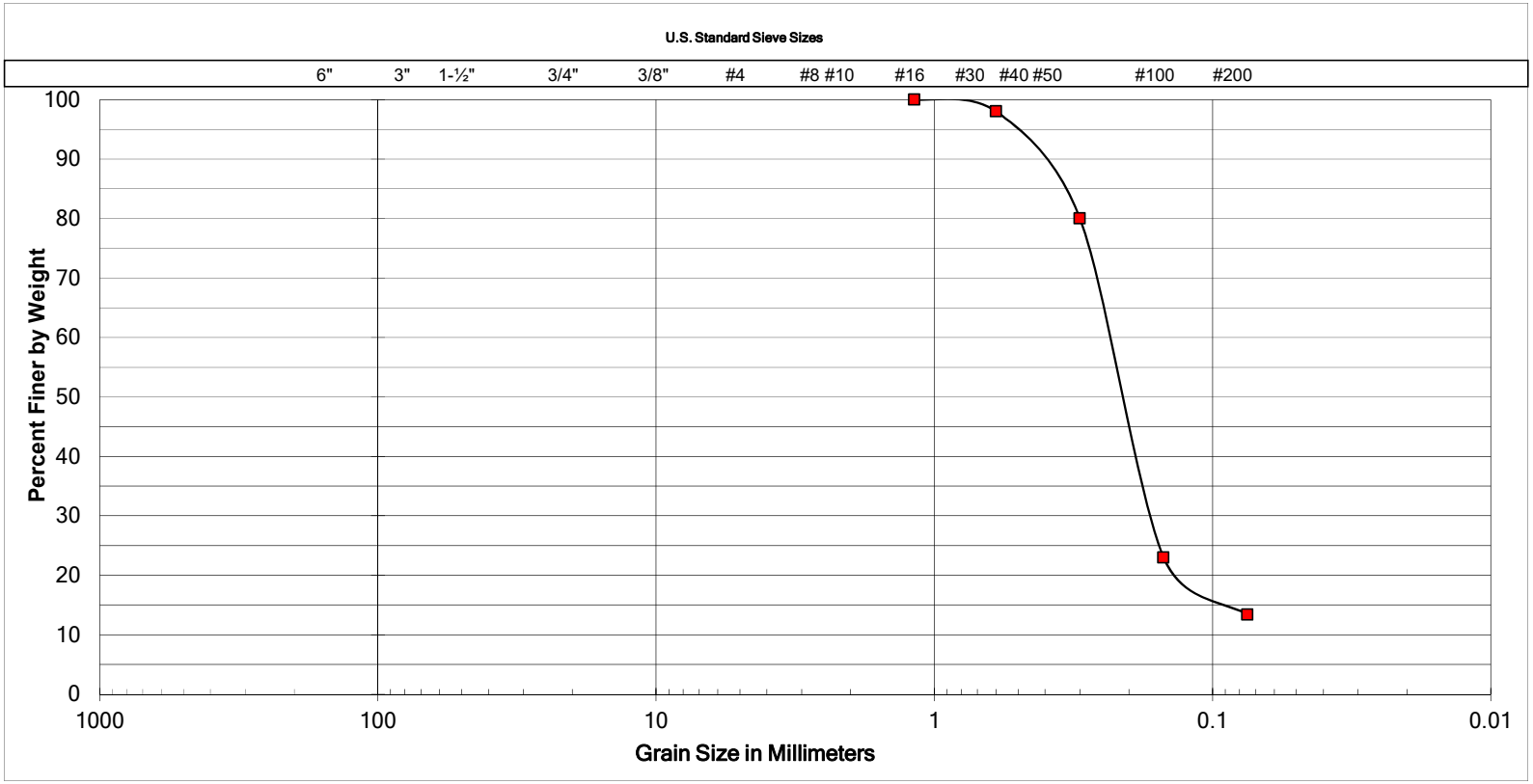
By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-14

APPENDIX II
LABORATORY TESTING

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **PARTICLE-SIZE DISTRIBUTION:** The particle-size distribution was determined on selected soil samples in accordance with ASTM D422.
- **DIRECT SHEAR:** The direct shear was determined on selected soil samples in accordance with ASTM D3080.
- **R-VALUE:** R-value tests were performed on selected soil samples in accordance with California Test Method 301.
- **EXPANSION INDEX:** The expansion index was determined on selected soil samples in accordance with ASTM D4829.
- **CORROSIVITY**: Corrosivity tests were performed on selected soil samples. The pH and minimum resistivity were determined in accordance with California Test 643. The total chloride ion content was determined in accordance with California Test 422. The soluble sulfate content was determined in accordance with California Test 417.

Soil samples not tested are now stored in our laboratory for future reference and analysis, if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-2 at 0 to 5 feet
SAMPLE NUMBER
34809

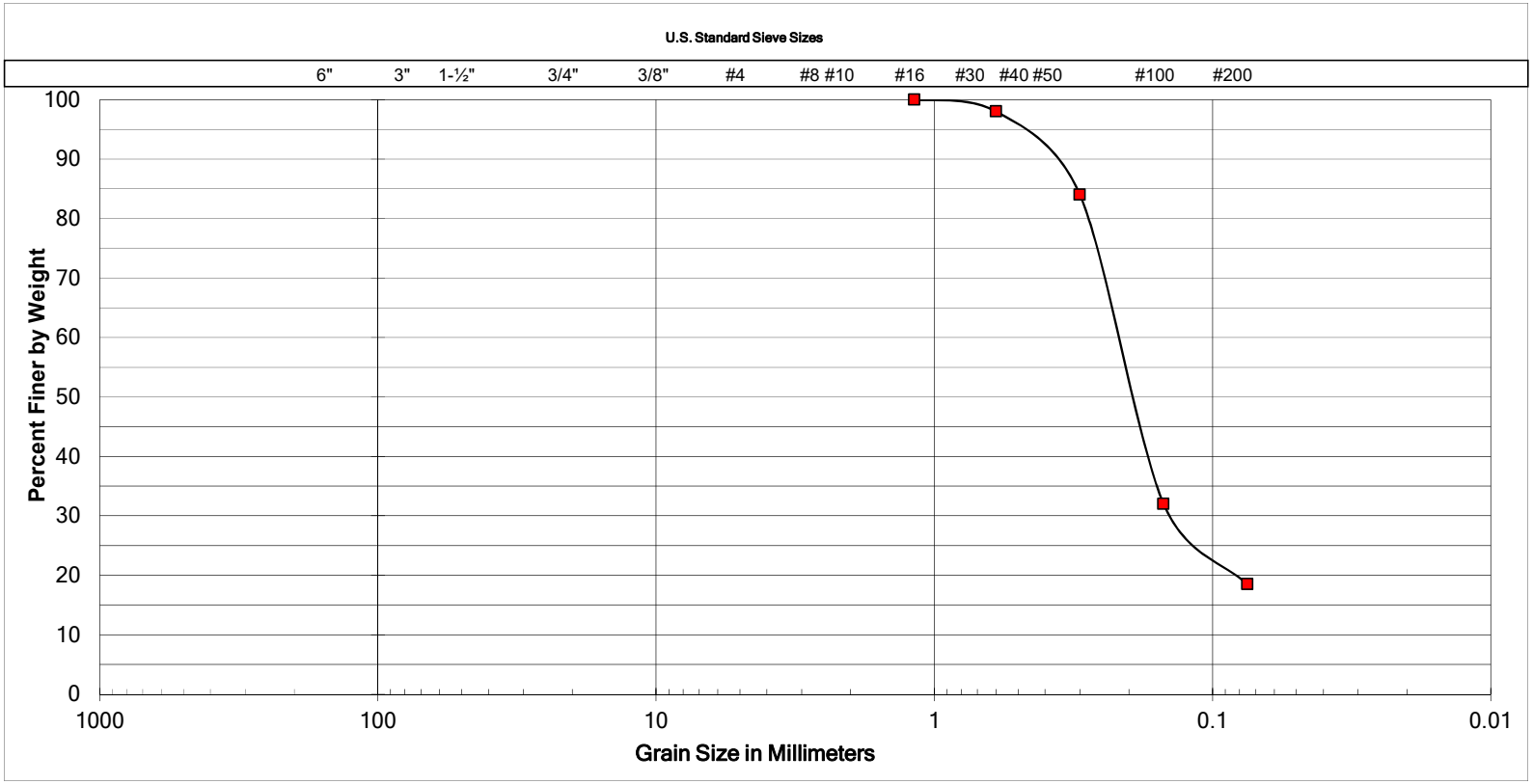
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

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CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-5 at 0 to 5 feet
SAMPLE NUMBER
34819

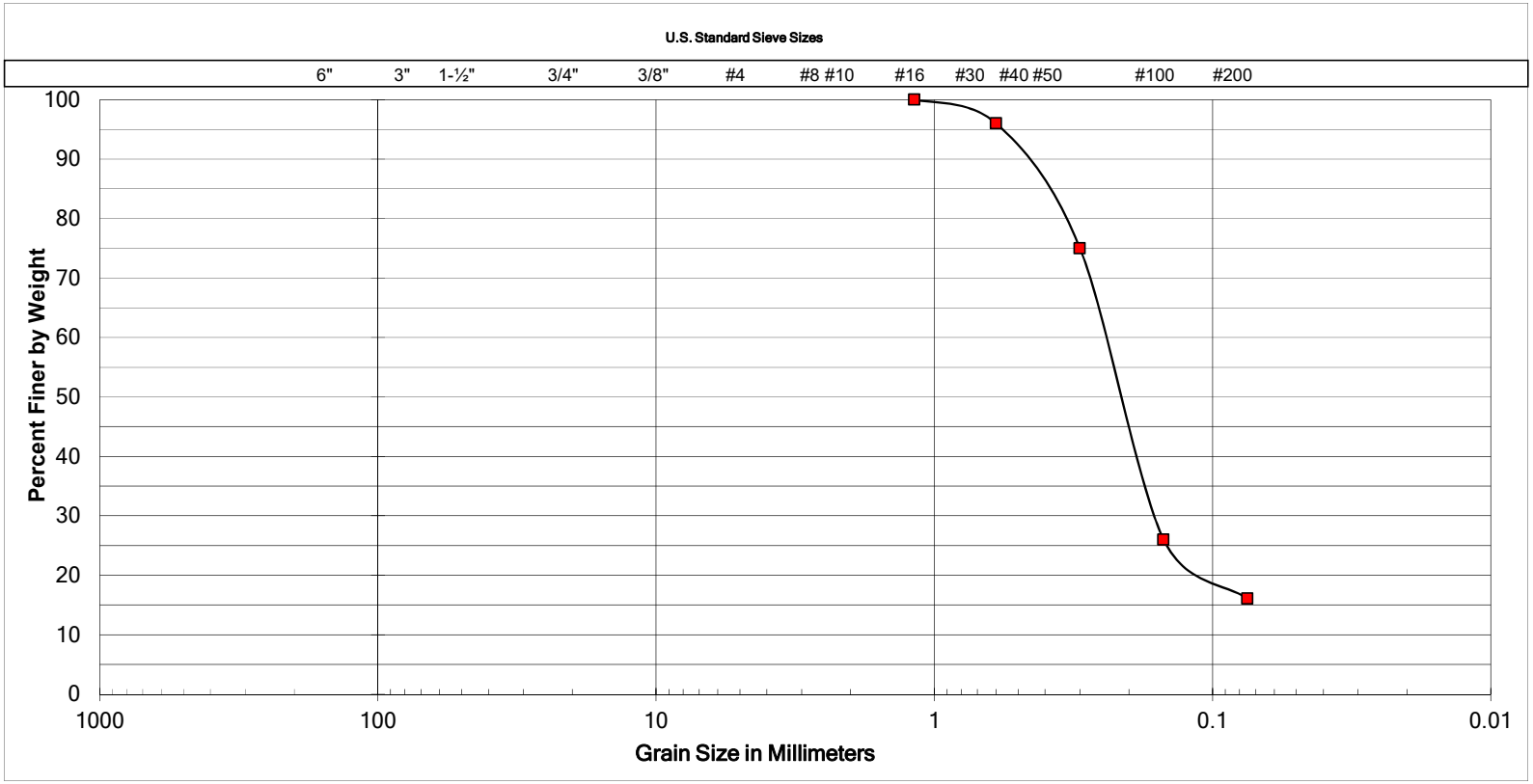
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

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CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-6 at 0 to 5 feet
SAMPLE NUMBER
34823

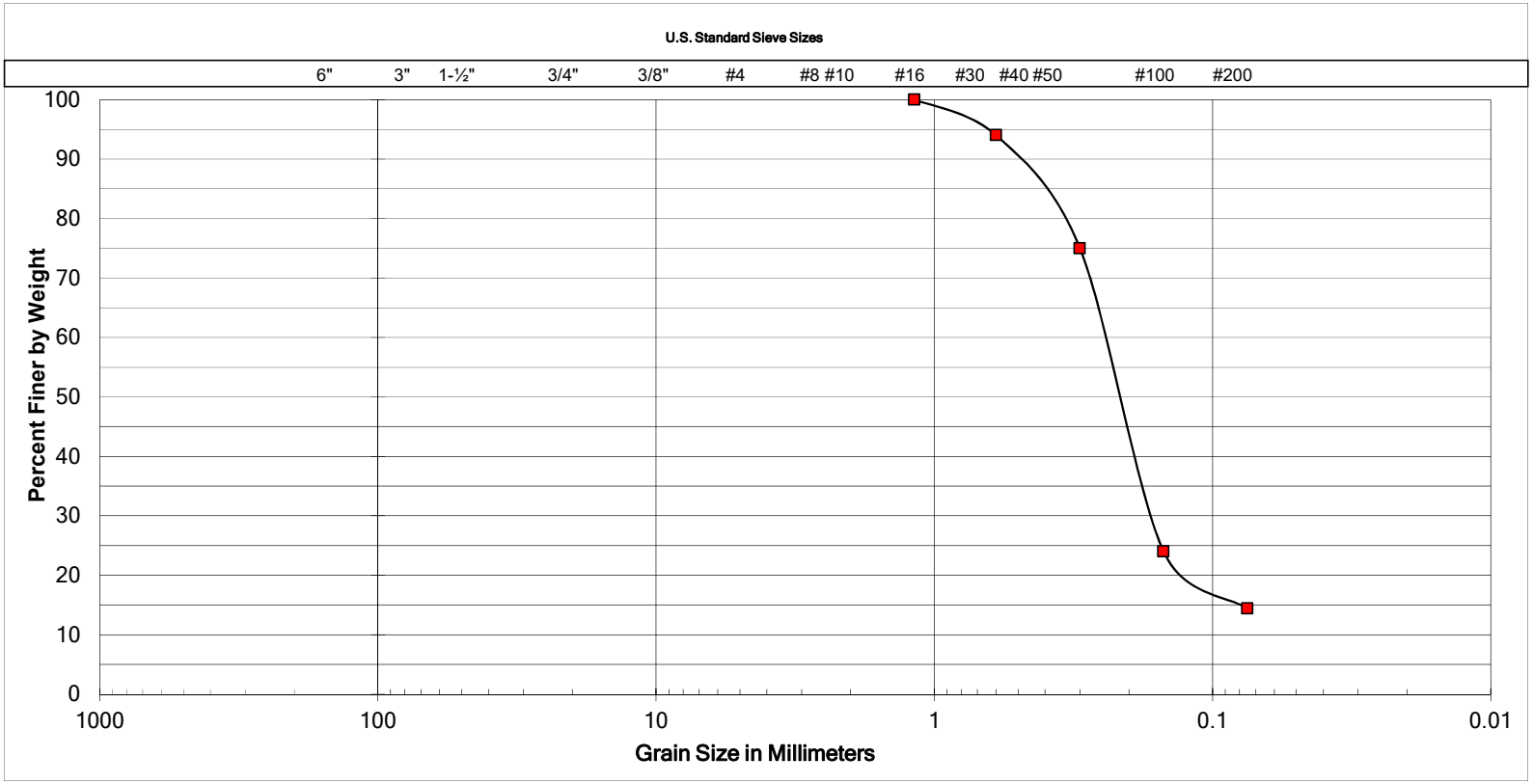
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

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By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-3



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-7 at 0 to 5 feet
SAMPLE NUMBER
34827

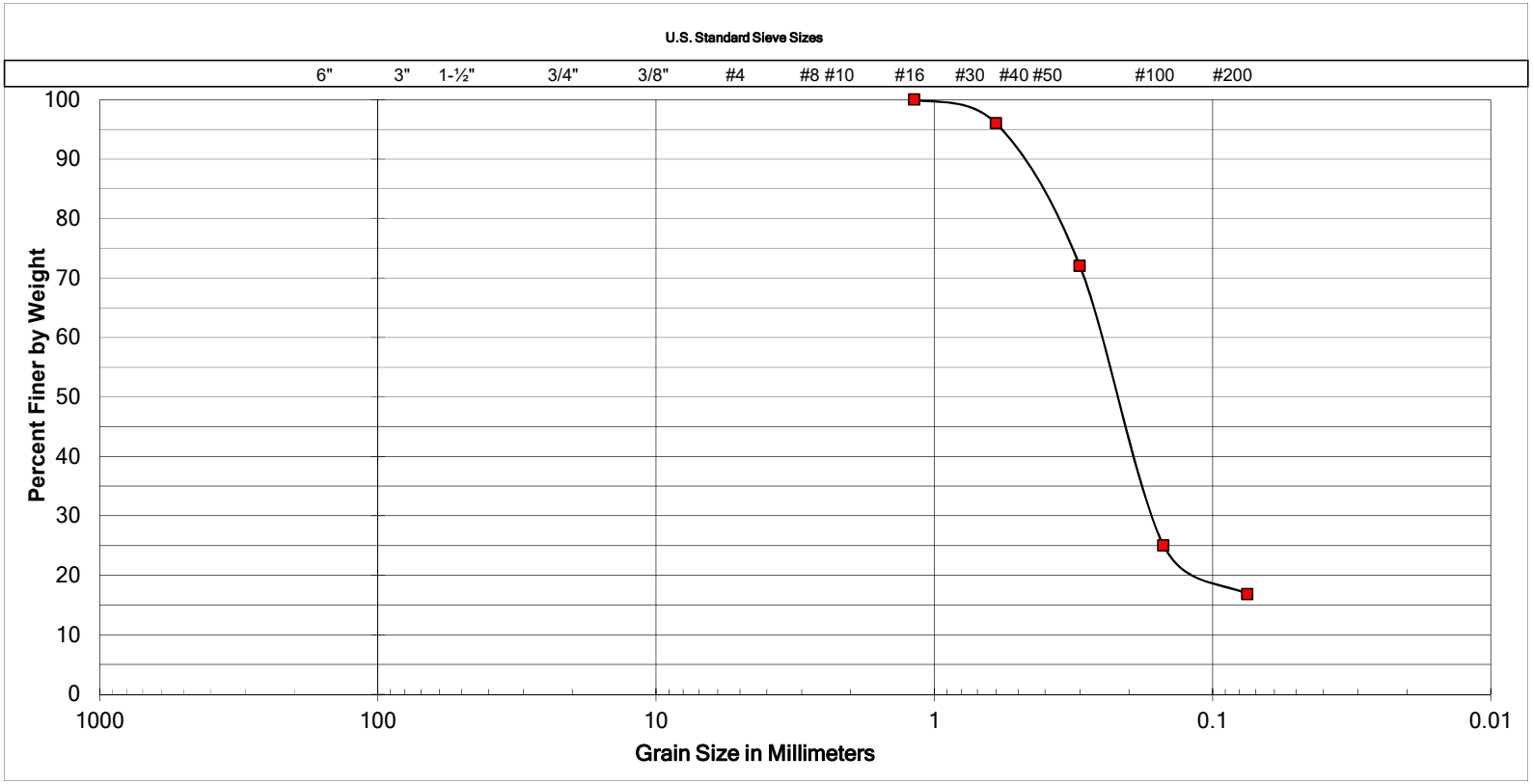
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

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Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-4



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-9 at 0 to 5 feet
SAMPLE NUMBER
34833

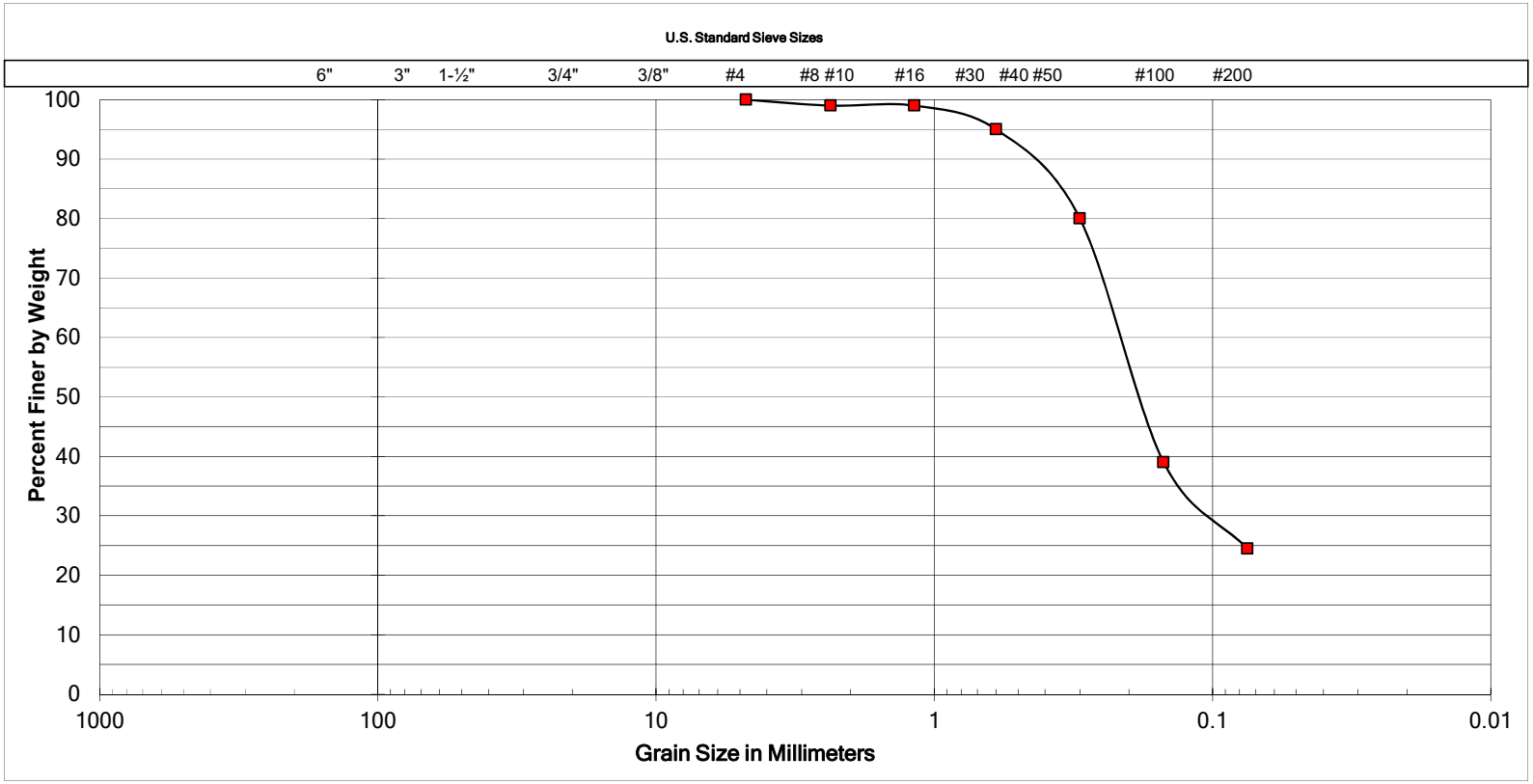
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-5



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
P-1 at 0 to 1.5 feet
SAMPLE NUMBER
34840

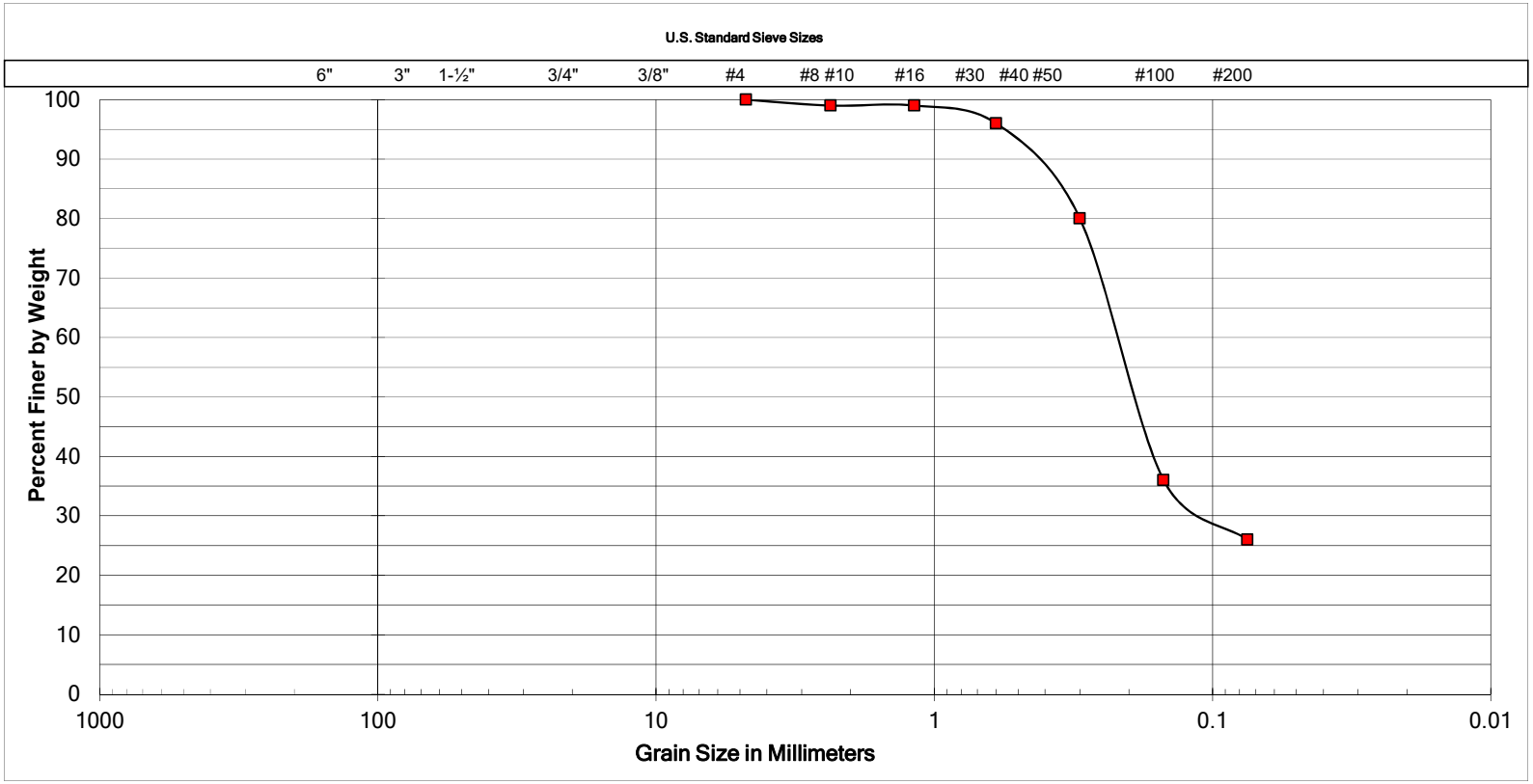
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	ACL	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-6



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
P-2 at 0 to 2 feet
SAMPLE NUMBER
34841

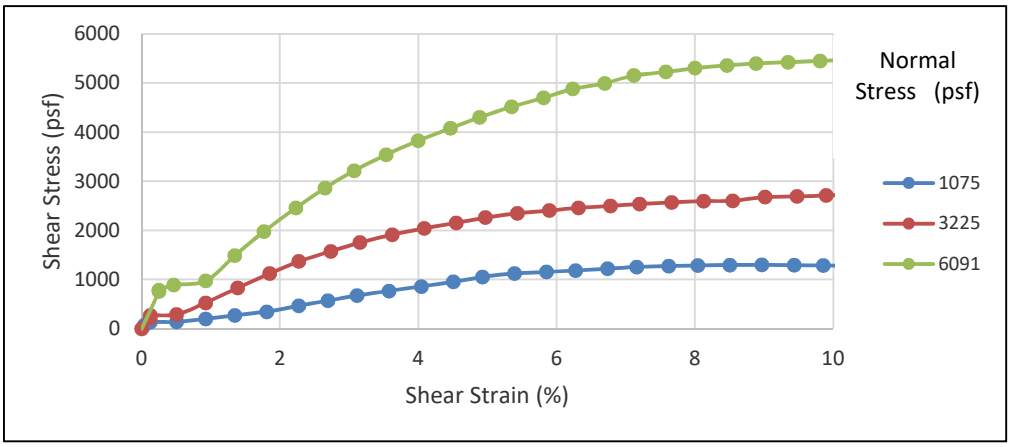
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

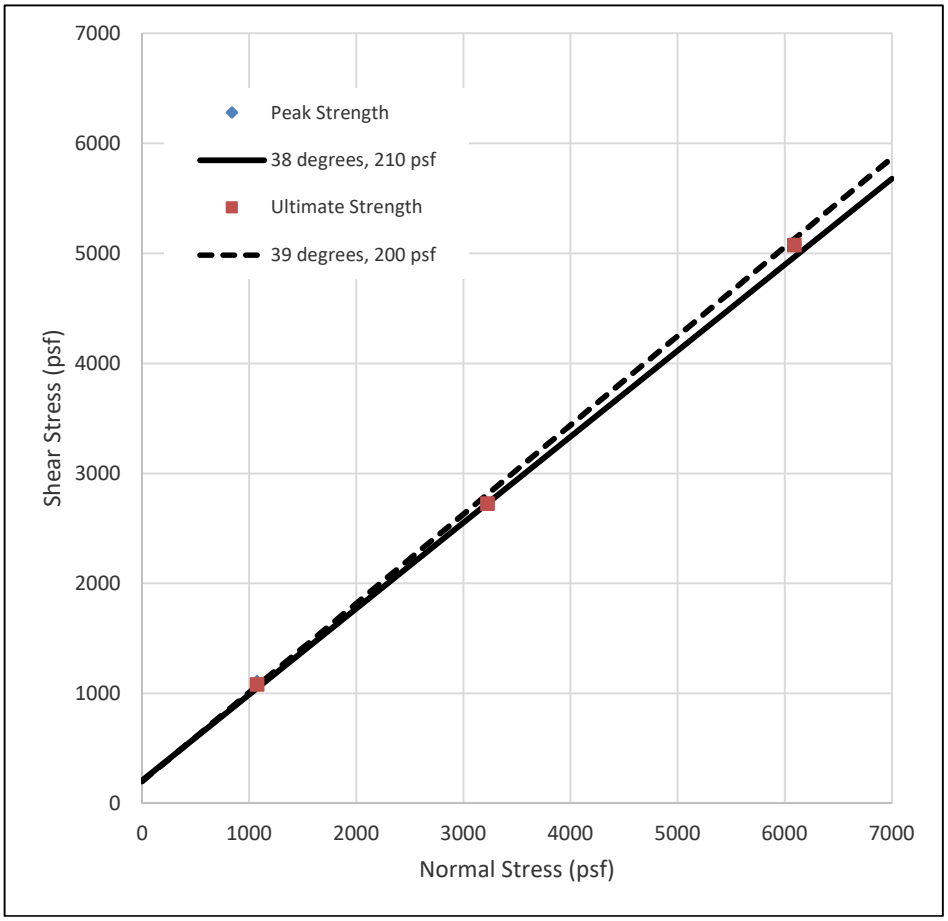
ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-7





SAMPLE ID: B-1 at 3 to 3.5 feet

Silty Sand

NOTES: Insitu
Strain Rate: 0.003 in/min
Sample was consolidated and drained

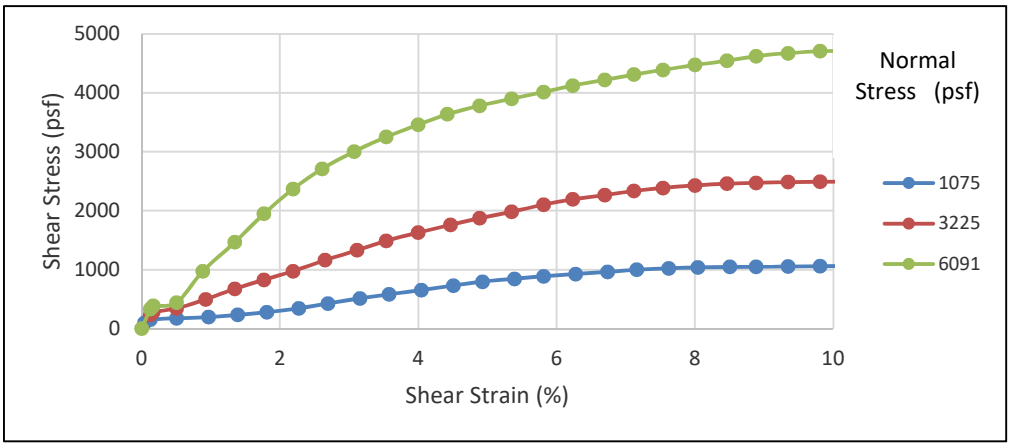
	Peak	Ultimate
Φ	38 °	39 °
c	210 psf	200 psf

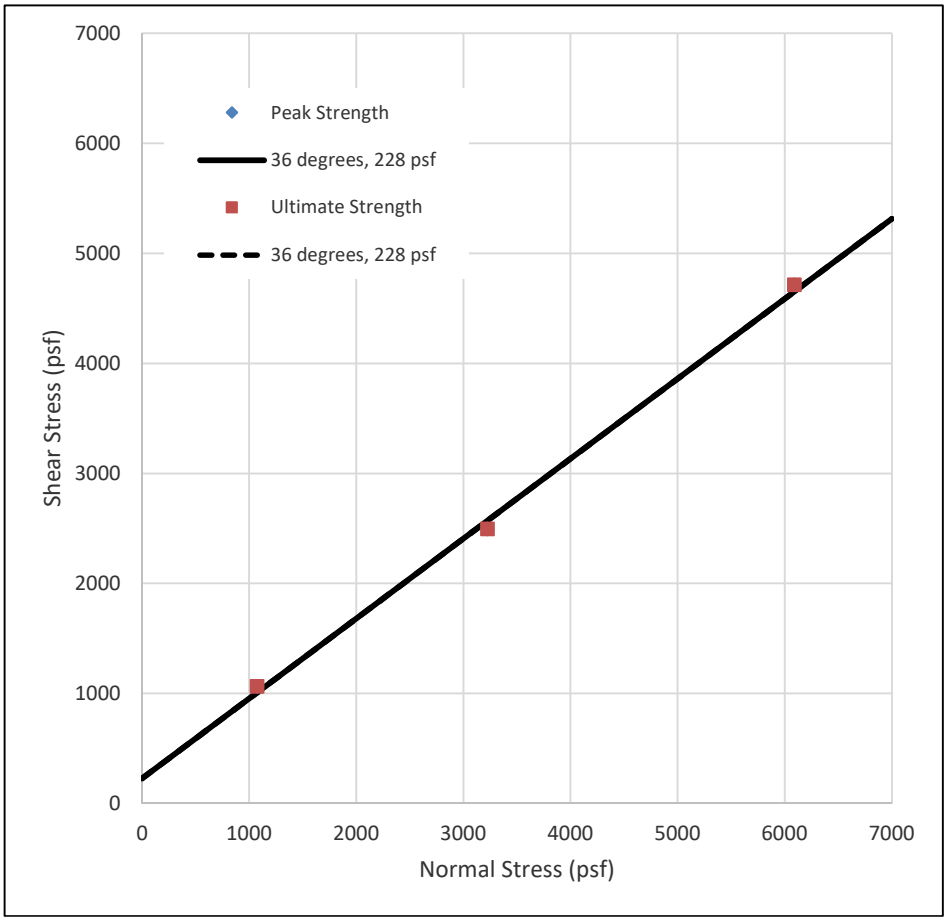
	Initial	Final
γ_d	96.3 pcf	96.3 pcf
w_c	2.7 %	25.0 %
Saturation	10 %	91 %

SCST Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	DB	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-8





SAMPLE ID: B-8 at 6 to 6.5 feet

Silty Sand

NOTES: Insitu
Strain Rate: 0.003 in/min
Sample was consolidated and drained

	Peak	Ultimate
Φ	36 °	36 °
c	228 psf	228 psf

	Initial	Final
γ_d	110.3 pcf	110.3 pcf
w_c	10.1 %	15.4 %
Saturation	55 %	84 %

SCST Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	DB	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-9

EXPANSION INDEX

ASTM D4829

SAMPLE	DESCRIPTION	EI
B-2 at 0 to 5 feet	SILTY SAND	0
B-5 at 0 to 5 feet	SILTY SAND	1
B-9 at 0 to 5 feet	SILTY SAND	0

Classification of Expansive Soil [1]

EXPANSIVE INDEX	POTENTIAL EXPANSION
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

1. ASTM - D4829

R-VALUE

CALIFORNIA TEST 301

SAMPLE	DESCRIPTION	R-VALUE
B-6 at 0 to 5 feet	SILTY SAND	78
B-7 at 0 to 5 feet	SILTY SAND	67

RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

pH & Resistivity (Cal 643, ASTM G51)

Soluble Chlorides (Cal 422)

Soluble Sulfate (Cal 417)

SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-2 at 0 to 5 feet	19,000	6.91	0.005	0.003
B-5 at 0 to 5 feet	15,400	7.16	0.003	0.003
B-9 at 0 to 5 feet	10,700	6.61	0.005	0.005

Sulphate Exposure Classes [2]

CLASS	SEVERITY	WATER-SOLUBLE SULFATE (SO_4) IN SOIL, PERCENT BY MASS
S0	Not applicable	$SO_4 < 0.10$
S1	Moderate	$0.10 \le SO_4 < 0.20$
S2	Severe	$0.20 \le SO_4 \le 2.00$
S3	Very Severe	$SO_4 > 2.00$

2. ACI 318, Table 19.3.1.1

APPENDIX III
INFILTRATION TESTING RESULTS

We performed borehole percolation testing at three locations (P-1 through P-3). Figures III-1 through III-3 present the results of the testing.

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-1**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	10.0	Water Used (gallons):	5.2
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	14:05 14:10	0:05	3.50	0.00	42.00	0.1	Dry
2	14:16 14:18	0:02	2.50	0.78	20.64	0.1	Refilled
3	14:18 14:20	0:02	0.78	0.59	2.28	0.9	
4	14:20 14:22	0:02	0.59	0.50	1.08	1.9	
5	14:22 14:24	0:02	0.50	0.00	6.00	Dry	Dry
6	14:25 14:27	0:02	3.50	0.55	35.40	0.1	Refilled
7	14:27 14:29	0:02	0.55	0.50	0.60	3.3	
8	14:29 14:31	0:02	0.50	0.00	6.00	0.3	Dry
9	14:32 14:33	0:01	3.50	0.49	36.12	0.0	Refilled
10	14:33 14:34	0:01	0.49	0.00	5.88	Dry	Dry
11	14:38 14:39	0:01	2.50	0.62	22.56	0.0	Refilled
12	14:39 14:40	0:01	0.62	0.59	0.36	2.8	
13	14:40 14:41	0:01	0.59	0.56	0.36	2.8	
14	14:41 14:42	0:01	0.56	0.54	0.24	4.2	
15	14:42 14:43	0:01	0.54	0.50	0.48	2.1	
16	14:43 14:44	0:01	0.50	0.00	6.00	Dry	Dry
				Observed Percolation Rate:		2.1 min/in 28.8 in/hr	
				Gravel Correction Factor:		1.82	
				Corrected Percolation Rate:		4 min/in 15.8 in/hr	
				***Tested Infiltation Rate, I_t:**		**5.3 in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.5

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 1

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 6.6

SCST, Inc.	CCCVC, Veterans Cemetery Project Seaside, California		
	By: EMW	Date:	December, 2018
	Job No: 180402P4-1	Figure:	III-1

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-2**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	9.0	Water Used (gallons):	7.35
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	11:07 11:17	0:10	2.15	0.45	20.40	0.5	
2	11:17 11:22	0:05	0.45	0.29	1.92	Dry	Dry, 1.5" of silt at bottom
3	11:26 11:31	0:05	2.09	1.13	11.52	0.4	Refilled
4	11:31 11:36	0:05	1.13	0.70	5.16	1.0	
5	11:36 11:42	0:06	0.70	0.44	3.12	Dry	Dry, 2" of silt at bottom
6	11:51 11:53	0:02	2.15	1.94	2.52	0.8	Refilled
7	11:53 11:55	0:02	1.94	1.80	1.68	1.2	
8	11:55 11:57	0:02	1.80	1.66	1.68	1.2	
9	11:57 11:59	0:02	1.66	1.55	1.32	1.5	
10	11:59 12:01	0:02	1.55	1.44	1.32	1.5	
11	12:01 12:03	0:02	1.44	1.32	1.44	1.4	
12	12:03 12:05	0:02	1.32	1.25	0.84	2.4	
13	12:05 12:07	0:02	1.25	1.16	1.08	1.9	
14	12:07 12:12	0:05	1.16	1.10	0.72	6.9	
15	12:12 12:17	0:05	1.10	1.06	0.48	10.4	
16	12:17 12:22	0:05	1.06	1.02	0.48	10.4	
17	12:22 12:27	0:05	1.02	0.95	0.84	Dry	Dry, 8" of silt at bottom
			Observed Percolation Rate:		10 5.8	min/in in/hr	
			Gravel Correction Factor:		1.82		
			Corrected Percolation Rate:		19 3.2	min/in in/hr	
			***Tested Infiltation Rate, I_t:**		**0.6**	**in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.5

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 5

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 13.0

SCST, Inc.	CCCVC, Veterans Cemetery Project Seaside, California	
	By: EMW	Date: December, 2018
	Job No: 180402P4-1	Figure: III-2

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-3**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	10.0	Water Used (gallons):	5.55
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	16:15 16:16	0:01	3.21	0.40	33.72	0.0	
2	16:16 16:17	0:01	0.40	0.35	0.60	1.7	
3	16:17 16:18	0:01	0.35	0.27	0.96	1.0	
4	16:18 16:19	0:01	0.27	0.00	3.24	Dry	Dry
5	16:20 16:21	0:01	3.21	0.42	33.48	0.0	Refill
6	16:21 16:22	0:01	0.42	0.36	0.72	1.4	
7	16:22 16:23	0:01	0.36	0.31	0.60	1.7	
8	16:23 16:24	0:01	0.31	0.27	0.48	2.1	
9	16:24 16:25	0:01	0.27	0.00	3.24	Dry	Dry
10	16:26 16:27	0:01	3.21	0.32	34.68	0.0	Refill
11	16:27 16:28	0:01	0.32	0.25	0.84	1.2	
12	16:28 16:29	0:01	0.27	0.00	3.24	Dry	Dry
				Observed Percolation Rate:		1.2 min/in 50.4 in/hr	
				Gravel Correction Factor:		1.82	
				Corrected Percolation Rate:		2 min/in 27.7 in/hr	
				***Tested Infiltation Rate, I_t:**		**7.4 in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.8

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 1

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 8.7

Appendix G

Hydrological Reports

DETERMINATION OF 100-YEAR FLOODPLAIN

FOR

CALIFORNIA CENTRAL COAST VETERANS CEMETERY

City of Seaside, CA

HZ PROJECT NO. R305029.02

Prepared for:

California Department of Veterans Affairs and California Department of General Services



February 18, 2019

Prepared By:

HUITT-ZOLLARS

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Irvine, CA 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820

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Drainage Report for California Central Coast Veterans Cemetery – Phase 1 by Wood Rodgers, Inc. dated July 2, 2014 5
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1. Introduction

1.1 PROJECT AREA DESCRIPTION

This drainage report shows the results of analysis performed to evaluate the proposed changes to the 100-year floodplain for the Phase 2 development of the California Central Coast Veterans Cemetery (CCCVC) located in the City of Seaside, California. The analysis demonstrated that the proposed enlargement of an existing infiltration drainage basin as part of Phase 2 will lower the mapped flood elevation to below the level shown in the existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM). The existing FEMA FIRM shows a base flood elevation of 286 feet with no mapped floodway. According to 44 CFR 60.3(c)13, a conditional letter of map revision (CLOMR) is required by FEMA in a mapped flood zone with no floodway if the proposed project increases the water surface elevation of the base flood by more than one foot. Because the water surface elevation will not be raised, a FEMA CLOMR is not necessary. The project will be required to perform another floodplain analysis after the construction of Phase 2 and submit a letter of map revision (LOMR) to FEMA. The determination that a CLOMR is not required is included in Attachment 15.

The cemetery is owned and operated by the State of California. The property is south of Normandy Road and Parker Flats Road and east of Parker Flats Cut-Off Road. The project area is shown in the vicinity map in Attachment 1. Phase 1 has already been constructed, and Phase 2 will consist of the construction of pre-placed concrete burial crypts, less than an acre of roadway, and the expansion of the existing basin to hold the 100-year flood volume. Part of the crypt burial section will be located on fill in the current floodplain. The 100-year flood volume will be contained in the proposed infiltration basin, reducing the extents and elevation of the floodplain. The study is intended to show that the flood hazard areas as shown in the effective FEMA FIRM Panel #06053C0195H are modified for the proposed development based on hydrology/hydraulic analysis. The current FIRM, #06053C0195H, is available in Attachment 2.

1.2 REPORT OBJECTIVES

The purpose of this study is to:

1. Update the limits of the 1% annual probability flooding area to reflect the development of existing Phase 1 and proposed Phase 2. The FEMA FIRM will be updated to show that the proposed enlarged infiltration basin has capacity to contain the 100-year flood volume for the tributary area.

This report provides:

1. Review of previous studies, grading plans, and any other applicable study produced in the area.
2. Outline of the methodology used to define the new limits of the 100-year flood plain condition.
3. Supporting information for the flood plain revision, including hydrology models, FEMA floodplain maps, geotechnical information and previous studies.

2. Hydrology and Flooding Patterns

2.1 Watershed Hydrology

The cemetery is located in a watershed that does not drain to any water body. All surface runoff flows to an onsite infiltration basin located in a natural depression. The site does not receive runoff from adjacent watersheds because each watershed has capacity to retain the 100-year storm event runoff.

The cemetery master plan shows that it will be developed in 11 Phases. Phase 1 has already been constructed and is modeled in the existing condition model. The proposed condition model is Phases 1 and 2. The ultimate condition, in which all 11 Phases have been developed, was also modeled and is shown in Attachment 14.

2.2 Existing Studies

LOMR #14-09-3525P and LOMR Application for California Central Coast Veterans Cemetery by Wood Rodgers, Inc. dated May 27, 2014

A LOMR by Wood Rodgers dated May 27, 2014 was approved for the project site on March 23, 2015 (LOMR application in Attachment 8 and LOMR determination letter in Attachment 9). The LOMR considered only the existing pre-development condition of the site, prior to construction of Phase 1, and assumed an imperviousness of 1%. A 100-year 72-hour duration storm event was modeled in HEC-HMS, per the former County of Monterey standard criteria. The report evaluated the undeveloped hillside drainage to the north and east of the cemetery project site. The drainage area containing the cemetery was designated Basin 5, and was found to have no offsite run-on from adjacent watersheds due to existing local depressions that contain and infiltrate runoff. The existing local depression in the Basin 5 drainage area was found sufficient to contain the 100-year flood volume, yielding a Base Flood Elevation of 286.1 feet.

Drainage Report for California Central Coast Veterans Cemetery – Phase 1 by Wood Rodgers, Inc. dated July 2, 2014

This report documents drainage design for Phase 1 of the cemetery and offsite improvements on Parker Flats Road. The report details on-site pipe design for Phase 1. The report details design of an infiltration chamber to take 100-year flows from a local sump in Parker Flats Road, north of the cemetery, preventing run-on to the cemetery project area. The report evaluated the drainage area north of Parker Flats Road that was shown as tributary to the cemetery site in the 2014 LOMR and determined that the hillside and northern half of the road are retained in a depression. The 100-year storm flow will not cross the road to enter the infiltration chamber on the south side or the cemetery site tributary area. The report is in Attachment 10.

2.3 FIELD RECONNAISSANCE

Four field reconnaissance visits were performed in the vicinity of the study area from November 2017 through December 2018. Photos taken during the reconnaissance visits provide the basis for the development of runoff curve numbers for the existing cover within the drainage area.







Existing cover in the project area

The existing cover in the project drainage area is oak woods and brush. Areas of woods and brush were delineated using ESRI imagery.

3. Methodology and Modeling Assumptions

3.1 METHODOLOGY

Calculations and design criteria in this report are based on hydrologic models meeting the minimum requirement of the National Flood Insurance Program.

3.2 Delineation of Subbasins

Drainage area delineation was based on existing site topography, the Phase 1 contour files, the proposed Phase 2 contours, and the previous studies by Wood Rogers. The Basin 5 existing condition drainage area from the Woods Rogers LOMR application was updated to reflect the findings of the Woods Rogers Drainage Study dated July 3, 2014, which shows no offsite run-on north of the cemetery.

The following plans and elevation data were used for drainage delineation:

- State of California Department of Veterans Affairs California Central Coast Veterans Cemetery – Phase 1 FAI No. CA-09-05 record plan set, dated June 11, 2014
- RHAA Masterplan Concept, dated September 2015
- Phase 2 proposed grading
- A topographic survey of the 5547 Paradise Valley Rd photographed in July 2010 (and updated in March 2014), spliced with Phase 1 development topography and Phase 2 proposed development topography

3.3 Hydrology

Hydrologic computations were performed using the FEMA approved WinTR-55 software.

Storm data

The 100-year 24-hour storm with a Type 1 SCS rainfall distribution was modeled for the tributary drainage area. The Type 1 distribution is applicable to the Monterey County area, as shown in the SCS map in Attachment 6. The 100-year 72-hour rainfall distribution used in the Wood Rogers LOMR model was not used because the 100-yr 24-hour rainfall distribution is the new Monterey County standard. The existing condition flow from the new model was compared with the Wood Rogers LOMR model, as discussed in the Model Calibration section below.

- 24-hour precipitation depths are from NOAA Atlas 14. The 100-year 24-hour depth is 4.93 inches. See Attachment 6.
- The infiltration basin was modeled without infiltration losses to ensure that it can contain the entire 100-year volume. In reality, infiltration will occur throughout the storm, as the watershed has no outlet.

Soil and geotechnical

The watershed is entirely on NRCS Soil A, as shown in Attachment 3. A geotechnical report was prepared by SCST, LLC on December 10, 2018 for Phase 2 of the development (See Attachment 12). The report showed that the native soil at the existing basin location has a minimum infiltration rate of 5.3 in/hr, based on two tests. This high infiltration rate allows the existing basin and depression to infiltrate the entire storm

volume for the watershed. Approximately 2.5 feet of silt will be excavated from the basin invert to result in a new invert elevation of 270 ft. Potential interference of the water table is not a concern in lowering the basin invert. The geotechnical report states that no groundwater was encountered while boring at the site of the basin, and nearby historic high groundwater is 400 feet below existing ground at the site.

Land use

Development curve numbers are based on the Phase 1 and Phase 2 plans. Pervious cover in the development will consist of shrubs and grass over uncompacted, decomposed granite. The crypts and in-ground cremains sections will be covered with decomposed granite. The existing woods and brush outside the proposed development will remain untouched and were delineated using ESRI imagery. Existing and proposed condition land use exhibits are in Attachment 4.

Flow paths and tc

The flow path in the existing condition was delineated based on the topography. The proposed condition flow path was delineated based on the existing topography and the development Masterplan and proposed basin grading. In both models, concentrated flow is input into the TR-55 program as a velocity and length. Pipe and street flow velocities were calculated in Bentley Flowmaster. Flowmaster and slope calculations are shown in Attachment 6. Hydrology maps are shown in Attachment 5.

Table 1 - Runoff Curve Numbers

Cover	CN (soil A)	Impervious fraction	Existing Condition Area (ac)	Proposed Condition (Phase 1&2) Area (ac)
Existing cover, undeveloped				
Oak- aspen, fair	48	0	91.77	90.02
Desert shrub, poor	63	0	50.83	48.59
Pervious development				
Decomposed granite/mulch, brush and grass = open space, fair	49	0	7.65	10.05
Crypts and in-ground cremain sections = bare soil	77	0	0.0	1.33
Impervious development				
Roads, sidewalks, columbariums, buildings	98	0.9	4.42	4.69
		SUM	**154.67**	**154.67**

Model Calibration

The project area is in a local sump and is not tributary to any water body by surface flow, so flow records cannot be used for calibration. There is no stream gage in the relative proximity to the project, thus eliminating the potential to calibrate the model based on drainage areas of similar characteristics.

Regional runoff frequency equations

To calibrate the model, a regional runoff frequency equation that applies to the Central Coast of California was evaluated.

Reference: *Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2016* (USGS Scientific Investigations Report 2012-5113 developed in collaboration with FEMA). Regional flood-frequency equations are based on 771 streamflow-gaging stations in California having 10 or more years of data. A copy of the report is included in Attachment 13.

The 1%-AEP regional flood frequency equation for the Central Coast (Region 4) is as follows:

$$Q_{100}[cfs] = 11.0 \cdot (Drainage\ Area[mi^2])^{0.840} \cdot (Mean\ Annual\ Precipitation[in])^{0.994}$$

The 2018 Salinas Valley Hydrologic Subareas Hydrologic Report published by the Monterey County Water Resources Agency identifies the seasonal average precipitation depth at nearby Salinas Municipal Airport to be 12.06 inches based on a data record from 1981-2010. A copy of the report is provided in Attachment 13.

The 1% AEP peak discharge for the existing condition watershed calculates 39.64 cfs. The USGS report identifies that the standard error of estimate is of 0.24 for the Central Coast Region.

Hydrograph calibration

The flood frequency equation applies to undeveloped watersheds, so the existing condition model (2.9% impervious) was copied and calibrated to meet or exceed the peak discharge calculated by the equation, producing the "existing calibrated" model. Using TR-55, the natural vegetation Curve Number in the existing condition model was adjusted to calibrate the peak discharge. The time of concentration is a relatively stable hydrologic parameter developed based on the flow path, so it was not changed. A rainfall distribution of Type 1A was tested and found to flatten the hydrograph and decrease the peak flow by 50%. This seemed unreasonable, so the Type 1 distribution recommended by the SCS map was not changed for calibration.

The calibrated peak discharge was achieved by changing the runoff Curve Number to 52 for undeveloped areas (originally oak, CN 48, and desert shrub, CN 63). Other parameters remained the same. This change was applied to the proposed model to get the peak discharge and flood volume. Results from the previous LOMR, and the existing, existing calibrated, and proposed models are shown below.

Table 2 - Model Results

Model	Runoff Depth, in	TDA, ac	Vol, ac-ft	Q, cfs
Existing	0.886	154.67	11.42	46.81
Existing calibrated	0.829	154.67	10.69	39.88
Proposed (Ph1-2)	0.829	154.67	10.69	39.97
2014 LOMR (no development)	0.355	165.70	4.90	47.90

"Existing" in the table above refers to the existing condition model with Phase 1, prior to calibration. "Existing calibrated" refers to the existing condition model with Phase 1, after calibration. "Proposed" is the proposed model with Phase 2. "2014 LOMR" is the previous existing model with no Phases constructed. The 2014 LOMR existing condition model resulted in a similar peak flow (47.9 cfs) and smaller volume (4.9 ac-ft) than the calibrated model. The peak flow in the new model is slightly lower, but the higher volume is more conservative due to calibration against local data. Other differences in the 2014 model were use of a 72-hour rainfall distribution and use of a soil constant loss rate instead of a runoff curve number. The TR-55 models and results are saved under Attachment 7.

3.4 BASIN VOLUME

The proposed basin will contain the 100-year proposed condition flood volume with 1 foot of freeboard. The basin will infiltrate the entire volume. The basin is designed to hold a flood volume of 10.7 ac-ft for runoff in the proposed condition (i.e., only Phases 1 and 2 developed), with an additional foot of freeboard on top of the flood volume. Basin staged storage calculations are shown in Attachment 11.

4. 100-Year Storm Event Floodplain Mapping

4.1 METHOD AND PURPOSE

The 100-year storm study area model is based upon the assumptions listed under Section 1.6. The results from the model of the existing study area allow a comparison to the flooding zones delineated in the effective Digital Flood Insurance Rate Map (DFIRM) as well as determine the flooding characteristics of the study area.

4.2 RESULTS

Based on model results, the proposed flood zones were re-shaped and designated as Zone AE. The 100-year floodplain shown in the Wood Rogers 2014 LOMR was designated Zone AH (1-3ft depth flooding). The change from Zone AH to AE is due to the proposed construction of an onsite 14-foot deep infiltration basin in the natural low point of the watershed, which will increase the ponding depth.

The Proposed Base Effective Floodplain elevation is 283 feet. The previous BFE elevation was 286.1. The new BFE of 283 is 22 feet below the lowest point in any adjacent watershed, 305 feet on Parker Flats Road.

4.3 PROPOSED CHANGES TO FIRM PANEL #06053C0195H

This project has no impact on adjacent properties because the watershed has no outflow. The basin will infiltrate the entire 100-year proposed condition volume, and the proposed base flood elevation will be 3 feet lower than the current effective floodplain. Changes are documented in the Annotated FIRM Map in Attachment 7.

4.4 CONCLUSIONS

This report shows that the Phase 2 development of the California Central Coast Veterans Cemetery will not adversely impact the mapped floodplain. The results from the TR-55 hydrologic model demonstrate that:

1. The proposed infiltration basin has capacity to hold the proposed condition 100-year volume for Phases 1 and 2, lowering the 100-year floodplain by 3 feet.
2. No stormwater will exit the watershed, so there will be no flooding impacts to adjacent properties.
3. The evaluation was performed using the best available information at the time of the study.

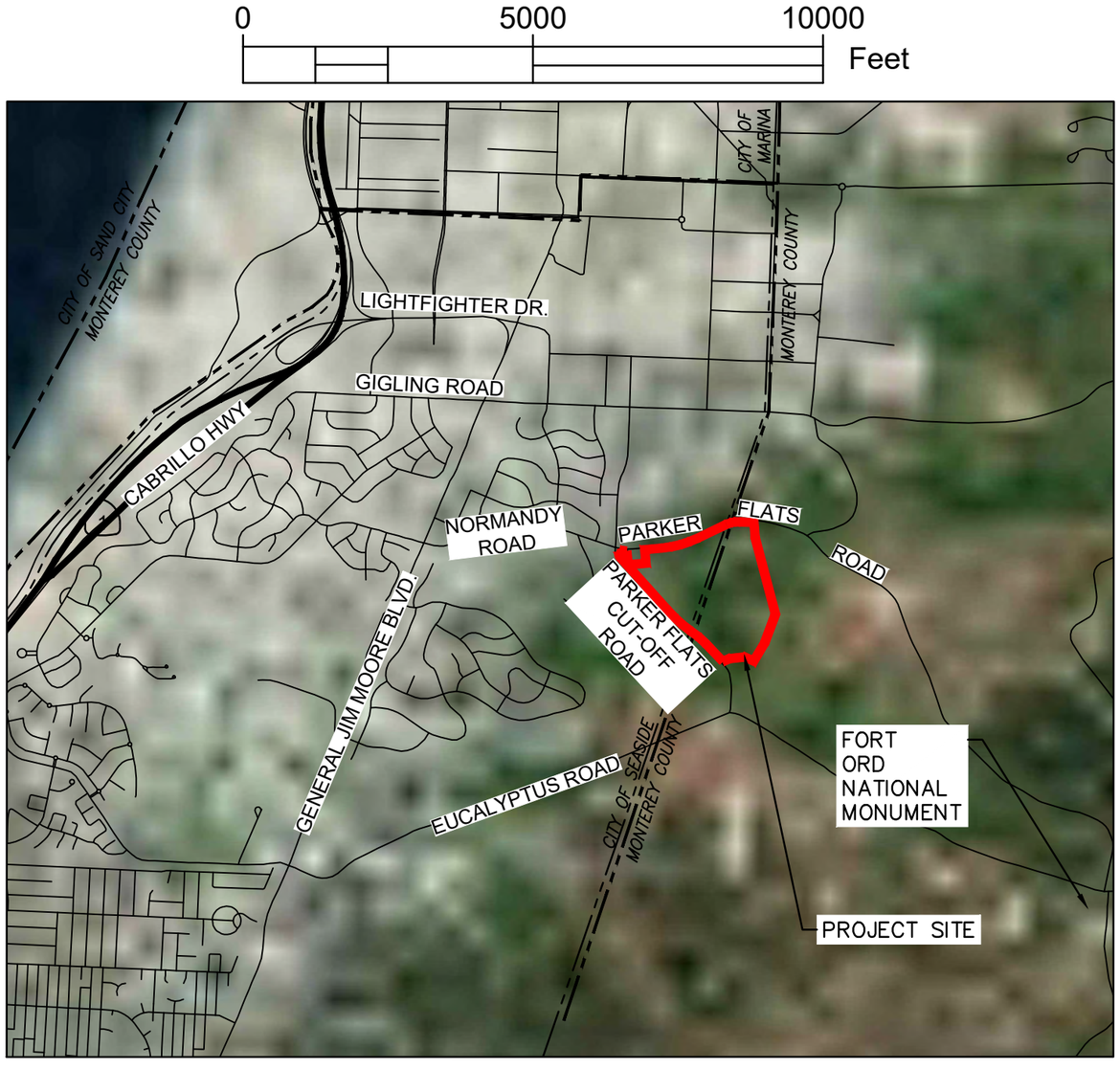
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5. Attachments

Attachment 1	Vicinity Map
Attachment 2	Effective FEMA FIRM Map #06053C0195H
Attachment 3	NRCS Soil Map
Attachment 4	Land Use Exhibits
Attachment 5	Hydrology Maps
Attachment 6	TR55 Hydrology Models and Input Data
Attachment 7	Annotated DFIRM Map
Attachment 8	LOMR #06053C0195G Application
Attachment 9	LOMR Approval #06053C0195G
Attachment 10	Drainage Report for California Central Coast Veterans Cemetery – Phase 1
Attachment 11	Basin Staged Storage
Attachment 12	Geotechnical Investigation: California Central Coast Veterans Cemetery, Phase 2
Attachment 13	Calibration References
Attachment 14	Ultimate Built-Out Condition Models and Input Data
Attachment 15	CLOMR Correspondence Memo

Attachment 1

Vicinity Map



LOCATION MAP



VICINITY MAP

HUITT-ZOLLARS
Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820

DRAWN BY: VAA

CHECKED BY: RMC

DATE: 01/04/2019

LEGEND:

PROPERTY BOUNDARY

CITY BOUNDARY

INTERSTATE/HIGHWAY

N

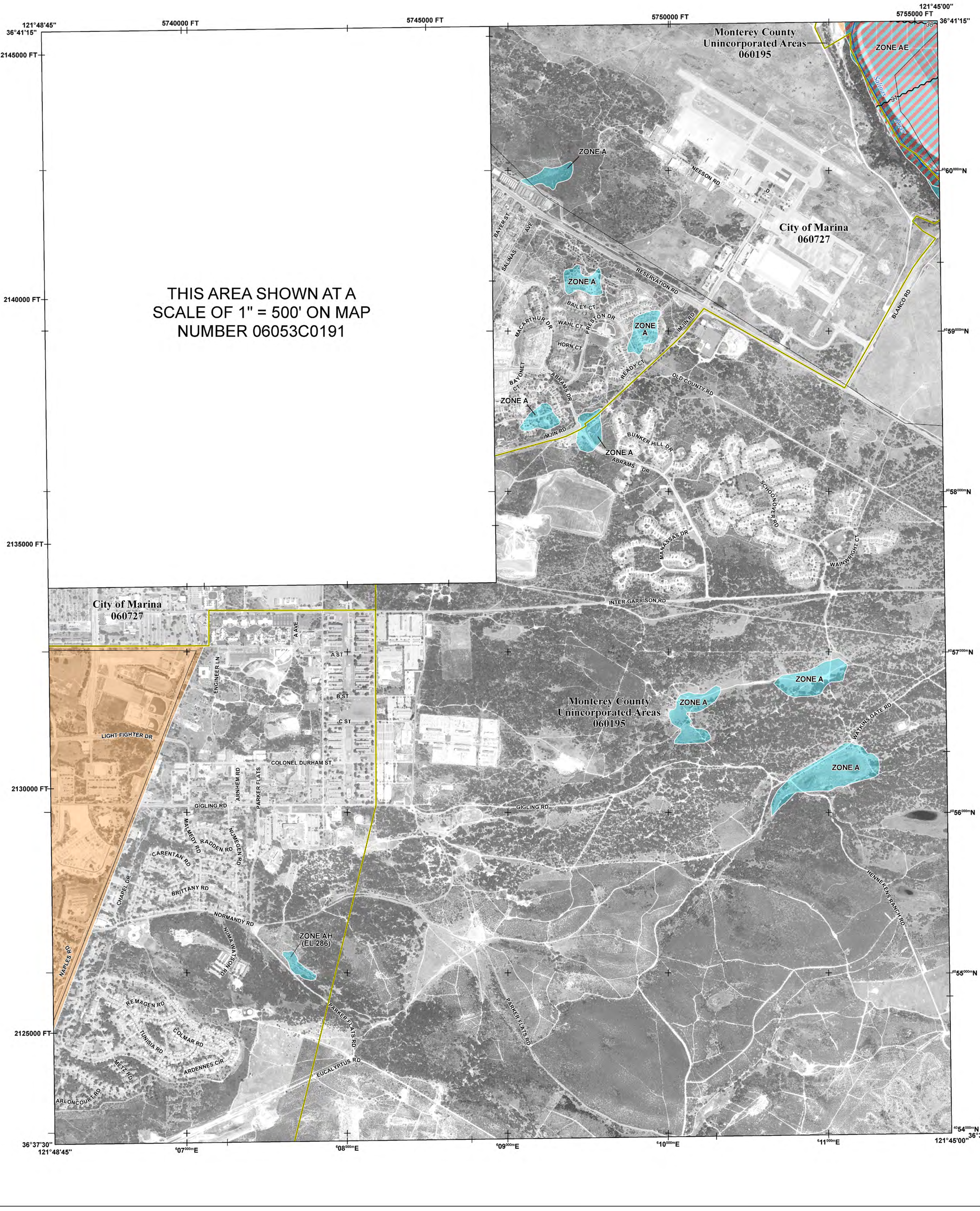
FIGURE 1.1
VICINITY MAP
CALIFORNIA CENTRAL
COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

R:\R305029.02 - CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\Hydrology\LOMR_Vicinity Map.dwg 2/18/2019 10:19 AM Mital, Jenny

Attachment 2

Effective FEMA FIRM Map #06053C0195H

THIS AREA SHOWN AT A
SCALE OF 1" = 500' ON MAP
NUMBER 06053C0191



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / E / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from Coastal California LiDAR and Digital Imagery dated 2011. USDA NAIP 2010 imagery is used in areas not covered by the Coastal California digital imagery.

SCALE

N

Map Projection:
Universal Transverse Mercator Zone 10N; North American Datum 1983; Western Hemisphere; Vertical Datum; NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 260 520 1,040 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MONTEREY COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 195 OF 2050

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARINA, CITY OF	060727	0195	H
MONTEREY COUNTY	060195	0195	H
SEASIDE, CITY OF	060203	0195	H

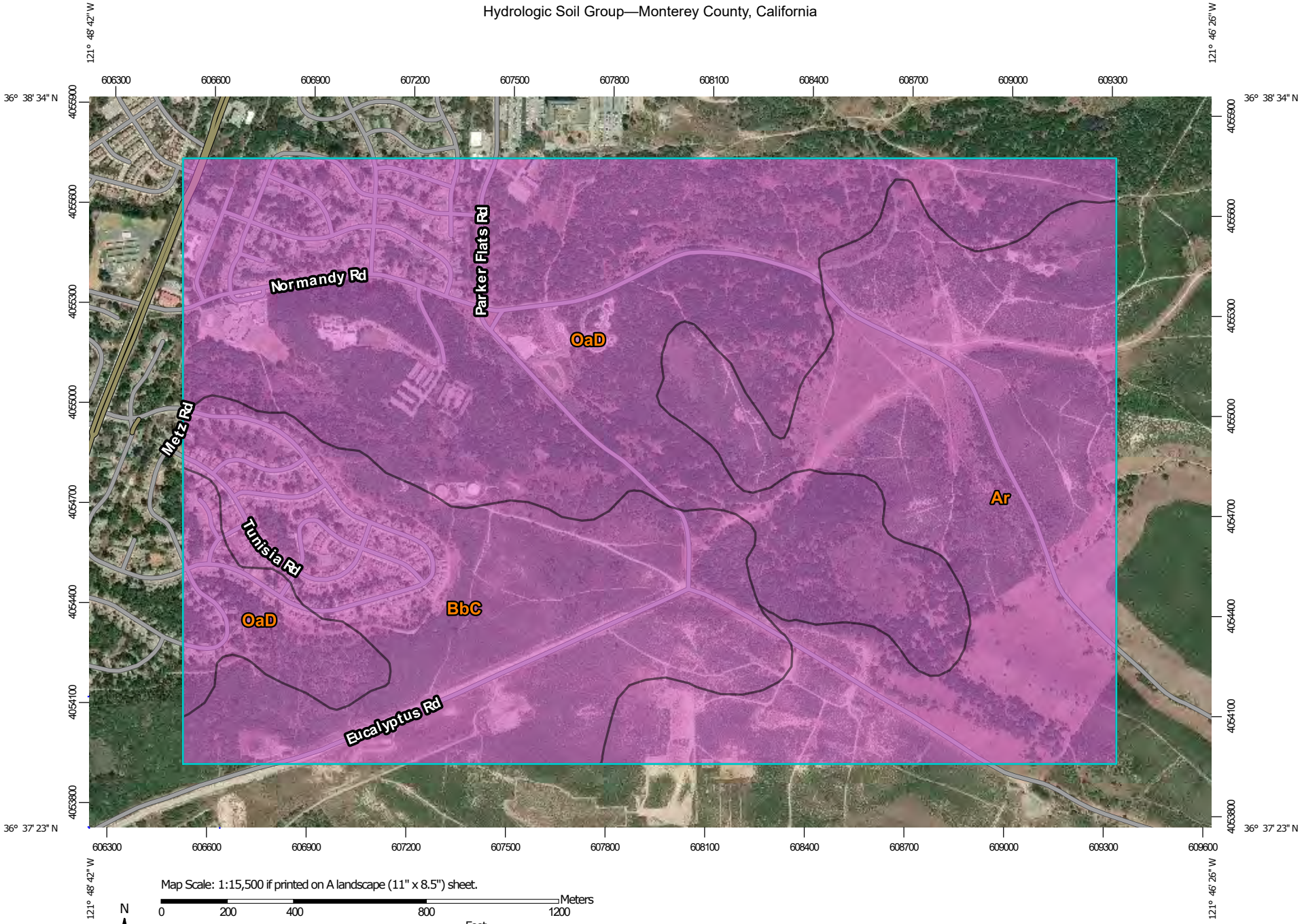
VERSION NUMBER
2.3.2.1

MAP NUMBER
06053C0195H

MAP REVISED
June 21, 2017

Attachment 3

NRCS Soil Map



Map Scale: 1:15,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Monterey County, California
Survey Area Data: Version 15, Sep 17, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 8, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ar	Arnold-Santa Ynez complex	A	389.0	30.7%
BbC	Baywood sand, 2 to 15 percent slopes	A	297.6	23.5%
OaD	Oceano loamy sand, 2 to 15 percent slopes	A	579.8	45.8%
Totals for Area of Interest			**1,266.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

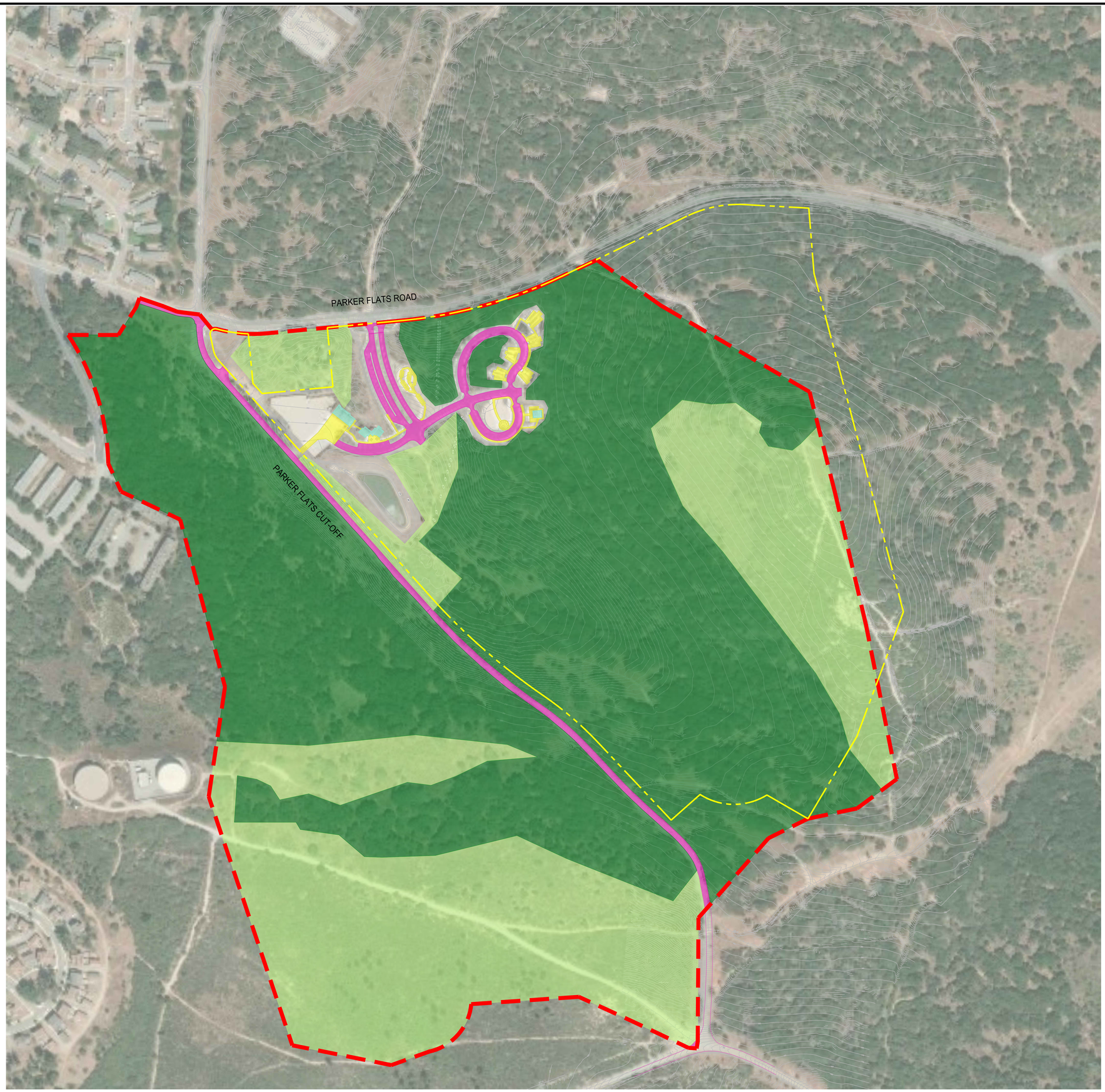
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment 4
Land Use Exhibits

Figure 4.1 Existing Condition Land Use Exhibit
Figure 4.2 Proposed Phase 1&2 Land Use Exhibit



LEGEND

- IMPERVIOUS WALKWAY, COLUMBARIA
- ROAD
- BUILDING
- OAK WOODS
- DESERT SHRUB
- DEVELOPMENT LANDSCAPING/PERVIOUS
- WATERSHED BOUNDARY
- CEMETERY PROPERTY BOUNDARY

N

150 0 75 150 300

SCALE 1"= 150'

DGS
GENERAL SERVICES

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS

CALIFORNIA CENTRAL COAST VETERANS CEMETERY PHASE 2

SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
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WEST SACRAMENTO, CA 95605
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EMAIL: TOM.SCHANBERGER@DGS.CA.GOV

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REGISTERED PROFESSIONAL ENGINEER
CARL T. TAYLOR
No. 30924
CIVIL
STATE OF CALIFORNIA

FAI NO. CA-17-11

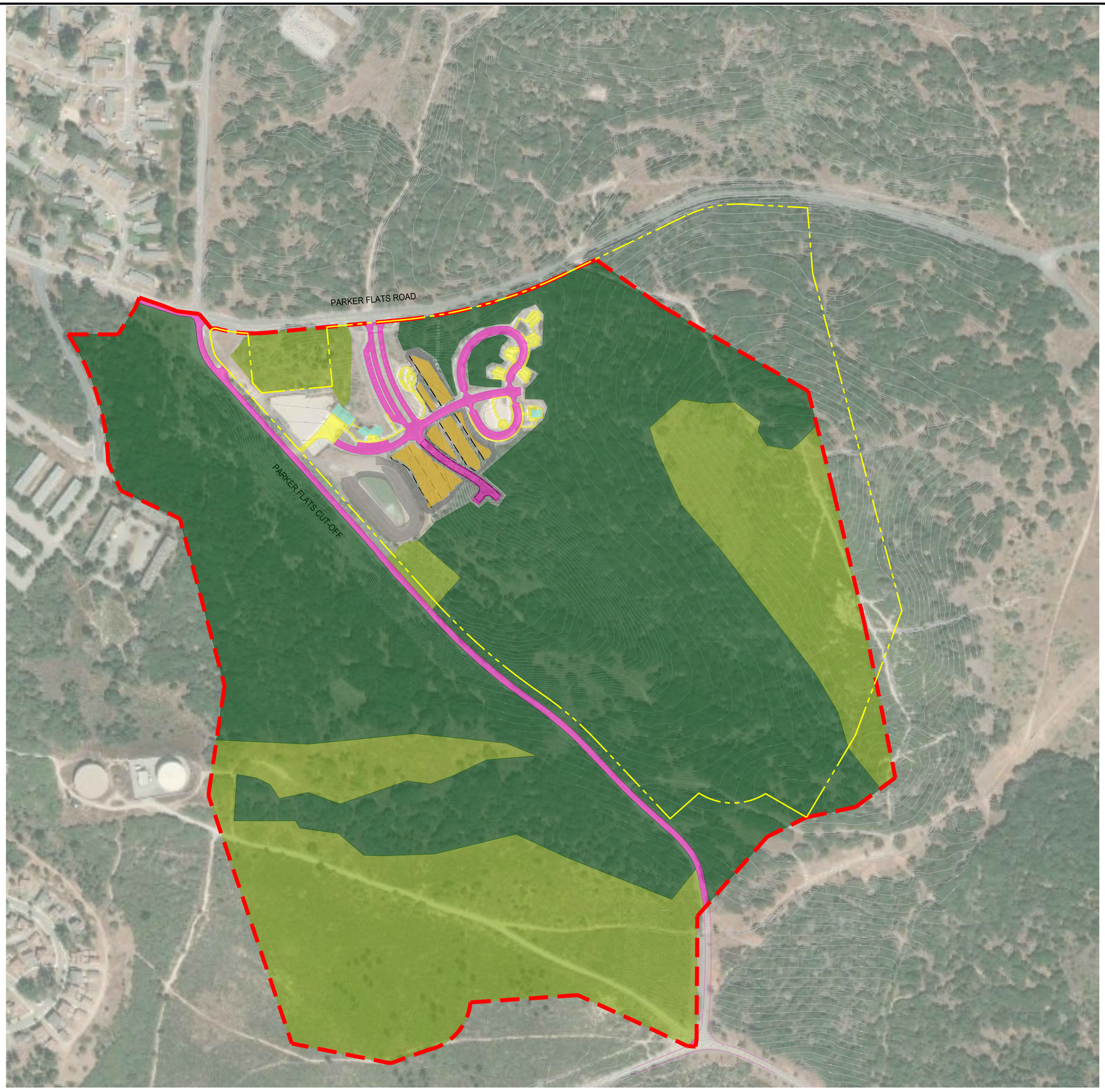
REVISIONS

SCHEMATIC DESIGN

FIGURE 4.1
EXISTING CONDITION
LANDUSE EXHIBIT

PROJ. NO.	
SCALE	1" = 150'
DATE	JANUARY 03, 2019
DRAWN	

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LEGEND

- IMPERVIOUS WALKWAY, COLUMBARIA
- ROAD
- BUILDING
- CRYPTS, CREMAINS
- OAK WOODS
- DESERT SHRUB
- DEVELOPMENT LANDSCAPING/PERVIOUS
- WATERSHED BOUNDARY
- CEMETERY PROPERTY BOUNDARY

N

150 0 75 150 300

SCALE 1"= 150'

DGS
GENERAL SERVICES

STATE OF CALIFORNIA
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REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS

CALIFORNIA CENTRAL COAST VETERANS CEMETERY PHASE 2

SEASIDE, CALIFORNIA

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REVISIONS

SCHEMATIC DESIGN

FIGURE 4.2
PROPOSED PHASE 1&2
LANDUSE EXHIBIT

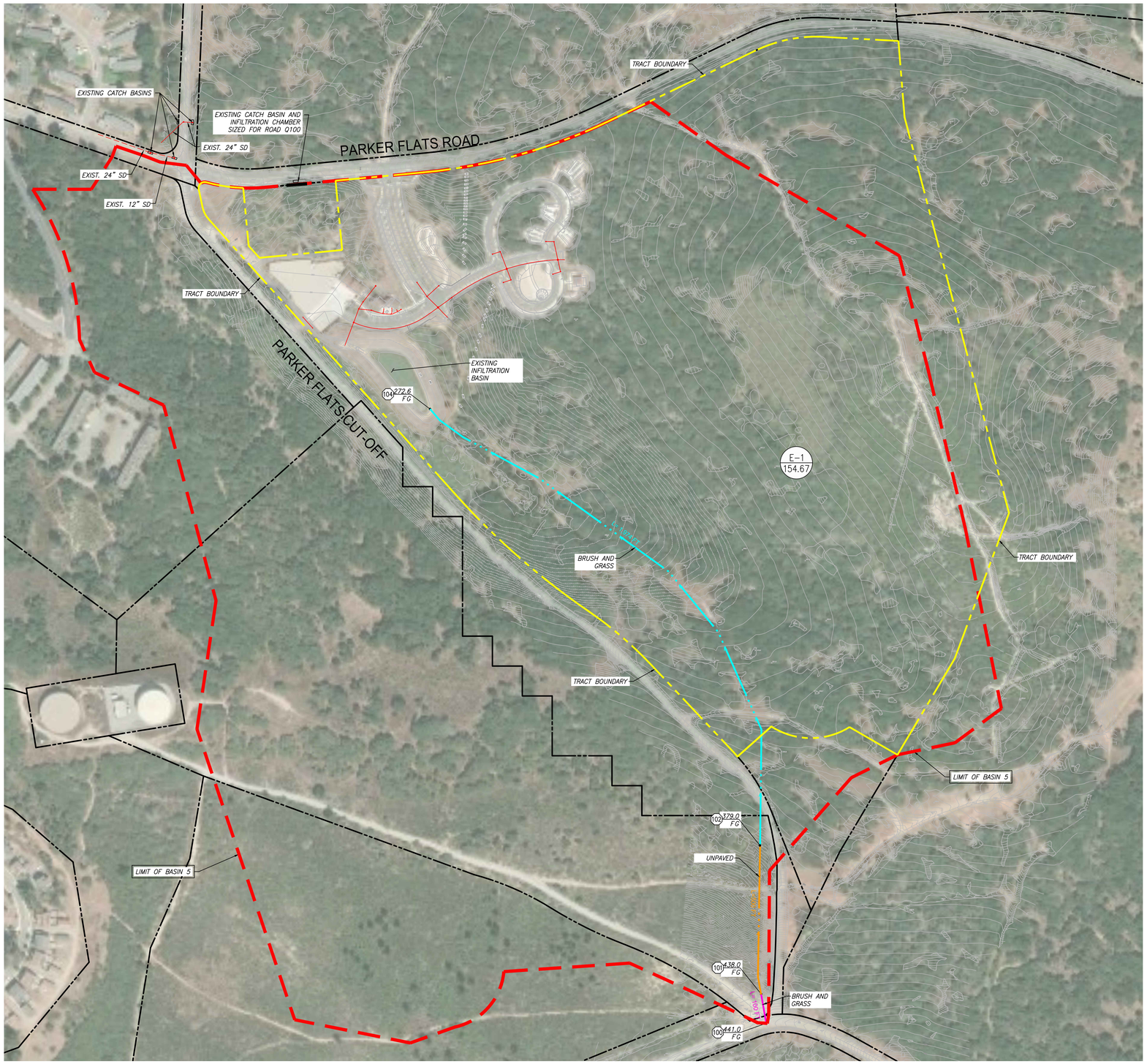
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DATE	JANUARY 03, 2019
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Attachment 5

Hydrology Maps

Figure 5.1 Existing Condition Hydrology Exhibit
Figure 5.2 Proposed Phase 1&2 Hydrology Exhibit
Figure 5.3 Proposed Phase 1&2 Topographic Work Map – Area of Revision



LEGEND

EXISTING STORM DRAIN

CEMETERY PROPERTY BOUNDARY

OTHER PROPERTY BOUNDARY

WATERSHED BOUNDARY

EXISTING CONDITION FLOWPATHS

SHEET FLOW

CONCENTRATED FLOW

CONCENTRATED CHANNEL FLOW

PIPE FLOW

SUBAREA DESTINATION – E-1
SUBAREA ACREAGE – XX.XX

HYDRAULIC NODES 100

N

150 0 75 150 300
SCALE 1"= 150'

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REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
PHASE 2
SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
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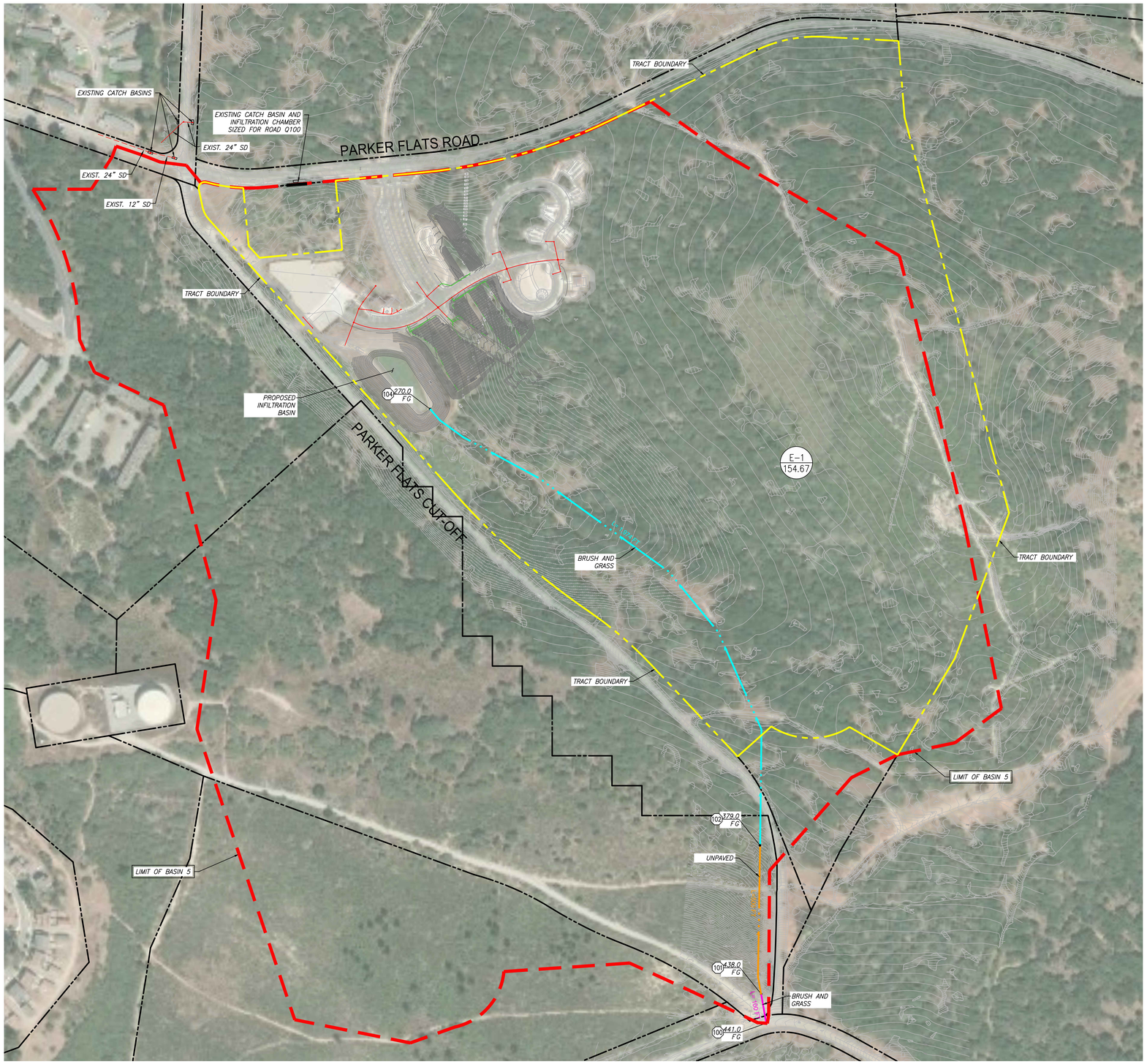
REVISIONS

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FIGURE 5.1
EXISTING CONDITION HYDROLOGY EXHIBIT

PROJ. NO.
SCALE 1" = 150'
DATE JANUARY 03, 2019
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LEGEND

EXISTING STORM DRAIN

PROPOSED STORM DRAIN

CEMETERY PROPERTY BOUNDARY

OTHER PROPERTY BOUNDARY

WATERSHED BOUNDARY

EXISTING CONDITION FLOWPATHS

SHEET FLOW

CONCENTRATED FLOW

CONCENTRATED CHANNEL FLOW

PIPE FLOW

SUBAREA DESTINATION – E-1
SUBAREA ACREAGE – XX.XX

HYDRAULIC NODES 100

N

150 0 75 150 300

SCALE 1"= 150'

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GENERAL SERVICES

STATE OF CALIFORNIA
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REAL ESTATE SERVICES DIVISION

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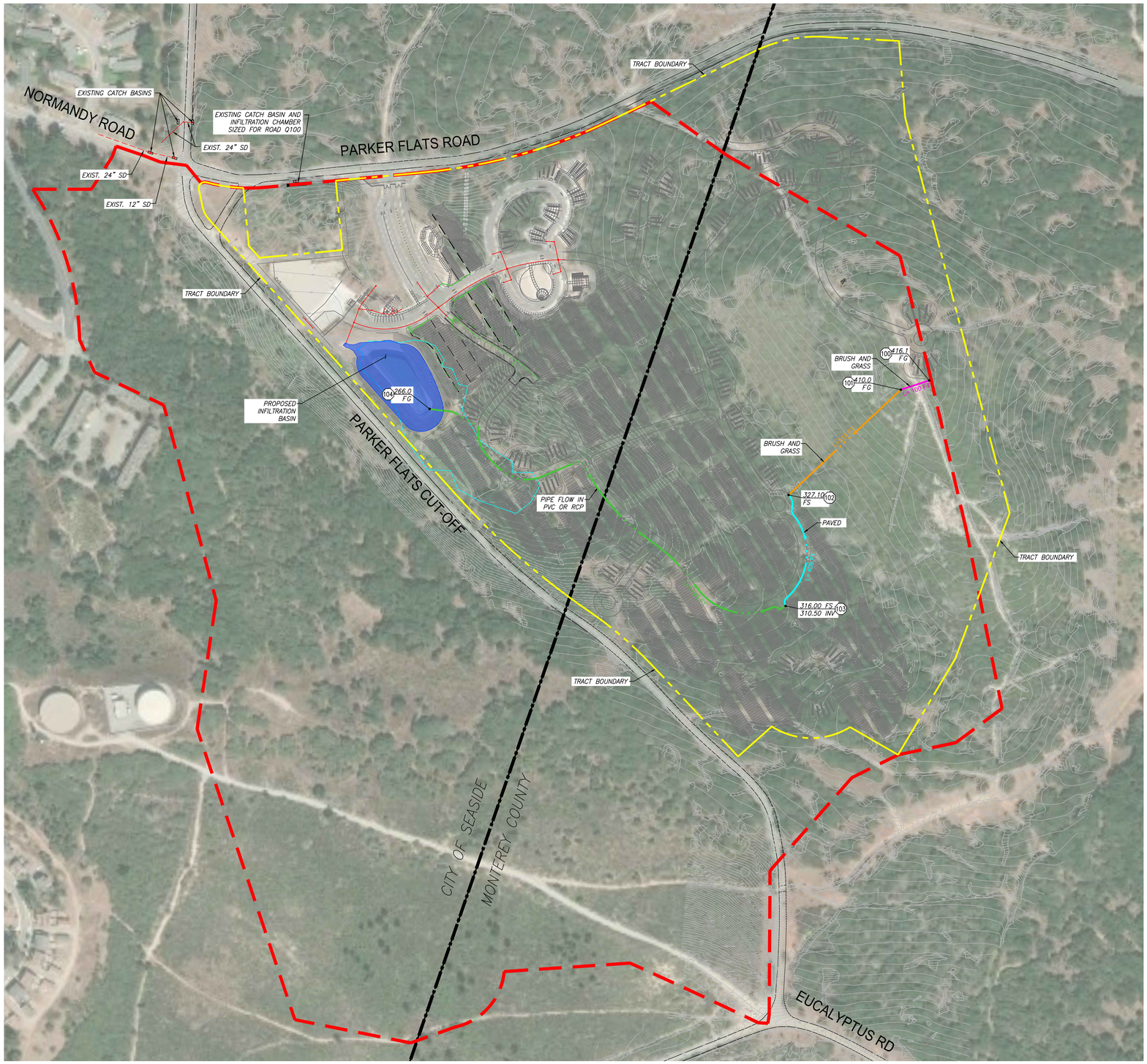
SCHEMATIC DESIGN

FIGURE

FIGURE 5.2
PROPOSED PHASE 1&2
HYDROLOGY EXHIBIT

PROJ. NO.
SCALE 1" = 150'
DATE JANUARY 03, 2019
DRAWN

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NOTES:
–VERITCAL DATUM: NAVD88
–HORIZONTAL DATUM: NAD83 CA STATE PLANE ZONE IV

DATA SOURCES:
–ESRI AERIAL
–EXISTING CONDITION TOPOGRAPHY BY AERIAL PHOTOMAPPING SERVICES PHOTOGRAPHED 7/27/2010 AND UPDATED MARCH 2014

LEGEND

- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- CEMETERY PROPERTY BOUNDARY
- WATERSHED BOUNDARY

PROPOSED CONDITION FLOWPATHS

- SHEET FLOW
- CONCENTRATED FLOW
- CONCENTRATED CHANNEL FLOW
- PIPE FLOW

- EFFECTIVE FLOOD ELEV (DFIRM #06053C0195H)
- PROPOSED FLOOD ELEV
- HYDRAULIC NODES (100)

N

150 0 75 150 300
SCALE 1"= 150'

DGS GENERAL SERVICES

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
PHASE 2
SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
TOM SCHANBERGER
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERV. DIV - PROJECT MGMT BRANCH
707 THIRD STREET, SUITE 3-305
WEST SACRAMENTO, CA 95605
OFFICE PHONE: (916) 320-0718
EMAIL: TOM.SCHANBERGER@DGS.CA.GOV

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT

AC _____ FLS _____ SS _____
DATE _____

OFFICE OF THE STATE FIRE MARSHAL
APPROVED FIRE AND PANIC ONLY

REVIEWED BY: _____
FIRE AND LIFE SAFETY DIVISION- NORTH

APPROVAL OF THIS PLAN DOES NOT AUTHORIZE OR APPROVE ANY OMISSION OR DEVIATION FROM APPLICABLE REGULATIONS. FINAL APPROVAL IS SUBJECT TO FIELD INSPECTION. ONE SET OF APPROVED PLANS SHALL BE AVAILABLE ON THE PROJECT SITE AT ALL TIMES.

HUITT-ZOLLARS
Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820

rhaa
LANDSCAPE ARCHITECTURE + PLANNING
225 Miller Avenue, Mill Valley, CA 94941
T 415 383 7900 F 415 383 1433 www.rhaa.com

REGISTERED PROFESSIONAL ENGINEER
CARL F. TAYLOR
No. 30924
CIVIL
STATE OF CALIFORNIA

FAI NO. CA-17-11

REVISIONS

SCHEMATIC DESIGN

FIGURE 5.3
PROPOSED PHASE 1&2
TOPOGRAPHIC WORK
MAP - AREA OF REVISION

PROJ. NO.
SCALE 1" = 150'
DATE JANUARY 03, 2019
DRAWN

R:\PJ005029.02 – CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\Hydrology\TEMA Topo Workmap.dwg 2/18/2019 10:16 AM MIDA, Jenny

Attachment 6

TR55 Hydrology Models and input data

TR-55 Hydrology Models
Flowmaster Existing Channel Calculation
Flowmaster Proposed Phase 1&2 Channel Calculation
Slope Calculations
CCCVC Landuse and Impervious Areas
Precipitation Frequency Data Server NOAA Atlas14
SCS Rainfall Distribution Types

```
WinTR-20 Printed Page File      Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10                  0         0         0.05
CCCVC
EX - Basin 5

SUB-AREA:
          Basin 5   Basin 5             .24167    54.       .224

STREAM REACH:
          Basin 5   Outlet    Xsec 1              2.

STORM ANALYSIS:
          100-Yr                        4.93      Type I    2

STRUCTURE RATING:

STREAM CROSS SECTION:
          Xsec 1    0.0       0.0       0.0
                    0.0       0.000     0.00      50.00     0.0100
                    0.5       182.295   26.00     54.00     0.0100
                    1.0       586.885   54.00     58.00     0.0100
                    2.0       1921.575  116.00    66.00     0.0100
                    5.0       9804.536  350.00    90.00     0.0100
                    10.0      36904.998 900.00    130.00    0.0100
                    20.0      156617.6822600.00   210.00    0.0100


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN


WinTR-20 Printed Page File      End of Input Data List

                                    CCCVC
                                EX - Basin 5

                            Name of printed page file:
                                    TR20.out

                                          STORM 100-Yr

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
 Reach       Area      ID or       Amount   Elevation   Time      Rate      Rate
Identifier  (sq mi)   Location      (in)      (ft)      (hr)     (cfs)     (csm)

Basin 5       0.242                0.886               10.07     46.81    193.70

   Line
Start Time   ------------ Flow Values @ time increment of  0.014 hr ------------
      (hr)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)

     9.743      0.05      0.13      0.28      0.52      0.88      1.41      2.19
     9.842      3.25      4.66      6.49      8.81     11.63     14.89     18.48
     9.941     22.28     26.18     30.01     33.63     37.01     40.04     42.60
    10.040     44.63     46.06     46.81     46.77     46.02     44.71     43.06
    10.139     41.21     39.22     37.23     35.30     33.46     31.80     30.41
    10.238     29.27     28.28     27.42     26.66     25.97     25.35     24.80
    10.337     24.31     23.85     23.43     23.03     22.64     22.26     21.91
    10.436     21.58     21.25     20.93     20.60     20.26     19.92     19.59
    10.535     19.27     18.96     18.66     18.37     18.08     17.80     17.54
    10.634     17.30     17.08     16.88     16.69     16.52     16.37     16.23
    10.733     16.11     16.00     15.90     15.81     15.72     15.63     15.54
    10.832     15.47     15.39     15.32     15.25     15.18     15.10     15.03
    10.931     14.96     14.89     14.82     14.75     14.68     14.60     14.53
```

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

11.030	14.46	14.39	14.32	14.26	14.19	14.13	14.07
11.129	14.01	13.96	13.92	13.87	13.83	13.80	13.76
11.228	13.74	13.71	13.69	13.67	13.65	13.63	13.61
11.327	13.59	13.58	13.56	13.55	13.53	13.51	13.50
11.426	13.48	13.47	13.45	13.44	13.42	13.40	13.39
11.525	13.37	13.35	13.34	13.32	13.30	13.28	13.26
11.624	13.24	13.22	13.21	13.19	13.17	13.14	13.12
11.723	13.10	13.08	13.06	13.04	13.01	12.99	12.97
11.822	12.94	12.92	12.90	12.87	12.85	12.82	12.79
11.922	12.77	12.74	12.72	12.69	12.66	12.63	12.60
12.021	12.58	12.55	12.52	12.50	12.47	12.44	12.42
12.120	12.39	12.37	12.35	12.32	12.30	12.28	12.26
12.219	12.24	12.23	12.21	12.19	12.18	12.16	12.15
12.318	12.13	12.11	12.10	12.08	12.07	12.05	12.04
12.417	12.02	12.01	11.99	11.98	11.96	11.94	11.93
12.516	11.91	11.89	11.88	11.86	11.84	11.83	11.81
12.615	11.79	11.77	11.76	11.74	11.72	11.70	11.68
12.714	11.66	11.65	11.63	11.61	11.59	11.57	11.55
12.813	11.53	11.51	11.49	11.47	11.45	11.43	11.41
12.912	11.39	11.37	11.35	11.33	11.31	11.28	11.26
13.011	11.24	11.22	11.20	11.17	11.15	11.13	11.11
13.110	11.08	11.06	11.04	11.02	10.99	10.97	10.95
13.209	10.92	10.90	10.87	10.85	10.83	10.80	10.78
13.308	10.75	10.73	10.70	10.68	10.65	10.63	10.60
13.407	10.58	10.55	10.52	10.50	10.47	10.45	10.42
13.506	10.39	10.37	10.34	10.32	10.29	10.26	10.23
13.605	10.21	10.18	10.15	10.12	10.10	10.07	10.04

CCCVC

EX - Basin 5

Line Start Time (hr) — Flow Values @ time increment of 0.014 hr (cfs)

13.704	10.01	9.98	9.96	9.93	9.90	9.87	9.84
13.803	9.81	9.78	9.76	9.73	9.70	9.67	9.64
13.902	9.61	9.58	9.55	9.52	9.49	9.46	9.43
14.001	9.40	9.37	9.34	9.31	9.28	9.26	9.23
14.100	9.21	9.18	9.16	9.14	9.12	9.11	9.10
14.199	9.08	9.07	9.06	9.05	9.05	9.04	9.04
14.298	9.03	9.03	9.03	9.02	9.02	9.02	9.01
14.397	9.01	9.01	9.01	9.01	9.01	9.00	9.00
14.496	9.00	9.00	9.00	9.00	9.00	8.99	8.99
14.595	8.99	8.99	8.99	8.99	8.99	8.98	8.98
14.694	8.98	8.98	8.98	8.98	8.98	8.97	8.97
14.793	8.97	8.97	8.97	8.97	8.96	8.96	8.96
14.892	8.96	8.96	8.95	8.95	8.95	8.95	8.95
14.991	8.95	8.94	8.94	8.94	8.94	8.94	8.93
15.091	8.93	8.93	8.93	8.93	8.92	8.92	8.92
15.190	8.92	8.92	8.91	8.91	8.91	8.91	8.90
15.289	8.90	8.90	8.90	8.89	8.89	8.89	8.89
15.388	8.89	8.88	8.88	8.88	8.88	8.87	8.87
15.487	8.87	8.86	8.86	8.86	8.86	8.85	8.85

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224			

STREAM REACH:

15.586	8.85	8.85	8.84	8.84	8.84	8.84	8.83
15.685	8.83	8.83	8.82	8.82	8.82	8.82	8.81
15.784	8.81	8.81	8.80	8.80	8.80	8.79	8.79
15.883	8.79	8.78	8.78	8.78	8.78	8.77	8.77
15.982	8.77	8.76	8.76	8.76	8.75	8.75	8.75
16.081	8.74	8.74	8.74	8.73	8.73	8.73	8.72
16.180	8.72	8.72	8.71	8.71	8.70	8.70	8.70
16.279	8.69	8.69	8.69	8.68	8.68	8.68	8.67
16.378	8.67	8.66	8.66	8.66	8.65	8.65	8.65
16.477	8.64	8.64	8.63	8.63	8.63	8.62	8.62
16.576	8.61	8.61	8.61	8.60	8.60	8.59	8.59
16.675	8.59	8.58	8.58	8.57	8.57	8.57	8.56
16.774	8.56	8.55	8.55	8.54	8.54	8.54	8.53
16.873	8.53	8.52	8.52	8.51	8.51	8.51	8.50
16.972	8.50	8.49	8.49	8.48	8.48	8.47	8.47
17.071	8.47	8.46	8.46	8.45	8.45	8.44	8.44
17.170	8.43	8.43	8.42	8.42	8.41	8.41	8.41
17.269	8.40	8.40	8.39	8.39	8.38	8.38	8.37
17.368	8.37	8.36	8.36	8.35	8.35	8.34	8.34
17.467	8.33	8.33	8.32	8.32	8.31	8.31	8.30
17.566	8.30	8.29	8.29	8.28	8.28	8.27	8.27
17.665	8.26	8.26	8.25	8.25	8.24	8.24	8.23
17.764	8.23	8.22	8.22	8.21	8.20	8.20	8.19
17.863	8.19	8.18	8.18	8.17	8.17	8.16	8.16
17.962	8.15	8.15	8.14	8.13	8.13	8.12	8.12
18.061	8.11	8.11	8.10	8.10	8.09	8.08	8.08
18.161	8.07	8.07	8.06	8.06	8.05	8.05	8.04
18.260	8.03	8.03	8.02	8.02	8.01	8.00	8.00
18.359	7.99	7.99	7.98	7.98	7.97	7.96	7.96
18.458	7.95	7.95	7.94	7.93	7.93	7.92	7.92
18.557	7.91	7.90	7.90	7.89	7.89	7.88	7.87
18.656	7.87	7.86	7.86	7.85	7.84	7.84	7.83

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
18.755	7.83	7.82	7.81	7.81	7.80	7.79	7.79
18.854	7.78	7.78	7.77	7.76	7.76	7.75	7.74
18.953	7.74	7.73	7.73	7.72	7.71	7.71	7.70
19.052	7.69	7.69	7.68	7.67	7.67	7.66	7.65
19.151	7.65	7.64	7.63	7.63	7.62	7.61	7.61
19.250	7.60	7.60	7.59	7.58	7.57	7.57	7.56
19.349	7.56	7.55	7.54	7.53	7.53	7.52	7.51
19.448	7.51	7.50	7.49	7.49	7.48	7.47	7.47
19.547	7.46	7.45	7.45	7.44	7.43	7.43	7.42
19.646	7.41	7.41	7.40	7.39	7.38	7.38	7.37
19.745	7.36	7.36	7.35	7.34	7.34	7.33	7.32
19.844	7.31	7.31	7.30	7.29	7.29	7.28	7.27
19.943	7.26	7.26	7.25	7.24	7.24	7.23	7.22
20.042	7.21	7.21	7.20	7.19	7.19	7.18	7.17

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

20.141	7.16	7.16	7.15	7.14	7.13	7.13	7.12
20.240	7.11	7.10	7.10	7.09	7.08	7.07	7.07
20.339	7.06	7.05	7.05	7.04	7.03	7.02	7.02
20.438	7.01	7.00	6.99	6.99	6.98	6.97	6.96
20.537	6.96	6.95	6.94	6.93	6.92	6.92	6.91
20.636	6.90	6.89	6.89	6.88	6.87	6.86	6.86
20.735	6.85	6.84	6.83	6.83	6.82	6.81	6.80
20.834	6.79	6.79	6.78	6.77	6.76	6.75	6.75
20.933	6.74	6.73	6.72	6.72	6.71	6.70	6.69
21.032	6.68	6.68	6.67	6.66	6.65	6.64	6.64
21.131	6.63	6.62	6.61	6.61	6.60	6.59	6.58
21.230	6.57	6.56	6.56	6.55	6.54	6.53	6.52
21.330	6.52	6.51	6.50	6.49	6.48	6.48	6.47
21.429	6.46	6.45	6.44	6.44	6.43	6.42	6.41
21.528	6.40	6.39	6.39	6.38	6.37	6.36	6.35
21.627	6.34	6.34	6.33	6.32	6.31	6.30	6.29
21.726	6.29	6.28	6.27	6.26	6.25	6.25	6.24
21.825	6.23	6.22	6.21	6.20	6.19	6.19	6.18
21.924	6.17	6.16	6.15	6.14	6.14	6.13	6.12
22.023	6.11	6.10	6.09	6.09	6.08	6.07	6.06
22.122	6.05	6.04	6.03	6.03	6.02	6.01	6.00
22.221	5.99	5.98	5.97	5.96	5.96	5.95	5.94
22.320	5.93	5.92	5.91	5.90	5.90	5.89	5.88
22.419	5.87	5.86	5.85	5.84	5.83	5.83	5.82
22.518	5.81	5.80	5.79	5.78	5.77	5.76	5.76
22.617	5.75	5.74	5.73	5.72	5.71	5.70	5.69
22.716	5.68	5.68	5.67	5.66	5.65	5.64	5.63
22.815	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.914	5.56	5.55	5.54	5.53	5.52	5.52	5.51
23.013	5.50	5.49	5.48	5.47	5.46	5.45	5.44
23.112	5.43	5.43	5.42	5.41	5.40	5.39	5.38
23.211	5.37	5.36	5.35	5.34	5.33	5.33	5.32
23.310	5.31	5.30	5.29	5.28	5.27	5.26	5.25
23.409	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.508	5.18	5.17	5.16	5.15	5.14	5.13	5.12
23.607	5.11	5.10	5.10	5.09	5.08	5.07	5.06
23.706	5.05	5.04	5.03	5.02	5.01	5.00	4.99

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
23.805	4.98	4.97	4.96	4.96	4.95	4.94	4.93
23.904	4.92	4.91	4.90	4.89	4.88	4.87	4.86
24.003	4.85	4.82	4.77	4.69	4.55	4.36	4.11
24.102	3.80	3.46	3.10	2.74	2.39	2.06	1.76
24.201	1.48	1.25	1.06	0.90	0.76	0.65	0.55
24.300	0.47	0.40	0.34	0.28	0.24	0.20	0.17
24.399	0.14	0.12	0.10	0.09	0.07	0.06	0.05

Area or Drainage Rain Gage Runoff ---------- Peak Flow ----------

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.242	Upstream	0.886	0.13	10.07	46.81	193.70

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
9.743	0.05	0.13	0.28	0.52	0.88	1.41	2.19
9.842	3.25	4.66	6.49	8.81	11.63	14.89	18.48
9.941	22.28	26.18	30.01	33.63	37.01	40.04	42.60
10.040	44.63	46.06	46.81	46.77	46.02	44.71	43.06
10.139	41.21	39.22	37.23	35.30	33.46	31.80	30.41
10.238	29.27	28.28	27.42	26.66	25.97	25.35	24.80
10.337	24.31	23.85	23.43	23.03	22.64	22.26	21.91
10.436	21.58	21.25	20.93	20.60	20.26	19.92	19.59
10.535	19.27	18.96	18.66	18.37	18.08	17.80	17.54
10.634	17.30	17.08	16.88	16.69	16.52	16.37	16.23
10.733	16.11	16.00	15.90	15.81	15.72	15.63	15.54
10.832	15.47	15.39	15.32	15.25	15.18	15.10	15.03
10.931	14.96	14.89	14.82	14.75	14.68	14.60	14.53
11.030	14.46	14.39	14.32	14.26	14.19	14.13	14.07
11.129	14.01	13.96	13.92	13.87	13.83	13.80	13.76
11.228	13.74	13.71	13.69	13.67	13.65	13.63	13.61
11.327	13.59	13.58	13.56	13.55	13.53	13.51	13.50
11.426	13.48	13.47	13.45	13.44	13.42	13.40	13.39
11.525	13.37	13.35	13.34	13.32	13.30	13.28	13.26
11.624	13.24	13.22	13.21	13.19	13.17	13.14	13.12
11.723	13.10	13.08	13.06	13.04	13.01	12.99	12.97
11.822	12.94	12.92	12.90	12.87	12.85	12.82	12.79
11.922	12.77	12.74	12.72	12.69	12.66	12.63	12.60
12.021	12.58	12.55	12.52	12.50	12.47	12.44	12.42
12.120	12.39	12.37	12.35	12.32	12.30	12.28	12.26
12.219	12.24	12.23	12.21	12.19	12.18	12.16	12.15
12.318	12.13	12.11	12.10	12.08	12.07	12.05	12.04
12.417	12.02	12.01	11.99	11.98	11.96	11.94	11.93
12.516	11.91	11.89	11.88	11.86	11.84	11.83	11.81
12.615	11.79	11.77	11.76	11.74	11.72	11.70	11.68
12.714	11.66	11.65	11.63	11.61	11.59	11.57	11.55
12.813	11.53	11.51	11.49	11.47	11.45	11.43	11.41
12.912	11.39	11.37	11.35	11.33	11.31	11.28	11.26

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
13.011	11.24	11.22	11.20	11.17	11.15	11.13	11.11
13.110	11.08	11.06	11.04	11.02	10.99	10.97	10.95
13.209	10.92	10.90	10.87	10.85	10.83	10.80	10.78
13.308	10.75	10.73	10.70	10.68	10.65	10.63	10.60

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

13.407	10.58	10.55	10.52	10.50	10.47	10.45	10.42
13.506	10.39	10.37	10.34	10.32	10.29	10.26	10.23
13.605	10.21	10.18	10.15	10.12	10.10	10.07	10.04
13.704	10.01	9.98	9.96	9.93	9.90	9.87	9.84
13.803	9.81	9.78	9.76	9.73	9.70	9.67	9.64
13.902	9.61	9.58	9.55	9.52	9.49	9.46	9.43
14.001	9.40	9.37	9.34	9.31	9.28	9.26	9.23
14.100	9.21	9.18	9.16	9.14	9.12	9.11	9.10
14.199	9.08	9.07	9.06	9.05	9.05	9.04	9.04
14.298	9.03	9.03	9.03	9.02	9.02	9.02	9.01
14.397	9.01	9.01	9.01	9.01	9.01	9.00	9.00
14.496	9.00	9.00	9.00	9.00	9.00	8.99	8.99
14.595	8.99	8.99	8.99	8.99	8.99	8.98	8.98
14.694	8.98	8.98	8.98	8.98	8.98	8.97	8.97
14.793	8.97	8.97	8.97	8.97	8.96	8.96	8.96
14.892	8.96	8.96	8.95	8.95	8.95	8.95	8.95
14.991	8.95	8.94	8.94	8.94	8.94	8.94	8.93
15.091	8.93	8.93	8.93	8.93	8.92	8.92	8.92
15.190	8.92	8.92	8.91	8.91	8.91	8.91	8.90
15.289	8.90	8.90	8.90	8.89	8.89	8.89	8.89
15.388	8.89	8.88	8.88	8.88	8.88	8.87	8.87
15.487	8.87	8.86	8.86	8.86	8.86	8.85	8.85
15.586	8.85	8.85	8.84	8.84	8.84	8.84	8.83
15.685	8.83	8.83	8.82	8.82	8.82	8.82	8.81
15.784	8.81	8.81	8.80	8.80	8.80	8.79	8.79
15.883	8.79	8.78	8.78	8.78	8.78	8.77	8.77
15.982	8.77	8.76	8.76	8.76	8.75	8.75	8.75
16.081	8.74	8.74	8.74	8.73	8.73	8.73	8.72
16.180	8.72	8.72	8.71	8.71	8.70	8.70	8.70
16.279	8.69	8.69	8.69	8.68	8.68	8.68	8.67
16.378	8.67	8.66	8.66	8.66	8.65	8.65	8.65
16.477	8.64	8.64	8.63	8.63	8.63	8.62	8.62
16.576	8.61	8.61	8.61	8.60	8.60	8.59	8.59
16.675	8.59	8.58	8.58	8.57	8.57	8.57	8.56
16.774	8.56	8.55	8.55	8.54	8.54	8.54	8.53
16.873	8.53	8.52	8.52	8.51	8.51	8.51	8.50
16.972	8.50	8.49	8.49	8.48	8.48	8.47	8.47
17.071	8.47	8.46	8.46	8.45	8.45	8.44	8.44
17.170	8.43	8.43	8.42	8.42	8.41	8.41	8.41
17.269	8.40	8.40	8.39	8.39	8.38	8.38	8.37
17.368	8.37	8.36	8.36	8.35	8.35	8.34	8.34
17.467	8.33	8.33	8.32	8.32	8.31	8.31	8.30
17.566	8.30	8.29	8.29	8.28	8.28	8.27	8.27
17.665	8.26	8.26	8.25	8.25	8.24	8.24	8.23
17.764	8.23	8.22	8.22	8.21	8.20	8.20	8.19
17.863	8.19	8.18	8.18	8.17	8.17	8.16	8.16
17.962	8.15	8.15	8.14	8.13	8.13	8.12	8.12

CCCVC
EX - Basin 5

Line Start Time	Flow Values @ time increment of 0.014 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5 Basin 5 .24167 54. .224

STREAM REACH:

18.061	8.11	8.11	8.10	8.10	8.09	8.08	8.08
18.161	8.07	8.07	8.06	8.06	8.05	8.05	8.04
18.260	8.03	8.03	8.02	8.02	8.01	8.00	8.00
18.359	7.99	7.99	7.98	7.98	7.97	7.96	7.96
18.458	7.95	7.95	7.94	7.93	7.93	7.92	7.92
18.557	7.91	7.90	7.90	7.89	7.89	7.88	7.87
18.656	7.87	7.86	7.86	7.85	7.84	7.84	7.83
18.755	7.83	7.82	7.81	7.81	7.80	7.79	7.79
18.854	7.78	7.78	7.77	7.76	7.76	7.75	7.74
18.953	7.74	7.73	7.73	7.72	7.71	7.71	7.70
19.052	7.69	7.69	7.68	7.67	7.67	7.66	7.65
19.151	7.65	7.64	7.63	7.63	7.62	7.61	7.61
19.250	7.60	7.60	7.59	7.58	7.57	7.57	7.56
19.349	7.56	7.55	7.54	7.53	7.53	7.52	7.51
19.448	7.51	7.50	7.49	7.49	7.48	7.47	7.47
19.547	7.46	7.45	7.45	7.44	7.43	7.43	7.42
19.646	7.41	7.41	7.40	7.39	7.38	7.38	7.37
19.745	7.36	7.36	7.35	7.34	7.34	7.33	7.32
19.844	7.31	7.31	7.30	7.29	7.29	7.28	7.27
19.943	7.26	7.26	7.25	7.24	7.24	7.23	7.22
20.042	7.21	7.21	7.20	7.19	7.19	7.18	7.17
20.141	7.16	7.16	7.15	7.14	7.13	7.13	7.12
20.240	7.11	7.10	7.10	7.09	7.08	7.07	7.07
20.339	7.06	7.05	7.05	7.04	7.03	7.02	7.02
20.438	7.01	7.00	6.99	6.99	6.98	6.97	6.96
20.537	6.96	6.95	6.94	6.93	6.92	6.92	6.91
20.636	6.90	6.89	6.89	6.88	6.87	6.86	6.86
20.735	6.85	6.84	6.83	6.83	6.82	6.81	6.80
20.834	6.79	6.79	6.78	6.77	6.76	6.75	6.75
20.933	6.74	6.73	6.72	6.72	6.71	6.70	6.69
21.032	6.68	6.68	6.67	6.66	6.65	6.64	6.64
21.131	6.63	6.62	6.61	6.61	6.60	6.59	6.58
21.230	6.57	6.56	6.56	6.55	6.54	6.53	6.52
21.330	6.52	6.51	6.50	6.49	6.48	6.48	6.47
21.429	6.46	6.45	6.44	6.44	6.43	6.42	6.41
21.528	6.40	6.39	6.39	6.38	6.37	6.36	6.35
21.627	6.34	6.34	6.33	6.32	6.31	6.30	6.29
21.726	6.29	6.28	6.27	6.26	6.25	6.25	6.24
21.825	6.23	6.22	6.21	6.20	6.19	6.19	6.18
21.924	6.17	6.16	6.15	6.14	6.14	6.13	6.12
22.023	6.11	6.10	6.09	6.09	6.08	6.07	6.06
22.122	6.05	6.04	6.03	6.03	6.02	6.01	6.00
22.221	5.99	5.98	5.97	5.96	5.96	5.95	5.94
22.320	5.93	5.92	5.91	5.90	5.90	5.89	5.88
22.419	5.87	5.86	5.85	5.84	5.83	5.83	5.82
22.518	5.81	5.80	5.79	5.78	5.77	5.76	5.76
22.617	5.75	5.74	5.73	5.72	5.71	5.70	5.69
22.716	5.68	5.68	5.67	5.66	5.65	5.64	5.63
22.815	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.914	5.56	5.55	5.54	5.53	5.52	5.52	5.51
23.013	5.50	5.49	5.48	5.47	5.46	5.45	5.44

CCCVC

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
23.112	5.43	5.43	5.42	5.41	5.40	5.39	5.38
23.211	5.37	5.36	5.35	5.34	5.33	5.33	5.32
23.310	5.31	5.30	5.29	5.28	5.27	5.26	5.25
23.409	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.508	5.18	5.17	5.16	5.15	5.14	5.13	5.12
23.607	5.11	5.10	5.10	5.09	5.08	5.07	5.06
23.706	5.05	5.04	5.03	5.02	5.01	5.00	4.99
23.805	4.98	4.97	4.96	4.96	4.95	4.94	4.93
23.904	4.92	4.91	4.90	4.89	4.88	4.87	4.86
24.003	4.85	4.82	4.77	4.69	4.55	4.36	4.11
24.102	3.80	3.46	3.10	2.74	2.39	2.06	1.76
24.201	1.48	1.25	1.06	0.90	0.76	0.65	0.55
24.300	0.47	0.40	0.34	0.28	0.24	0.20	0.17
24.399	0.14	0.12	0.10	0.09	0.07	0.06	0.05

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.242	Downstream	0.886	0.13	10.07	46.81	193.69

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.743	0.05	0.13	0.28	0.52	0.88	1.41	2.18
9.842	3.25	4.65	6.48	8.80	11.62	14.88	18.47
9.941	22.27	26.16	29.99	33.62	37.00	40.03	42.59
10.040	44.62	46.06	46.81	46.78	46.02	44.72	43.06
10.139	41.22	39.23	37.24	35.30	33.47	31.81	30.41
10.238	29.27	28.28	27.43	26.66	25.98	25.35	24.80
10.337	24.31	23.85	23.43	23.03	22.64	22.27	21.91
10.436	21.58	21.25	20.93	20.60	20.26	19.92	19.59
10.535	19.27	18.96	18.66	18.37	18.08	17.80	17.54
10.634	17.30	17.08	16.88	16.69	16.52	16.37	16.23
10.733	16.11	16.00	15.90	15.81	15.72	15.63	15.55
10.832	15.47	15.39	15.32	15.25	15.18	15.10	15.03
10.931	14.96	14.89	14.82	14.75	14.68	14.60	14.53
11.030	14.46	14.39	14.32	14.26	14.19	14.13	14.07
11.129	14.01	13.96	13.92	13.87	13.83	13.80	13.76
11.228	13.74	13.71	13.69	13.67	13.65	13.63	13.61
11.327	13.59	13.58	13.56	13.55	13.53	13.51	13.50
11.426	13.48	13.47	13.45	13.44	13.42	13.40	13.39
11.525	13.37	13.35	13.34	13.32	13.30	13.28	13.26
11.624	13.24	13.22	13.21	13.19	13.17	13.14	13.12
11.723	13.10	13.08	13.06	13.04	13.01	12.99	12.97
11.822	12.94	12.92	12.90	12.87	12.85	12.82	12.79
11.922	12.77	12.74	12.72	12.69	12.66	12.63	12.60
12.021	12.58	12.55	12.52	12.50	12.47	12.44	12.42
12.120	12.39	12.37	12.35	12.32	12.30	12.28	12.26

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 54. .224

STREAM REACH:
12.219 12.24 12.23 12.21 12.19 12.18 12.16 12.15

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.318	12.13	12.11	12.10	12.08	12.07	12.05	12.04
12.417	12.02	12.01	11.99	11.98	11.96	11.94	11.93
12.516	11.91	11.89	11.88	11.86	11.84	11.83	11.81
12.615	11.79	11.77	11.76	11.74	11.72	11.70	11.68
12.714	11.66	11.65	11.63	11.61	11.59	11.57	11.55
12.813	11.53	11.51	11.49	11.47	11.45	11.43	11.41
12.912	11.39	11.37	11.35	11.33	11.31	11.28	11.26
13.011	11.24	11.22	11.20	11.17	11.15	11.13	11.11
13.110	11.08	11.06	11.04	11.02	10.99	10.97	10.95
13.209	10.92	10.90	10.87	10.85	10.83	10.80	10.78
13.308	10.75	10.73	10.70	10.68	10.65	10.63	10.60
13.407	10.58	10.55	10.52	10.50	10.47	10.45	10.42
13.506	10.39	10.37	10.34	10.32	10.29	10.26	10.23
13.605	10.21	10.18	10.15	10.12	10.10	10.07	10.04
13.704	10.01	9.98	9.96	9.93	9.90	9.87	9.84
13.803	9.81	9.78	9.76	9.73	9.70	9.67	9.64
13.902	9.61	9.58	9.55	9.52	9.49	9.46	9.43
14.001	9.40	9.37	9.34	9.31	9.28	9.26	9.23
14.100	9.21	9.18	9.16	9.14	9.13	9.11	9.10
14.199	9.08	9.07	9.06	9.06	9.05	9.04	9.04
14.298	9.03	9.03	9.03	9.02	9.02	9.02	9.01
14.397	9.01	9.01	9.01	9.01	9.01	9.00	9.00
14.496	9.00	9.00	9.00	9.00	9.00	8.99	8.99
14.595	8.99	8.99	8.99	8.99	8.99	8.98	8.98
14.694	8.98	8.98	8.98	8.98	8.98	8.97	8.97
14.793	8.97	8.97	8.97	8.97	8.96	8.96	8.96
14.892	8.96	8.96	8.95	8.95	8.95	8.95	8.95
14.991	8.95	8.94	8.94	8.94	8.94	8.94	8.93
15.091	8.93	8.93	8.93	8.93	8.92	8.92	8.92
15.190	8.92	8.92	8.91	8.91	8.91	8.91	8.90
15.289	8.90	8.90	8.90	8.89	8.89	8.89	8.89
15.388	8.89	8.88	8.88	8.88	8.88	8.87	8.87
15.487	8.87	8.86	8.86	8.86	8.86	8.85	8.85
15.586	8.85	8.85	8.84	8.84	8.84	8.84	8.83
15.685	8.83	8.83	8.82	8.82	8.82	8.82	8.81
15.784	8.81	8.81	8.80	8.80	8.80	8.79	8.79
15.883	8.79	8.78	8.78	8.78	8.78	8.77	8.77
15.982	8.77	8.76	8.76	8.76	8.75	8.75	8.75
16.081	8.74	8.74	8.74	8.73	8.73	8.73	8.72
16.180	8.72	8.72	8.71	8.71	8.70	8.70	8.70
16.279	8.69	8.69	8.69	8.68	8.68	8.68	8.67
16.378	8.67	8.66	8.66	8.66	8.65	8.65	8.65
16.477	8.64	8.64	8.63	8.63	8.63	8.62	8.62
16.576	8.61	8.61	8.61	8.60	8.60	8.59	8.59
16.675	8.59	8.58	8.58	8.57	8.57	8.57	8.56

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 54. .224

STREAM REACH:

16.774	8.56	8.55	8.55	8.54	8.54	8.54	8.53
16.873	8.53	8.52	8.52	8.51	8.51	8.51	8.50
16.972	8.50	8.49	8.49	8.48	8.48	8.47	8.47
17.071	8.47	8.46	8.46	8.45	8.45	8.44	8.44
17.170	8.43	8.43	8.42	8.42	8.42	8.41	8.41
17.269	8.40	8.40	8.39	8.39	8.38	8.38	8.37

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
17.368	8.37	8.36	8.36	8.35	8.35	8.34	8.34
17.467	8.33	8.33	8.32	8.32	8.31	8.31	8.30
17.566	8.30	8.29	8.29	8.28	8.28	8.27	8.27
17.665	8.26	8.26	8.25	8.25	8.24	8.24	8.23
17.764	8.23	8.22	8.22	8.21	8.20	8.20	8.19
17.863	8.19	8.18	8.18	8.17	8.17	8.16	8.16
17.962	8.15	8.15	8.14	8.13	8.13	8.12	8.12
18.061	8.11	8.11	8.10	8.10	8.09	8.08	8.08
18.161	8.07	8.07	8.06	8.06	8.05	8.05	8.04
18.260	8.03	8.03	8.02	8.02	8.01	8.01	8.00
18.359	7.99	7.99	7.98	7.98	7.97	7.96	7.96
18.458	7.95	7.95	7.94	7.93	7.93	7.92	7.92
18.557	7.91	7.90	7.90	7.89	7.89	7.88	7.87
18.656	7.87	7.86	7.86	7.85	7.84	7.84	7.83
18.755	7.83	7.82	7.81	7.81	7.80	7.79	7.79
18.854	7.78	7.78	7.77	7.76	7.76	7.75	7.74
18.953	7.74	7.73	7.73	7.72	7.71	7.71	7.70
19.052	7.69	7.69	7.68	7.67	7.67	7.66	7.65
19.151	7.65	7.64	7.63	7.63	7.62	7.61	7.61
19.250	7.60	7.60	7.59	7.58	7.57	7.57	7.56
19.349	7.56	7.55	7.54	7.53	7.53	7.52	7.51
19.448	7.51	7.50	7.49	7.49	7.48	7.47	7.47
19.547	7.46	7.45	7.45	7.44	7.43	7.43	7.42
19.646	7.41	7.41	7.40	7.39	7.38	7.38	7.37
19.745	7.36	7.36	7.35	7.34	7.34	7.33	7.32
19.844	7.31	7.31	7.30	7.29	7.29	7.28	7.27
19.943	7.26	7.26	7.25	7.24	7.24	7.23	7.22
20.042	7.21	7.21	7.20	7.19	7.19	7.18	7.17
20.141	7.16	7.16	7.15	7.14	7.13	7.13	7.12
20.240	7.11	7.10	7.10	7.09	7.08	7.07	7.07
20.339	7.06	7.05	7.05	7.04	7.03	7.02	7.02
20.438	7.01	7.00	6.99	6.99	6.98	6.97	6.96
20.537	6.96	6.95	6.94	6.93	6.92	6.92	6.91
20.636	6.90	6.89	6.89	6.88	6.87	6.86	6.86
20.735	6.85	6.84	6.83	6.83	6.82	6.81	6.80
20.834	6.79	6.79	6.78	6.77	6.76	6.75	6.75
20.933	6.74	6.73	6.72	6.72	6.71	6.70	6.69
21.032	6.68	6.68	6.67	6.66	6.65	6.64	6.64
21.131	6.63	6.62	6.61	6.61	6.60	6.59	6.58
21.230	6.57	6.56	6.56	6.55	6.54	6.53	6.52

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224

STREAM REACH:

21.330	6.52	6.51	6.50	6.49	6.48	6.48	6.47
21.429	6.46	6.45	6.44	6.44	6.43	6.42	6.41
21.528	6.40	6.39	6.39	6.38	6.37	6.36	6.35
21.627	6.34	6.34	6.33	6.32	6.31	6.30	6.29
21.726	6.29	6.28	6.27	6.26	6.25	6.25	6.24
21.825	6.23	6.22	6.21	6.20	6.19	6.19	6.18
21.924	6.17	6.16	6.15	6.14	6.14	6.13	6.12
22.023	6.11	6.10	6.09	6.09	6.08	6.07	6.06
22.122	6.05	6.04	6.03	6.03	6.02	6.01	6.00
22.221	5.99	5.98	5.97	5.97	5.96	5.95	5.94
22.320	5.93	5.92	5.91	5.90	5.90	5.89	5.88

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.419	5.87	5.86	5.85	5.84	5.83	5.83	5.82
22.518	5.81	5.80	5.79	5.78	5.77	5.76	5.76
22.617	5.75	5.74	5.73	5.72	5.71	5.70	5.69
22.716	5.68	5.68	5.67	5.66	5.65	5.64	5.63
22.815	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.914	5.56	5.55	5.54	5.53	5.52	5.52	5.51
23.013	5.50	5.49	5.48	5.47	5.46	5.45	5.44
23.112	5.43	5.43	5.42	5.41	5.40	5.39	5.38
23.211	5.37	5.36	5.35	5.34	5.33	5.33	5.32
23.310	5.31	5.30	5.29	5.28	5.27	5.26	5.25
23.409	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.508	5.18	5.17	5.16	5.15	5.14	5.13	5.12
23.607	5.11	5.10	5.10	5.09	5.08	5.07	5.06
23.706	5.05	5.04	5.03	5.02	5.01	5.00	4.99
23.805	4.98	4.97	4.96	4.96	4.95	4.94	4.93
23.904	4.92	4.91	4.90	4.89	4.88	4.87	4.86
24.003	4.85	4.82	4.77	4.69	4.55	4.36	4.11
24.102	3.80	3.46	3.10	2.74	2.39	2.06	1.76
24.201	1.49	1.25	1.06	0.90	0.76	0.65	0.55
24.300	0.47	0.40	0.34	0.28	0.24	0.20	0.17
24.399	0.14	0.12	0.10	0.09	0.07	0.06	0.05

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.242		0.886		10.07	46.81	193.69

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.743	0.05	0.13	0.28	0.52	0.88	1.41	2.18
9.842	3.25	4.65	6.48	8.80	11.62	14.88	18.47
9.941	22.27	26.16	29.99	33.62	37.00	40.03	42.59

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224	

STREAM REACH:

10.040	44.62	46.06	46.81	46.78	46.02	44.72	43.06
10.139	41.22	39.23	37.24	35.30	33.47	31.81	30.41
10.238	29.27	28.28	27.43	26.66	25.98	25.35	24.80
10.337	24.31	23.85	23.43	23.03	22.64	22.27	21.91
10.436	21.58	21.25	20.93	20.60	20.26	19.92	19.59
10.535	19.27	18.96	18.66	18.37	18.08	17.80	17.54
10.634	17.30	17.08	16.88	16.69	16.52	16.37	16.23
10.733	16.11	16.00	15.90	15.81	15.72	15.63	15.55
10.832	15.47	15.39	15.32	15.25	15.18	15.10	15.03
10.931	14.96	14.89	14.82	14.75	14.68	14.60	14.53
11.030	14.46	14.39	14.32	14.26	14.19	14.13	14.07
11.129	14.01	13.96	13.92	13.87	13.83	13.80	13.76
11.228	13.74	13.71	13.69	13.67	13.65	13.63	13.61
11.327	13.59	13.58	13.56	13.55	13.53	13.51	13.50
11.426	13.48	13.47	13.45	13.44	13.42	13.40	13.39
11.525	13.37	13.35	13.34	13.32	13.30	13.28	13.26

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
11.624	13.24	13.22	13.21	13.19	13.17	13.14	13.12
11.723	13.10	13.08	13.06	13.04	13.01	12.99	12.97
11.822	12.94	12.92	12.90	12.87	12.85	12.82	12.79
11.922	12.77	12.74	12.72	12.69	12.66	12.63	12.60
12.021	12.58	12.55	12.52	12.50	12.47	12.44	12.42
12.120	12.39	12.37	12.35	12.32	12.30	12.28	12.26
12.219	12.24	12.23	12.21	12.19	12.18	12.16	12.15
12.318	12.13	12.11	12.10	12.08	12.07	12.05	12.04
12.417	12.02	12.01	11.99	11.98	11.96	11.94	11.93
12.516	11.91	11.89	11.88	11.86	11.84	11.83	11.81
12.615	11.79	11.77	11.76	11.74	11.72	11.70	11.68
12.714	11.66	11.65	11.63	11.61	11.59	11.57	11.55
12.813	11.53	11.51	11.49	11.47	11.45	11.43	11.41
12.912	11.39	11.37	11.35	11.33	11.31	11.28	11.26
13.011	11.24	11.22	11.20	11.17	11.15	11.13	11.11
13.110	11.08	11.06	11.04	11.02	10.99	10.97	10.95
13.209	10.92	10.90	10.87	10.85	10.83	10.80	10.78
13.308	10.75	10.73	10.70	10.68	10.65	10.63	10.60
13.407	10.58	10.55	10.52	10.50	10.47	10.45	10.42
13.506	10.39	10.37	10.34	10.32	10.29	10.26	10.23
13.605	10.21	10.18	10.15	10.12	10.10	10.07	10.04
13.704	10.01	9.98	9.96	9.93	9.90	9.87	9.84
13.803	9.81	9.78	9.76	9.73	9.70	9.67	9.64
13.902	9.61	9.58	9.55	9.52	9.49	9.46	9.43
14.001	9.40	9.37	9.34	9.31	9.28	9.26	9.23
14.100	9.21	9.18	9.16	9.14	9.13	9.11	9.10
14.199	9.08	9.07	9.06	9.06	9.05	9.04	9.04
14.298	9.03	9.03	9.03	9.02	9.02	9.02	9.01
14.397	9.01	9.01	9.01	9.01	9.01	9.00	9.00
14.496	9.00	9.00	9.00	9.00	9.00	8.99	8.99

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224			

STREAM REACH:

14.595	8.99	8.99	8.99	8.99	8.99	8.98	8.98
14.694	8.98	8.98	8.98	8.98	8.98	8.97	8.97
14.793	8.97	8.97	8.97	8.97	8.96	8.96	8.96
14.892	8.96	8.96	8.95	8.95	8.95	8.95	8.95
14.991	8.95	8.94	8.94	8.94	8.94	8.94	8.93
15.091	8.93	8.93	8.93	8.93	8.92	8.92	8.92
15.190	8.92	8.92	8.91	8.91	8.91	8.91	8.90
15.289	8.90	8.90	8.90	8.89	8.89	8.89	8.89
15.388	8.89	8.88	8.88	8.88	8.88	8.87	8.87
15.487	8.87	8.86	8.86	8.86	8.86	8.85	8.85
15.586	8.85	8.85	8.84	8.84	8.84	8.84	8.83
15.685	8.83	8.83	8.82	8.82	8.82	8.82	8.81
15.784	8.81	8.81	8.80	8.80	8.80	8.79	8.79
15.883	8.79	8.78	8.78	8.78	8.78	8.77	8.77
15.982	8.77	8.76	8.76	8.76	8.75	8.75	8.75
16.081	8.74	8.74	8.74	8.73	8.73	8.73	8.72
16.180	8.72	8.72	8.71	8.71	8.70	8.70	8.70
16.279	8.69	8.69	8.69	8.68	8.68	8.68	8.67
16.378	8.67	8.66	8.66	8.66	8.65	8.65	8.65
16.477	8.64	8.64	8.63	8.63	8.63	8.62	8.62
16.576	8.61	8.61	8.61	8.60	8.60	8.59	8.59

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
16.675	8.59	8.58	8.58	8.57	8.57	8.57	8.56
16.774	8.56	8.55	8.55	8.54	8.54	8.54	8.53
16.873	8.53	8.52	8.52	8.51	8.51	8.51	8.50
16.972	8.50	8.49	8.49	8.48	8.48	8.47	8.47
17.071	8.47	8.46	8.46	8.45	8.45	8.44	8.44
17.170	8.43	8.43	8.42	8.42	8.42	8.41	8.41
17.269	8.40	8.40	8.39	8.39	8.38	8.38	8.37
17.368	8.37	8.36	8.36	8.35	8.35	8.34	8.34
17.467	8.33	8.33	8.32	8.32	8.31	8.31	8.30
17.566	8.30	8.29	8.29	8.28	8.28	8.27	8.27
17.665	8.26	8.26	8.25	8.25	8.24	8.24	8.23
17.764	8.23	8.22	8.22	8.21	8.20	8.20	8.19
17.863	8.19	8.18	8.18	8.17	8.17	8.16	8.16
17.962	8.15	8.15	8.14	8.13	8.13	8.12	8.12
18.061	8.11	8.11	8.10	8.10	8.09	8.08	8.08
18.161	8.07	8.07	8.06	8.06	8.05	8.05	8.04
18.260	8.03	8.03	8.02	8.02	8.01	8.01	8.00
18.359	7.99	7.99	7.98	7.98	7.97	7.96	7.96
18.458	7.95	7.95	7.94	7.93	7.93	7.92	7.92
18.557	7.91	7.90	7.90	7.89	7.89	7.88	7.87
18.656	7.87	7.86	7.86	7.85	7.84	7.84	7.83
18.755	7.83	7.82	7.81	7.81	7.80	7.79	7.79
18.854	7.78	7.78	7.77	7.76	7.76	7.75	7.74
18.953	7.74	7.73	7.73	7.72	7.71	7.71	7.70
19.052	7.69	7.69	7.68	7.67	7.67	7.66	7.65

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 54. .224

STREAM REACH:

19.151	7.65	7.64	7.63	7.63	7.62	7.61	7.61
19.250	7.60	7.60	7.59	7.58	7.57	7.57	7.56
19.349	7.56	7.55	7.54	7.53	7.53	7.52	7.51
19.448	7.51	7.50	7.49	7.49	7.48	7.47	7.47
19.547	7.46	7.45	7.45	7.44	7.43	7.43	7.42
19.646	7.41	7.41	7.40	7.39	7.38	7.38	7.37
19.745	7.36	7.36	7.35	7.34	7.34	7.33	7.32
19.844	7.31	7.31	7.30	7.29	7.29	7.28	7.27
19.943	7.26	7.26	7.25	7.24	7.24	7.23	7.22
20.042	7.21	7.21	7.20	7.19	7.19	7.18	7.17
20.141	7.16	7.16	7.15	7.14	7.13	7.13	7.12
20.240	7.11	7.10	7.10	7.09	7.08	7.07	7.07
20.339	7.06	7.05	7.05	7.04	7.03	7.02	7.02
20.438	7.01	7.00	6.99	6.99	6.98	6.97	6.96
20.537	6.96	6.95	6.94	6.93	6.92	6.92	6.91
20.636	6.90	6.89	6.89	6.88	6.87	6.86	6.86
20.735	6.85	6.84	6.83	6.83	6.82	6.81	6.80
20.834	6.79	6.79	6.78	6.77	6.76	6.75	6.75
20.933	6.74	6.73	6.72	6.72	6.71	6.70	6.69
21.032	6.68	6.68	6.67	6.66	6.65	6.64	6.64
21.131	6.63	6.62	6.61	6.61	6.60	6.59	6.58
21.230	6.57	6.56	6.56	6.55	6.54	6.53	6.52
21.330	6.52	6.51	6.50	6.49	6.48	6.48	6.47
21.429	6.46	6.45	6.44	6.44	6.43	6.42	6.41
21.528	6.40	6.39	6.39	6.38	6.37	6.36	6.35
21.627	6.34	6.34	6.33	6.32	6.31	6.30	6.29

CCCVC
EX - Basin 5

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
21.726	6.29	6.28	6.27	6.26	6.25	6.25	6.24
21.825	6.23	6.22	6.21	6.20	6.19	6.19	6.18
21.924	6.17	6.16	6.15	6.14	6.14	6.13	6.12
22.023	6.11	6.10	6.09	6.09	6.08	6.07	6.06
22.122	6.05	6.04	6.03	6.03	6.02	6.01	6.00
22.221	5.99	5.98	5.97	5.97	5.96	5.95	5.94
22.320	5.93	5.92	5.91	5.90	5.90	5.89	5.88
22.419	5.87	5.86	5.85	5.84	5.83	5.83	5.82
22.518	5.81	5.80	5.79	5.78	5.77	5.76	5.76
22.617	5.75	5.74	5.73	5.72	5.71	5.70	5.69
22.716	5.68	5.68	5.67	5.66	5.65	5.64	5.63
22.815	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.914	5.56	5.55	5.54	5.53	5.52	5.52	5.51
23.013	5.50	5.49	5.48	5.47	5.46	5.45	5.44
23.112	5.43	5.43	5.42	5.41	5.40	5.39	5.38
23.211	5.37	5.36	5.35	5.34	5.33	5.33	5.32
23.310	5.31	5.30	5.29	5.28	5.27	5.26	5.25
23.409	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.508	5.18	5.17	5.16	5.15	5.14	5.13	5.12
23.607	5.11	5.10	5.10	5.09	5.08	5.07	5.06

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	54.	.224

STREAM REACH:

23.706	5.05	5.04	5.03	5.02	5.01	5.00	4.99
23.805	4.98	4.97	4.96	4.96	4.95	4.94	4.93
23.904	4.92	4.91	4.90	4.89	4.88	4.87	4.86
24.003	4.85	4.82	4.77	4.69	4.55	4.36	4.11
24.102	3.80	3.46	3.10	2.74	2.39	2.06	1.76
24.201	1.49	1.25	1.06	0.90	0.76	0.65	0.55
24.300	0.47	0.40	0.34	0.28	0.24	0.20	0.17
24.399	0.14	0.12	0.10	0.09	0.07	0.06	0.05

CCCVC
EX - Basin 5

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 100-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Basin 5	0.242		46.81				
Basin 5	0.242		46.81				
DOWNSTREAM			46.81				
OUTLET	0.242		46.81				

WinTR-20 Printed Page File TR20.inp Beginning of Input Data List

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24167	54.	.224

STREAM REACH:

```
WinTR-20 Printed Page File      Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10                  0         0         0.05
CCCVC
EX - Basin 5- calibrated to match 39.64 cfs

SUB-AREA:
          Basin 5   Basin 5             .24167    53.       .224

STREAM REACH:
          Basin 5   Outlet    Xsec 1              2.

STORM ANALYSIS:
          100-Yr                        4.93      Type I    2

STRUCTURE RATING:

STREAM CROSS SECTION:
          Xsec 1    0.0       0.0       0.0
                    0.0       0.000     0.00      50.00     0.0100
                    0.5       182.295   26.00     54.00     0.0100
                    1.0       586.885   54.00     58.00     0.0100
                    2.0       1921.575  116.00    66.00     0.0100
                    5.0       9804.536  350.00    90.00     0.0100
                    10.0      36904.998 900.00    130.00    0.0100
                    20.0      156617.6822600.00   210.00    0.0100


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN


WinTR-20 Printed Page File      End of Input Data List

                                    CCCVC
                  EX - Basin 5- calibrated to match 39.64 cfs

                          Name of printed page file:
                                  TR20.out

                                          STORM 100-Yr

Area or    Drainage  Rain Gage     Runoff   ------------ Peak Flow ------------
 Reach       Area      ID or       Amount   Elevation   Time      Rate      Rate
Identifier (sq mi)   Location      (in)      (ft)      (hr)     (cfs)     (csm)

Basin 5       0.242                0.829               10.07     39.88    165.00

   Line
Start Time   ------------ Flow Values @ time increment of  0.014 hr ------------
      (hr)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)

     9.776      0.05      0.13      0.27      0.54      1.00      1.72      2.75
     9.875      4.18      6.07      8.43     11.20     14.30     17.62     21.06
     9.974     24.47     27.74     30.82     33.59     35.95     37.84     39.18
    10.073     39.88     39.86     39.22     38.14     36.78     35.26     33.62
    10.172     32.00     30.42     28.94     27.63     26.55     25.66     24.89
    10.271     24.22     23.61     23.07     22.57     22.13     21.74     21.38
    10.370     21.03     20.70     20.38     20.07     19.78     19.50     19.22
    10.469     18.94     18.65     18.36     18.06     17.78     17.51     17.24
    10.568     16.98     16.72     16.47     16.22     16.00     15.80     15.61
    10.668     15.43     15.27     15.13     15.00     14.88     14.78     14.69
    10.767     14.61     14.53     14.45     14.37     14.31     14.24     14.18
    10.866     14.12     14.05     13.99     13.92     13.86     13.80     13.74
    10.965     13.68     13.62     13.55     13.49     13.42     13.36     13.30

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WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224			

STREAM REACH:

11.064	13.24	13.19	13.13	13.07	13.02	12.98	12.93
11.163	12.90	12.86	12.83	12.80	12.77	12.75	12.73
11.262	12.71	12.70	12.68	12.66	12.65	12.64	12.63
11.361	12.61	12.60	12.59	12.57	12.56	12.55	12.54
11.460	12.53	12.51	12.50	12.49	12.47	12.46	12.45
11.559	12.43	12.42	12.40	12.39	12.37	12.35	12.34
11.658	12.32	12.31	12.29	12.27	12.25	12.23	12.22
11.757	12.20	12.18	12.16	12.14	12.12	12.10	12.08
11.856	12.06	12.03	12.01	11.99	11.97	11.94	11.92
11.955	11.90	11.87	11.85	11.82	11.80	11.77	11.75
12.054	11.73	11.70	11.68	11.66	11.63	11.61	11.59
12.153	11.57	11.55	11.54	11.52	11.50	11.48	11.47
12.252	11.46	11.44	11.43	11.41	11.40	11.39	11.37
12.351	11.36	11.35	11.33	11.32	11.31	11.29	11.28
12.450	11.27	11.25	11.24	11.22	11.21	11.19	11.18
12.549	11.17	11.15	11.14	11.12	11.10	11.09	11.07
12.648	11.06	11.04	11.03	11.01	10.99	10.98	10.96
12.747	10.94	10.93	10.91	10.89	10.87	10.86	10.84
12.846	10.82	10.80	10.79	10.77	10.75	10.73	10.71
12.945	10.69	10.67	10.65	10.63	10.61	10.59	10.57
13.044	10.55	10.54	10.52	10.49	10.47	10.45	10.43
13.143	10.41	10.39	10.37	10.35	10.33	10.30	10.28
13.242	10.26	10.24	10.22	10.19	10.17	10.15	10.12
13.341	10.10	10.08	10.06	10.03	10.01	9.99	9.96
13.440	9.94	9.92	9.89	9.87	9.84	9.82	9.79
13.539	9.77	9.75	9.72	9.70	9.67	9.64	9.62
13.638	9.59	9.57	9.54	9.52	9.49	9.46	9.44

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
13.737	9.41	9.39	9.36	9.33	9.31	9.28	9.25
13.837	9.23	9.20	9.17	9.14	9.12	9.09	9.06
13.936	9.03	9.01	8.98	8.95	8.92	8.89	8.86
14.035	8.84	8.81	8.79	8.76	8.74	8.72	8.69
14.134	8.68	8.66	8.64	8.63	8.62	8.61	8.60
14.233	8.59	8.58	8.58	8.57	8.57	8.56	8.56
14.332	8.56	8.55	8.55	8.55	8.55	8.55	8.55
14.431	8.54	8.54	8.54	8.54	8.54	8.54	8.54
14.530	8.54	8.54	8.54	8.53	8.53	8.53	8.53
14.629	8.53	8.53	8.53	8.53	8.53	8.53	8.52
14.728	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.827	8.51	8.51	8.51	8.51	8.51	8.51	8.51
14.926	8.51	8.50	8.50	8.50	8.50	8.50	8.50
15.025	8.50	8.49	8.49	8.49	8.49	8.49	8.49
15.124	8.48	8.48	8.48	8.48	8.48	8.48	8.47
15.223	8.47	8.47	8.47	8.47	8.47	8.46	8.46
15.322	8.46	8.46	8.46	8.45	8.45	8.45	8.45
15.421	8.45	8.44	8.44	8.44	8.44	8.44	8.43
15.520	8.43	8.43	8.43	8.42	8.42	8.42	8.42

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

15.619	8.41	8.41	8.41	8.41	8.41	8.40	8.40
15.718	8.40	8.40	8.39	8.39	8.39	8.39	8.38
15.817	8.38	8.38	8.38	8.37	8.37	8.37	8.36
15.916	8.36	8.36	8.36	8.35	8.35	8.35	8.34
16.015	8.34	8.34	8.34	8.33	8.33	8.33	8.32
16.114	8.32	8.32	8.32	8.31	8.31	8.31	8.30
16.213	8.30	8.30	8.29	8.29	8.29	8.28	8.28
16.312	8.28	8.27	8.27	8.27	8.27	8.26	8.26
16.411	8.26	8.25	8.25	8.25	8.24	8.24	8.23
16.510	8.23	8.23	8.22	8.22	8.22	8.21	8.21
16.609	8.21	8.20	8.20	8.20	8.19	8.19	8.19
16.708	8.18	8.18	8.17	8.17	8.17	8.16	8.16
16.807	8.16	8.15	8.15	8.14	8.14	8.14	8.13
16.907	8.13	8.12	8.12	8.12	8.11	8.11	8.10
17.006	8.10	8.10	8.09	8.09	8.08	8.08	8.08
17.105	8.07	8.07	8.06	8.06	8.06	8.05	8.05
17.204	8.04	8.04	8.03	8.03	8.03	8.02	8.02
17.303	8.01	8.01	8.00	8.00	8.00	7.99	7.99
17.402	7.98	7.98	7.97	7.97	7.96	7.96	7.95
17.501	7.95	7.95	7.94	7.94	7.93	7.93	7.92
17.600	7.92	7.91	7.91	7.90	7.90	7.89	7.89
17.699	7.88	7.88	7.88	7.87	7.87	7.86	7.86
17.798	7.85	7.85	7.84	7.84	7.83	7.83	7.82
17.897	7.82	7.81	7.81	7.80	7.80	7.79	7.79
17.996	7.78	7.78	7.77	7.77	7.76	7.76	7.75
18.095	7.75	7.74	7.74	7.73	7.73	7.72	7.71
18.194	7.71	7.70	7.70	7.69	7.69	7.68	7.68
18.293	7.67	7.67	7.66	7.66	7.65	7.65	7.64
18.392	7.63	7.63	7.62	7.62	7.61	7.61	7.60
18.491	7.60	7.59	7.58	7.58	7.57	7.57	7.56
18.590	7.56	7.55	7.55	7.54	7.53	7.53	7.52
18.689	7.52	7.51	7.51	7.50	7.49	7.49	7.48

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
18.788	7.48	7.47	7.47	7.46	7.45	7.45	7.44
18.887	7.44	7.43	7.42	7.42	7.41	7.41	7.40
18.986	7.40	7.39	7.38	7.38	7.37	7.37	7.36
19.085	7.35	7.35	7.34	7.33	7.33	7.32	7.32
19.184	7.31	7.30	7.30	7.29	7.29	7.28	7.27
19.283	7.27	7.26	7.25	7.25	7.24	7.24	7.23
19.382	7.22	7.22	7.21	7.20	7.20	7.19	7.19
19.481	7.18	7.17	7.17	7.16	7.15	7.15	7.14
19.580	7.13	7.13	7.12	7.11	7.11	7.10	7.10
19.679	7.09	7.08	7.08	7.07	7.06	7.06	7.05
19.778	7.04	7.04	7.03	7.02	7.02	7.01	7.00
19.877	7.00	6.99	6.98	6.98	6.97	6.96	6.96
19.976	6.95	6.94	6.94	6.93	6.92	6.92	6.91
20.076	6.90	6.89	6.89	6.88	6.87	6.87	6.86

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

20.175	6.85	6.85	6.84	6.83	6.83	6.82	6.81
20.274	6.81	6.80	6.79	6.78	6.78	6.77	6.76
20.373	6.76	6.75	6.74	6.73	6.73	6.72	6.71
20.472	6.71	6.70	6.69	6.68	6.68	6.67	6.66
20.571	6.66	6.65	6.64	6.63	6.63	6.62	6.61
20.670	6.61	6.60	6.59	6.58	6.58	6.57	6.56
20.769	6.56	6.55	6.54	6.53	6.53	6.52	6.51
20.868	6.50	6.50	6.49	6.48	6.47	6.47	6.46
20.967	6.45	6.44	6.44	6.43	6.42	6.41	6.41
21.066	6.40	6.39	6.38	6.38	6.37	6.36	6.35
21.165	6.35	6.34	6.33	6.32	6.32	6.31	6.30
21.264	6.29	6.29	6.28	6.27	6.26	6.25	6.25
21.363	6.24	6.23	6.22	6.22	6.21	6.20	6.19
21.462	6.19	6.18	6.17	6.16	6.15	6.15	6.14
21.561	6.13	6.12	6.11	6.11	6.10	6.09	6.08
21.660	6.08	6.07	6.06	6.05	6.04	6.04	6.03
21.759	6.02	6.01	6.00	6.00	5.99	5.98	5.97
21.858	5.96	5.96	5.95	5.94	5.93	5.92	5.92
21.957	5.91	5.90	5.89	5.88	5.88	5.87	5.86
22.056	5.85	5.84	5.84	5.83	5.82	5.81	5.80
22.155	5.80	5.79	5.78	5.77	5.76	5.75	5.75
22.254	5.74	5.73	5.72	5.71	5.70	5.70	5.69
22.353	5.68	5.67	5.66	5.66	5.65	5.64	5.63
22.452	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.551	5.56	5.56	5.55	5.54	5.53	5.52	5.51
22.650	5.50	5.50	5.49	5.48	5.47	5.46	5.45
22.749	5.45	5.44	5.43	5.42	5.41	5.40	5.39
22.848	5.39	5.38	5.37	5.36	5.35	5.34	5.33
22.947	5.33	5.32	5.31	5.30	5.29	5.28	5.27
23.046	5.27	5.26	5.25	5.24	5.23	5.22	5.21
23.145	5.21	5.20	5.19	5.18	5.17	5.16	5.15
23.245	5.15	5.14	5.13	5.12	5.11	5.10	5.09
23.344	5.08	5.08	5.07	5.06	5.05	5.04	5.03
23.443	5.02	5.01	5.01	5.00	4.99	4.98	4.97
23.542	4.96	4.95	4.94	4.93	4.93	4.92	4.91
23.641	4.90	4.89	4.88	4.87	4.86	4.85	4.85
23.740	4.84	4.83	4.82	4.81	4.80	4.79	4.78

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
23.839	4.77	4.76	4.76	4.75	4.74	4.73	4.72
23.938	4.71	4.70	4.69	4.68	4.67	4.66	4.63
24.037	4.56	4.47	4.32	4.11	3.85	3.54	3.20
24.136	2.86	2.51	2.18	1.87	1.59	1.34	1.13
24.235	0.96	0.81	0.69	0.59	0.50	0.42	0.36
24.334	0.30	0.26	0.22	0.18	0.16	0.13	0.11
24.433	0.09	0.08	0.07	0.06			

Area or	Drainage	Rain Gage	Runoff	Peak Flow

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.242	Upstream	0.829	0.11	10.07	39.88	165.00

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
9.776	0.05	0.13	0.27	0.54	1.00	1.72	2.75
9.875	4.18	6.07	8.43	11.20	14.30	17.62	21.06
9.974	24.47	27.74	30.82	33.59	35.95	37.84	39.18
10.073	39.88	39.86	39.22	38.14	36.78	35.26	33.62
10.172	32.00	30.42	28.94	27.63	26.55	25.66	24.89
10.271	24.22	23.61	23.07	22.57	22.13	21.74	21.38
10.370	21.03	20.70	20.38	20.07	19.78	19.50	19.22
10.469	18.94	18.65	18.36	18.06	17.78	17.51	17.24
10.568	16.98	16.72	16.47	16.22	16.00	15.80	15.61
10.668	15.43	15.27	15.13	15.00	14.88	14.78	14.69
10.767	14.61	14.53	14.45	14.37	14.31	14.24	14.18
10.866	14.12	14.05	13.99	13.92	13.86	13.80	13.74
10.965	13.68	13.62	13.55	13.49	13.42	13.36	13.30
11.064	13.24	13.19	13.13	13.07	13.02	12.98	12.93
11.163	12.90	12.86	12.83	12.80	12.77	12.75	12.73
11.262	12.71	12.70	12.68	12.66	12.65	12.64	12.63
11.361	12.61	12.60	12.59	12.57	12.56	12.55	12.54
11.460	12.53	12.51	12.50	12.49	12.47	12.46	12.45
11.559	12.43	12.42	12.40	12.39	12.37	12.35	12.34
11.658	12.32	12.31	12.29	12.27	12.25	12.23	12.22
11.757	12.20	12.18	12.16	12.14	12.12	12.10	12.08
11.856	12.06	12.03	12.01	11.99	11.97	11.94	11.92
11.955	11.90	11.87	11.85	11.82	11.80	11.77	11.75
12.054	11.73	11.70	11.68	11.66	11.63	11.61	11.59
12.153	11.57	11.55	11.54	11.52	11.50	11.48	11.47
12.252	11.46	11.44	11.43	11.41	11.40	11.39	11.37
12.351	11.36	11.35	11.33	11.32	11.31	11.29	11.28
12.450	11.27	11.25	11.24	11.22	11.21	11.19	11.18
12.549	11.17	11.15	11.14	11.12	11.10	11.09	11.07
12.648	11.06	11.04	11.03	11.01	10.99	10.98	10.96
12.747	10.94	10.93	10.91	10.89	10.87	10.86	10.84
12.846	10.82	10.80	10.79	10.77	10.75	10.73	10.71
12.945	10.69	10.67	10.65	10.63	10.61	10.59	10.57

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
13.044	10.55	10.54	10.52	10.49	10.47	10.45	10.43
13.143	10.41	10.39	10.37	10.35	10.33	10.30	10.28
13.242	10.26	10.24	10.22	10.19	10.17	10.15	10.12
13.341	10.10	10.08	10.06	10.03	10.01	9.99	9.96

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

13.440	9.94	9.92	9.89	9.87	9.84	9.82	9.79
13.539	9.77	9.75	9.72	9.70	9.67	9.64	9.62
13.638	9.59	9.57	9.54	9.52	9.49	9.46	9.44
13.737	9.41	9.39	9.36	9.33	9.31	9.28	9.25
13.837	9.23	9.20	9.17	9.14	9.12	9.09	9.06
13.936	9.03	9.01	8.98	8.95	8.92	8.89	8.86
14.035	8.84	8.81	8.79	8.76	8.74	8.72	8.69
14.134	8.68	8.66	8.64	8.63	8.62	8.61	8.60
14.233	8.59	8.58	8.58	8.57	8.57	8.56	8.56
14.332	8.56	8.55	8.55	8.55	8.55	8.55	8.55
14.431	8.54	8.54	8.54	8.54	8.54	8.54	8.54
14.530	8.54	8.54	8.54	8.53	8.53	8.53	8.53
14.629	8.53	8.53	8.53	8.53	8.53	8.53	8.52
14.728	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.827	8.51	8.51	8.51	8.51	8.51	8.51	8.51
14.926	8.51	8.50	8.50	8.50	8.50	8.50	8.50
15.025	8.50	8.49	8.49	8.49	8.49	8.49	8.49
15.124	8.48	8.48	8.48	8.48	8.48	8.48	8.47
15.223	8.47	8.47	8.47	8.47	8.47	8.46	8.46
15.322	8.46	8.46	8.46	8.45	8.45	8.45	8.45
15.421	8.45	8.44	8.44	8.44	8.44	8.44	8.43
15.520	8.43	8.43	8.43	8.42	8.42	8.42	8.42
15.619	8.41	8.41	8.41	8.41	8.41	8.40	8.40
15.718	8.40	8.40	8.39	8.39	8.39	8.39	8.38
15.817	8.38	8.38	8.38	8.37	8.37	8.37	8.36
15.916	8.36	8.36	8.36	8.35	8.35	8.35	8.34
16.015	8.34	8.34	8.34	8.33	8.33	8.33	8.32
16.114	8.32	8.32	8.32	8.31	8.31	8.31	8.30
16.213	8.30	8.30	8.29	8.29	8.29	8.28	8.28
16.312	8.28	8.27	8.27	8.27	8.27	8.26	8.26
16.411	8.26	8.25	8.25	8.25	8.24	8.24	8.23
16.510	8.23	8.23	8.22	8.22	8.22	8.21	8.21
16.609	8.21	8.20	8.20	8.20	8.19	8.19	8.19
16.708	8.18	8.18	8.17	8.17	8.17	8.16	8.16
16.807	8.16	8.15	8.15	8.14	8.14	8.14	8.13
16.907	8.13	8.12	8.12	8.12	8.11	8.11	8.10
17.006	8.10	8.10	8.09	8.09	8.08	8.08	8.08
17.105	8.07	8.07	8.06	8.06	8.06	8.05	8.05
17.204	8.04	8.04	8.03	8.03	8.03	8.02	8.02
17.303	8.01	8.01	8.00	8.00	8.00	7.99	7.99
17.402	7.98	7.98	7.97	7.97	7.96	7.96	7.95
17.501	7.95	7.95	7.94	7.94	7.93	7.93	7.92
17.600	7.92	7.91	7.91	7.90	7.90	7.89	7.89
17.699	7.88	7.88	7.88	7.87	7.87	7.86	7.86
17.798	7.85	7.85	7.84	7.84	7.83	7.83	7.82
17.897	7.82	7.81	7.81	7.80	7.80	7.79	7.79
17.996	7.78	7.78	7.77	7.77	7.76	7.76	7.75

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5 Basin 5 .24167 53. .224

STREAM REACH:

18.095	7.75	7.74	7.74	7.73	7.73	7.72	7.71
18.194	7.71	7.70	7.70	7.69	7.69	7.68	7.68
18.293	7.67	7.67	7.66	7.66	7.65	7.65	7.64
18.392	7.63	7.63	7.62	7.62	7.61	7.61	7.60
18.491	7.60	7.59	7.58	7.58	7.57	7.57	7.56
18.590	7.56	7.55	7.55	7.54	7.53	7.53	7.52
18.689	7.52	7.51	7.51	7.50	7.49	7.49	7.48
18.788	7.48	7.47	7.47	7.46	7.45	7.45	7.44
18.887	7.44	7.43	7.42	7.42	7.41	7.41	7.40
18.986	7.40	7.39	7.38	7.38	7.37	7.37	7.36
19.085	7.35	7.35	7.34	7.33	7.33	7.32	7.32
19.184	7.31	7.30	7.30	7.29	7.29	7.28	7.27
19.283	7.27	7.26	7.25	7.25	7.24	7.24	7.23
19.382	7.22	7.22	7.21	7.20	7.20	7.19	7.19
19.481	7.18	7.17	7.17	7.16	7.15	7.15	7.14
19.580	7.13	7.13	7.12	7.11	7.11	7.10	7.10
19.679	7.09	7.08	7.08	7.07	7.06	7.06	7.05
19.778	7.04	7.04	7.03	7.02	7.02	7.01	7.00
19.877	7.00	6.99	6.98	6.98	6.97	6.96	6.96
19.976	6.95	6.94	6.94	6.93	6.92	6.92	6.91
20.076	6.90	6.89	6.89	6.88	6.87	6.87	6.86
20.175	6.85	6.85	6.84	6.83	6.83	6.82	6.81
20.274	6.81	6.80	6.79	6.78	6.78	6.77	6.76
20.373	6.76	6.75	6.74	6.73	6.73	6.72	6.71
20.472	6.71	6.70	6.69	6.68	6.68	6.67	6.66
20.571	6.66	6.65	6.64	6.63	6.63	6.62	6.61
20.670	6.61	6.60	6.59	6.58	6.58	6.57	6.56
20.769	6.56	6.55	6.54	6.53	6.53	6.52	6.51
20.868	6.50	6.50	6.49	6.48	6.47	6.47	6.46
20.967	6.45	6.44	6.44	6.43	6.42	6.41	6.41
21.066	6.40	6.39	6.38	6.38	6.37	6.36	6.35
21.165	6.35	6.34	6.33	6.32	6.32	6.31	6.30
21.264	6.29	6.29	6.28	6.27	6.26	6.25	6.25
21.363	6.24	6.23	6.22	6.22	6.21	6.20	6.19
21.462	6.19	6.18	6.17	6.16	6.15	6.15	6.14
21.561	6.13	6.12	6.11	6.11	6.10	6.09	6.08
21.660	6.08	6.07	6.06	6.05	6.04	6.04	6.03
21.759	6.02	6.01	6.00	6.00	5.99	5.98	5.97
21.858	5.96	5.96	5.95	5.94	5.93	5.92	5.92
21.957	5.91	5.90	5.89	5.88	5.88	5.87	5.86
22.056	5.85	5.84	5.84	5.83	5.82	5.81	5.80
22.155	5.80	5.79	5.78	5.77	5.76	5.75	5.75
22.254	5.74	5.73	5.72	5.71	5.70	5.70	5.69
22.353	5.68	5.67	5.66	5.66	5.65	5.64	5.63
22.452	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.551	5.56	5.56	5.55	5.54	5.53	5.52	5.51
22.650	5.50	5.50	5.49	5.48	5.47	5.46	5.45
22.749	5.45	5.44	5.43	5.42	5.41	5.40	5.39
22.848	5.39	5.38	5.37	5.36	5.35	5.34	5.33
22.947	5.33	5.32	5.31	5.30	5.29	5.28	5.27
23.046	5.27	5.26	5.25	5.24	5.23	5.22	5.21

CCCVC

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
23.145	5.21	5.20	5.19	5.18	5.17	5.16	5.15
23.245	5.15	5.14	5.13	5.12	5.11	5.10	5.09
23.344	5.08	5.08	5.07	5.06	5.05	5.04	5.03
23.443	5.02	5.01	5.01	5.00	4.99	4.98	4.97
23.542	4.96	4.95	4.94	4.93	4.93	4.92	4.91
23.641	4.90	4.89	4.88	4.87	4.86	4.85	4.85
23.740	4.84	4.83	4.82	4.81	4.80	4.79	4.78
23.839	4.77	4.76	4.76	4.75	4.74	4.73	4.72
23.938	4.71	4.70	4.69	4.68	4.67	4.66	4.63
24.037	4.56	4.47	4.32	4.11	3.85	3.54	3.20
24.136	2.86	2.51	2.18	1.87	1.59	1.34	1.13
24.235	0.96	0.81	0.69	0.59	0.50	0.42	0.36
24.334	0.30	0.26	0.22	0.18	0.16	0.13	0.11
24.433	0.09	0.08	0.07	0.06			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.242	Downstream	0.829	0.11	10.07	39.87	165.00

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.776	0.05	0.13	0.27	0.54	1.00	1.71	2.75
9.875	4.18	6.07	8.42	11.19	14.28	17.61	21.05
9.974	24.46	27.73	30.81	33.58	35.94	37.84	39.18
10.073	39.87	39.86	39.22	38.15	36.79	35.27	33.63
10.172	32.01	30.43	28.94	27.63	26.55	25.67	24.89
10.271	24.22	23.62	23.07	22.57	22.14	21.74	21.38
10.370	21.04	20.70	20.38	20.07	19.78	19.50	19.22
10.469	18.94	18.66	18.36	18.07	17.78	17.51	17.24
10.568	16.98	16.72	16.47	16.22	16.00	15.80	15.61
10.668	15.43	15.27	15.13	15.00	14.88	14.78	14.69
10.767	14.61	14.53	14.45	14.37	14.31	14.24	14.18
10.866	14.12	14.05	13.99	13.92	13.86	13.80	13.74
10.965	13.68	13.62	13.55	13.49	13.42	13.36	13.30
11.064	13.24	13.19	13.13	13.07	13.02	12.98	12.94
11.163	12.90	12.86	12.83	12.80	12.77	12.75	12.73
11.262	12.71	12.70	12.68	12.66	12.65	12.64	12.63
11.361	12.61	12.60	12.59	12.57	12.56	12.55	12.54
11.460	12.53	12.51	12.50	12.49	12.47	12.46	12.45
11.559	12.43	12.42	12.40	12.39	12.37	12.35	12.34
11.658	12.32	12.31	12.29	12.27	12.25	12.23	12.22
11.757	12.20	12.18	12.16	12.14	12.12	12.10	12.08
11.856	12.06	12.04	12.01	11.99	11.97	11.94	11.92
11.955	11.90	11.87	11.85	11.82	11.80	11.77	11.75
12.054	11.73	11.70	11.68	11.66	11.63	11.61	11.59
12.153	11.57	11.55	11.54	11.52	11.50	11.48	11.47

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 53. .224

STREAM REACH:
12.252 11.46 11.44 11.43 11.41 11.40 11.39 11.37

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
12.351	11.36	11.35	11.33	11.32	11.31	11.29	11.28
12.450	11.27	11.25	11.24	11.22	11.21	11.19	11.18
12.549	11.17	11.15	11.14	11.12	11.10	11.09	11.07
12.648	11.06	11.04	11.03	11.01	10.99	10.98	10.96
12.747	10.94	10.93	10.91	10.89	10.87	10.86	10.84
12.846	10.82	10.80	10.79	10.77	10.75	10.73	10.71
12.945	10.69	10.67	10.65	10.63	10.61	10.59	10.57
13.044	10.55	10.54	10.52	10.49	10.47	10.45	10.43
13.143	10.41	10.39	10.37	10.35	10.33	10.30	10.28
13.242	10.26	10.24	10.22	10.19	10.17	10.15	10.12
13.341	10.10	10.08	10.06	10.03	10.01	9.99	9.96
13.440	9.94	9.92	9.89	9.87	9.84	9.82	9.79
13.539	9.77	9.75	9.72	9.70	9.67	9.64	9.62
13.638	9.59	9.57	9.54	9.52	9.49	9.46	9.44
13.737	9.41	9.39	9.36	9.33	9.31	9.28	9.25
13.837	9.23	9.20	9.17	9.14	9.12	9.09	9.06
13.936	9.03	9.01	8.98	8.95	8.92	8.89	8.86
14.035	8.84	8.81	8.79	8.76	8.74	8.72	8.69
14.134	8.68	8.66	8.64	8.63	8.62	8.61	8.60
14.233	8.59	8.58	8.58	8.57	8.57	8.56	8.56
14.332	8.56	8.55	8.55	8.55	8.55	8.55	8.55
14.431	8.54	8.54	8.54	8.54	8.54	8.54	8.54
14.530	8.54	8.54	8.54	8.53	8.53	8.53	8.53
14.629	8.53	8.53	8.53	8.53	8.53	8.53	8.52
14.728	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.827	8.51	8.51	8.51	8.51	8.51	8.51	8.51
14.926	8.51	8.50	8.50	8.50	8.50	8.50	8.50
15.025	8.50	8.49	8.49	8.49	8.49	8.49	8.49
15.124	8.48	8.48	8.48	8.48	8.48	8.48	8.47
15.223	8.47	8.47	8.47	8.47	8.47	8.46	8.46
15.322	8.46	8.46	8.46	8.45	8.45	8.45	8.45
15.421	8.45	8.44	8.44	8.44	8.44	8.44	8.43
15.520	8.43	8.43	8.43	8.42	8.42	8.42	8.42
15.619	8.41	8.41	8.41	8.41	8.41	8.40	8.40
15.718	8.40	8.40	8.39	8.39	8.39	8.39	8.38
15.817	8.38	8.38	8.38	8.37	8.37	8.37	8.36
15.916	8.36	8.36	8.36	8.35	8.35	8.35	8.34
16.015	8.34	8.34	8.34	8.33	8.33	8.33	8.32
16.114	8.32	8.32	8.32	8.31	8.31	8.31	8.30
16.213	8.30	8.30	8.29	8.29	8.29	8.28	8.28
16.312	8.28	8.27	8.27	8.27	8.27	8.26	8.26
16.411	8.26	8.25	8.25	8.25	8.24	8.24	8.23
16.510	8.23	8.23	8.22	8.22	8.22	8.21	8.21
16.609	8.21	8.20	8.20	8.20	8.19	8.19	8.19
16.708	8.18	8.18	8.17	8.17	8.17	8.16	8.16

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

16.807	8.16	8.15	8.15	8.14	8.14	8.14	8.13
16.907	8.13	8.12	8.12	8.12	8.11	8.11	8.10
17.006	8.10	8.10	8.09	8.09	8.08	8.08	8.08
17.105	8.07	8.07	8.06	8.06	8.06	8.05	8.05
17.204	8.04	8.04	8.03	8.03	8.03	8.02	8.02
17.303	8.01	8.01	8.00	8.00	8.00	7.99	7.99

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
17.402	7.98	7.98	7.97	7.97	7.96	7.96	7.95
17.501	7.95	7.95	7.94	7.94	7.93	7.93	7.92
17.600	7.92	7.91	7.91	7.90	7.90	7.89	7.89
17.699	7.88	7.88	7.88	7.87	7.87	7.86	7.86
17.798	7.85	7.85	7.84	7.84	7.83	7.83	7.82
17.897	7.82	7.81	7.81	7.80	7.80	7.79	7.79
17.996	7.78	7.78	7.77	7.77	7.76	7.76	7.75
18.095	7.75	7.74	7.74	7.73	7.73	7.72	7.71
18.194	7.71	7.70	7.70	7.69	7.69	7.68	7.68
18.293	7.67	7.67	7.66	7.66	7.65	7.65	7.64
18.392	7.63	7.63	7.62	7.62	7.61	7.61	7.60
18.491	7.60	7.59	7.58	7.58	7.57	7.57	7.56
18.590	7.56	7.55	7.55	7.54	7.53	7.53	7.52
18.689	7.52	7.51	7.51	7.50	7.49	7.49	7.48
18.788	7.48	7.47	7.47	7.46	7.45	7.45	7.44
18.887	7.44	7.43	7.42	7.42	7.41	7.41	7.40
18.986	7.40	7.39	7.38	7.38	7.37	7.37	7.36
19.085	7.35	7.35	7.34	7.33	7.33	7.32	7.32
19.184	7.31	7.30	7.30	7.29	7.29	7.28	7.27
19.283	7.27	7.26	7.25	7.25	7.24	7.24	7.23
19.382	7.22	7.22	7.21	7.20	7.20	7.19	7.19
19.481	7.18	7.17	7.17	7.16	7.15	7.15	7.14
19.580	7.13	7.13	7.12	7.11	7.11	7.10	7.10
19.679	7.09	7.08	7.08	7.07	7.06	7.06	7.05
19.778	7.04	7.04	7.03	7.02	7.02	7.01	7.00
19.877	7.00	6.99	6.98	6.98	6.97	6.96	6.96
19.976	6.95	6.94	6.94	6.93	6.92	6.92	6.91
20.076	6.90	6.89	6.89	6.88	6.87	6.87	6.86
20.175	6.85	6.85	6.84	6.83	6.83	6.82	6.81
20.274	6.81	6.80	6.79	6.78	6.78	6.77	6.76
20.373	6.76	6.75	6.74	6.73	6.73	6.72	6.71
20.472	6.71	6.70	6.69	6.68	6.68	6.67	6.66
20.571	6.66	6.65	6.64	6.63	6.63	6.62	6.61
20.670	6.61	6.60	6.59	6.58	6.58	6.57	6.56
20.769	6.56	6.55	6.54	6.53	6.53	6.52	6.51
20.868	6.50	6.50	6.49	6.48	6.47	6.47	6.46
20.967	6.45	6.44	6.44	6.43	6.42	6.41	6.41
21.066	6.40	6.39	6.38	6.38	6.37	6.36	6.35
21.165	6.35	6.34	6.33	6.32	6.32	6.31	6.30
21.264	6.29	6.29	6.28	6.27	6.26	6.25	6.25

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

21.363	6.24	6.23	6.22	6.22	6.21	6.20	6.19
21.462	6.19	6.18	6.17	6.16	6.15	6.15	6.14
21.561	6.13	6.12	6.11	6.11	6.10	6.09	6.08
21.660	6.08	6.07	6.06	6.05	6.04	6.04	6.03
21.759	6.02	6.01	6.00	6.00	5.99	5.98	5.97
21.858	5.96	5.96	5.95	5.94	5.93	5.92	5.92
21.957	5.91	5.90	5.89	5.88	5.88	5.87	5.86
22.056	5.85	5.84	5.84	5.83	5.82	5.81	5.80
22.155	5.80	5.79	5.78	5.77	5.76	5.75	5.75
22.254	5.74	5.73	5.72	5.71	5.70	5.70	5.69
22.353	5.68	5.67	5.66	5.66	5.65	5.64	5.63

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
22.452	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.551	5.56	5.56	5.55	5.54	5.53	5.52	5.51
22.650	5.50	5.50	5.49	5.48	5.47	5.46	5.45
22.749	5.45	5.44	5.43	5.42	5.41	5.40	5.39
22.848	5.39	5.38	5.37	5.36	5.35	5.34	5.33
22.947	5.33	5.32	5.31	5.30	5.29	5.28	5.27
23.046	5.27	5.26	5.25	5.24	5.23	5.22	5.21
23.145	5.21	5.20	5.19	5.18	5.17	5.16	5.15
23.245	5.15	5.14	5.13	5.12	5.11	5.10	5.09
23.344	5.08	5.08	5.07	5.06	5.05	5.04	5.03
23.443	5.02	5.01	5.01	5.00	4.99	4.98	4.97
23.542	4.96	4.95	4.94	4.93	4.93	4.92	4.91
23.641	4.90	4.89	4.88	4.87	4.86	4.85	4.85
23.740	4.84	4.83	4.82	4.81	4.80	4.79	4.78
23.839	4.77	4.76	4.76	4.75	4.74	4.73	4.72
23.938	4.71	4.70	4.69	4.68	4.67	4.66	4.63
24.037	4.57	4.47	4.32	4.11	3.85	3.54	3.20
24.136	2.86	2.51	2.18	1.87	1.59	1.34	1.13
24.235	0.96	0.82	0.69	0.59	0.50	0.42	0.36
24.334	0.30	0.26	0.22	0.18	0.16	0.13	0.11
24.433	0.09	0.08	0.07	0.06			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	0.242		0.829		10.07	39.87	165.00

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
9.776	0.05	0.13	0.27	0.54	1.00	1.71	2.75
9.875	4.18	6.07	8.42	11.19	14.28	17.61	21.05
9.974	24.46	27.73	30.81	33.58	35.94	37.84	39.18

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

10.073	39.87	39.86	39.22	38.15	36.79	35.27	33.63
10.172	32.01	30.43	28.94	27.63	26.55	25.67	24.89
10.271	24.22	23.62	23.07	22.57	22.14	21.74	21.38
10.370	21.04	20.70	20.38	20.07	19.78	19.50	19.22
10.469	18.94	18.66	18.36	18.07	17.78	17.51	17.24
10.568	16.98	16.72	16.47	16.22	16.00	15.80	15.61
10.668	15.43	15.27	15.13	15.00	14.88	14.78	14.69
10.767	14.61	14.53	14.45	14.37	14.31	14.24	14.18
10.866	14.12	14.05	13.99	13.92	13.86	13.80	13.74
10.965	13.68	13.62	13.55	13.49	13.42	13.36	13.30
11.064	13.24	13.19	13.13	13.07	13.02	12.98	12.94
11.163	12.90	12.86	12.83	12.80	12.77	12.75	12.73
11.262	12.71	12.70	12.68	12.66	12.65	12.64	12.63
11.361	12.61	12.60	12.59	12.57	12.56	12.55	12.54
11.460	12.53	12.51	12.50	12.49	12.47	12.46	12.45
11.559	12.43	12.42	12.40	12.39	12.37	12.35	12.34

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
11.658	12.32	12.31	12.29	12.27	12.25	12.23	12.22
11.757	12.20	12.18	12.16	12.14	12.12	12.10	12.08
11.856	12.06	12.04	12.01	11.99	11.97	11.94	11.92
11.955	11.90	11.87	11.85	11.82	11.80	11.77	11.75
12.054	11.73	11.70	11.68	11.66	11.63	11.61	11.59
12.153	11.57	11.55	11.54	11.52	11.50	11.48	11.47
12.252	11.46	11.44	11.43	11.41	11.40	11.39	11.37
12.351	11.36	11.35	11.33	11.32	11.31	11.29	11.28
12.450	11.27	11.25	11.24	11.22	11.21	11.19	11.18
12.549	11.17	11.15	11.14	11.12	11.10	11.09	11.07
12.648	11.06	11.04	11.03	11.01	10.99	10.98	10.96
12.747	10.94	10.93	10.91	10.89	10.87	10.86	10.84
12.846	10.82	10.80	10.79	10.77	10.75	10.73	10.71
12.945	10.69	10.67	10.65	10.63	10.61	10.59	10.57
13.044	10.55	10.54	10.52	10.49	10.47	10.45	10.43
13.143	10.41	10.39	10.37	10.35	10.33	10.30	10.28
13.242	10.26	10.24	10.22	10.19	10.17	10.15	10.12
13.341	10.10	10.08	10.06	10.03	10.01	9.99	9.96
13.440	9.94	9.92	9.89	9.87	9.84	9.82	9.79
13.539	9.77	9.75	9.72	9.70	9.67	9.64	9.62
13.638	9.59	9.57	9.54	9.52	9.49	9.46	9.44
13.737	9.41	9.39	9.36	9.33	9.31	9.28	9.25
13.837	9.23	9.20	9.17	9.14	9.12	9.09	9.06
13.936	9.03	9.01	8.98	8.95	8.92	8.89	8.86
14.035	8.84	8.81	8.79	8.76	8.74	8.72	8.69
14.134	8.68	8.66	8.64	8.63	8.62	8.61	8.60
14.233	8.59	8.58	8.58	8.57	8.57	8.56	8.56
14.332	8.56	8.55	8.55	8.55	8.55	8.55	8.55
14.431	8.54	8.54	8.54	8.54	8.54	8.54	8.54
14.530	8.54	8.54	8.54	8.53	8.53	8.53	8.53

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224	

STREAM REACH:

14.629	8.53	8.53	8.53	8.53	8.53	8.53	8.52
14.728	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.827	8.51	8.51	8.51	8.51	8.51	8.51	8.51
14.926	8.51	8.50	8.50	8.50	8.50	8.50	8.50
15.025	8.50	8.49	8.49	8.49	8.49	8.49	8.49
15.124	8.48	8.48	8.48	8.48	8.48	8.48	8.47
15.223	8.47	8.47	8.47	8.47	8.47	8.46	8.46
15.322	8.46	8.46	8.46	8.45	8.45	8.45	8.45
15.421	8.45	8.44	8.44	8.44	8.44	8.44	8.43
15.520	8.43	8.43	8.43	8.42	8.42	8.42	8.42
15.619	8.41	8.41	8.41	8.41	8.41	8.40	8.40
15.718	8.40	8.40	8.39	8.39	8.39	8.39	8.38
15.817	8.38	8.38	8.38	8.37	8.37	8.37	8.36
15.916	8.36	8.36	8.36	8.35	8.35	8.35	8.34
16.015	8.34	8.34	8.34	8.33	8.33	8.33	8.32
16.114	8.32	8.32	8.32	8.31	8.31	8.31	8.30
16.213	8.30	8.30	8.29	8.29	8.29	8.28	8.28
16.312	8.28	8.27	8.27	8.27	8.27	8.26	8.26
16.411	8.26	8.25	8.25	8.25	8.24	8.24	8.23
16.510	8.23	8.23	8.22	8.22	8.22	8.21	8.21
16.609	8.21	8.20	8.20	8.20	8.19	8.19	8.19

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
16.708	8.18	8.18	8.17	8.17	8.17	8.16	8.16
16.807	8.16	8.15	8.15	8.14	8.14	8.14	8.13
16.907	8.13	8.12	8.12	8.12	8.11	8.11	8.10
17.006	8.10	8.10	8.09	8.09	8.08	8.08	8.08
17.105	8.07	8.07	8.06	8.06	8.06	8.05	8.05
17.204	8.04	8.04	8.03	8.03	8.03	8.02	8.02
17.303	8.01	8.01	8.00	8.00	8.00	7.99	7.99
17.402	7.98	7.98	7.97	7.97	7.96	7.96	7.95
17.501	7.95	7.95	7.94	7.94	7.93	7.93	7.92
17.600	7.92	7.91	7.91	7.90	7.90	7.89	7.89
17.699	7.88	7.88	7.88	7.87	7.87	7.86	7.86
17.798	7.85	7.85	7.84	7.84	7.83	7.83	7.82
17.897	7.82	7.81	7.81	7.80	7.80	7.79	7.79
17.996	7.78	7.78	7.77	7.77	7.76	7.76	7.75
18.095	7.75	7.74	7.74	7.73	7.73	7.72	7.71
18.194	7.71	7.70	7.70	7.69	7.69	7.68	7.68
18.293	7.67	7.67	7.66	7.66	7.65	7.65	7.64
18.392	7.63	7.63	7.62	7.62	7.61	7.61	7.60
18.491	7.60	7.59	7.58	7.58	7.57	7.57	7.56
18.590	7.56	7.55	7.55	7.54	7.53	7.53	7.52
18.689	7.52	7.51	7.51	7.50	7.49	7.49	7.48
18.788	7.48	7.47	7.47	7.46	7.45	7.45	7.44
18.887	7.44	7.43	7.42	7.42	7.41	7.41	7.40
18.986	7.40	7.39	7.38	7.38	7.37	7.37	7.36
19.085	7.35	7.35	7.34	7.33	7.33	7.32	7.32

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224		

STREAM REACH:

19.184	7.31	7.30	7.30	7.29	7.29	7.28	7.27
19.283	7.27	7.26	7.25	7.25	7.24	7.24	7.23
19.382	7.22	7.22	7.21	7.20	7.20	7.19	7.19
19.481	7.18	7.17	7.17	7.16	7.15	7.15	7.14
19.580	7.13	7.13	7.12	7.11	7.11	7.10	7.10
19.679	7.09	7.08	7.08	7.07	7.06	7.06	7.05
19.778	7.04	7.04	7.03	7.02	7.02	7.01	7.00
19.877	7.00	6.99	6.98	6.98	6.97	6.96	6.96
19.976	6.95	6.94	6.94	6.93	6.92	6.92	6.91
20.076	6.90	6.89	6.89	6.88	6.87	6.87	6.86
20.175	6.85	6.85	6.84	6.83	6.83	6.82	6.81
20.274	6.81	6.80	6.79	6.78	6.78	6.77	6.76
20.373	6.76	6.75	6.74	6.73	6.73	6.72	6.71
20.472	6.71	6.70	6.69	6.68	6.68	6.67	6.66
20.571	6.66	6.65	6.64	6.63	6.63	6.62	6.61
20.670	6.61	6.60	6.59	6.58	6.58	6.57	6.56
20.769	6.56	6.55	6.54	6.53	6.53	6.52	6.51
20.868	6.50	6.50	6.49	6.48	6.47	6.47	6.46
20.967	6.45	6.44	6.44	6.43	6.42	6.41	6.41
21.066	6.40	6.39	6.38	6.38	6.37	6.36	6.35
21.165	6.35	6.34	6.33	6.32	6.32	6.31	6.30
21.264	6.29	6.29	6.28	6.27	6.26	6.25	6.25
21.363	6.24	6.23	6.22	6.22	6.21	6.20	6.19
21.462	6.19	6.18	6.17	6.16	6.15	6.15	6.14
21.561	6.13	6.12	6.11	6.11	6.10	6.09	6.08
21.660	6.08	6.07	6.06	6.05	6.04	6.04	6.03

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
21.759	6.02	6.01	6.00	6.00	5.99	5.98	5.97
21.858	5.96	5.96	5.95	5.94	5.93	5.92	5.92
21.957	5.91	5.90	5.89	5.88	5.88	5.87	5.86
22.056	5.85	5.84	5.84	5.83	5.82	5.81	5.80
22.155	5.80	5.79	5.78	5.77	5.76	5.75	5.75
22.254	5.74	5.73	5.72	5.71	5.70	5.70	5.69
22.353	5.68	5.67	5.66	5.66	5.65	5.64	5.63
22.452	5.62	5.61	5.61	5.60	5.59	5.58	5.57
22.551	5.56	5.56	5.55	5.54	5.53	5.52	5.51
22.650	5.50	5.50	5.49	5.48	5.47	5.46	5.45
22.749	5.45	5.44	5.43	5.42	5.41	5.40	5.39
22.848	5.39	5.38	5.37	5.36	5.35	5.34	5.33
22.947	5.33	5.32	5.31	5.30	5.29	5.28	5.27
23.046	5.27	5.26	5.25	5.24	5.23	5.22	5.21
23.145	5.21	5.20	5.19	5.18	5.17	5.16	5.15
23.245	5.15	5.14	5.13	5.12	5.11	5.10	5.09
23.344	5.08	5.08	5.07	5.06	5.05	5.04	5.03
23.443	5.02	5.01	5.01	5.00	4.99	4.98	4.97
23.542	4.96	4.95	4.94	4.93	4.93	4.92	4.91
23.641	4.90	4.89	4.88	4.87	4.86	4.85	4.85

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.224			

STREAM REACH:

23.740	4.84	4.83	4.82	4.81	4.80	4.79	4.78
23.839	4.77	4.76	4.76	4.75	4.74	4.73	4.72
23.938	4.71	4.70	4.69	4.68	4.67	4.66	4.63
24.037	4.57	4.47	4.32	4.11	3.85	3.54	3.20
24.136	2.86	2.51	2.18	1.87	1.59	1.34	1.13
24.235	0.96	0.82	0.69	0.59	0.50	0.42	0.36
24.334	0.30	0.26	0.22	0.18	0.16	0.13	0.11
24.433	0.09	0.08	0.07	0.06			

CCCVC

EX - Basin 5- calibrated to match 39.64 cfs

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 100-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Basin 5	0.242		39.88				
Basin 5	0.242		39.88				
DOWNSTREAM			39.87				
OUTLET	0.242		39.87				

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05

(continued)

EX - Basin 5- calibrated to match 39.64 cfs

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24167	53.	.224

STREAM REACH:

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

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WinTR-20: Version 1.10                  0         0         0.05
CCCVC
PR- Basin 5 - Proposed Phase 1-2

SUB-AREA:
          Basin 5   Basin 5             .24167    53.       .223

STREAM REACH:
          Basin 5   Outlet    Xsec 1              2.

STORM ANALYSIS:
          100-Yr                        4.93      Type I    2

STRUCTURE RATING:

STREAM CROSS SECTION:
          Xsec 1    0.0       0.0       0.0
                    0.0       0.000     0.00      50.00     0.0100
                    0.5       182.295   26.00     54.00     0.0100
                    1.0       586.885   54.00     58.00     0.0100
                    2.0       1921.575  116.00    66.00     0.0100
                    5.0       9804.536  350.00    90.00     0.0100
                    10.0      36904.998 900.00    130.00    0.0100
                    20.0      156617.6822600.00   210.00    0.0100


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN
```

WinTR-20 Printed Page File End of Input Data List

CCCVC
PR- Basin 5 - Proposed Phase 1-2

Name of printed page file:
TR20.out

STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 5	0.242		0.829		10.09	39.97	165.38

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
9.776	0.05	0.13	0.27	0.54	1.00	1.70	2.73
9.875	4.15	6.03	8.38	11.14	14.22	17.54	20.97
9.973	24.38	27.65	30.74	33.53	35.91	37.83	39.20
10.072	39.95	39.97	39.36	38.30	36.95	35.43	33.79
10.170	32.16	30.57	29.07	27.74	26.64	25.74	24.96
10.269	24.28	23.67	23.12	22.62	22.18	21.78	21.42
10.368	21.07	20.74	20.42	20.11	19.82	19.54	19.26
10.466	18.99	18.70	18.41	18.12	17.83	17.56	17.29
10.565	17.03	16.77	16.52	16.27	16.05	15.84	15.65
10.663	15.47	15.31	15.16	15.03	14.91	14.81	14.72
10.762	14.63	14.55	14.47	14.39	14.32	14.26	14.20
10.861	14.13	14.07	14.01	13.94	13.88	13.82	13.76
10.959	13.70	13.64	13.58	13.51	13.45	13.38	13.32

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223			

STREAM REACH:

11.058	13.26	13.21	13.15	13.09	13.04	12.99	12.95
11.156	12.91	12.87	12.84	12.81	12.78	12.76	12.74
11.255	12.72	12.70	12.69	12.67	12.66	12.64	12.63
11.353	12.62	12.61	12.59	12.58	12.57	12.56	12.54
11.452	12.53	12.52	12.51	12.49	12.48	12.47	12.45
11.551	12.44	12.43	12.41	12.40	12.38	12.36	12.35
11.649	12.33	12.32	12.30	12.28	12.26	12.24	12.23
11.748	12.21	12.19	12.17	12.15	12.13	12.11	12.09
11.846	12.07	12.05	12.03	12.00	11.98	11.96	11.93
11.945	11.91	11.89	11.87	11.84	11.82	11.79	11.77
12.044	11.74	11.72	11.70	11.67	11.65	11.63	11.61
12.142	11.59	11.57	11.55	11.53	11.51	11.50	11.48
12.241	11.47	11.45	11.44	11.42	11.41	11.40	11.38
12.339	11.37	11.36	11.34	11.33	11.32	11.30	11.29
12.438	11.28	11.26	11.25	11.24	11.22	11.21	11.19
12.537	11.18	11.16	11.15	11.13	11.12	11.10	11.09
12.635	11.07	11.06	11.04	11.03	11.01	10.99	10.97
12.734	10.96	10.94	10.93	10.91	10.89	10.87	10.86
12.832	10.84	10.82	10.80	10.79	10.77	10.75	10.73
12.931	10.71	10.69	10.67	10.65	10.63	10.61	10.59
13.029	10.57	10.55	10.54	10.52	10.49	10.47	10.45
13.128	10.43	10.41	10.39	10.37	10.35	10.33	10.30
13.227	10.28	10.26	10.24	10.22	10.20	10.17	10.15
13.325	10.13	10.10	10.08	10.06	10.04	10.01	9.99
13.424	9.96	9.94	9.92	9.90	9.87	9.85	9.82
13.522	9.80	9.77	9.75	9.72	9.70	9.67	9.65
13.621	9.62	9.60	9.57	9.55	9.52	9.50	9.47

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
13.720	9.44	9.42	9.39	9.37	9.34	9.31	9.29
13.818	9.26	9.23	9.21	9.18	9.15	9.12	9.10
13.917	9.07	9.04	9.01	8.99	8.96	8.93	8.90
14.015	8.87	8.85	8.82	8.79	8.77	8.75	8.72
14.114	8.70	8.68	8.66	8.65	8.63	8.62	8.61
14.213	8.60	8.59	8.58	8.58	8.57	8.57	8.56
14.311	8.56	8.56	8.56	8.55	8.55	8.55	8.55
14.410	8.55	8.54	8.54	8.54	8.54	8.54	8.54
14.508	8.54	8.54	8.54	8.54	8.53	8.53	8.53
14.607	8.53	8.53	8.53	8.53	8.53	8.53	8.53
14.706	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.804	8.52	8.52	8.51	8.51	8.51	8.51	8.51
14.903	8.51	8.51	8.51	8.50	8.50	8.50	8.50
15.001	8.50	8.50	8.50	8.49	8.49	8.49	8.49
15.100	8.49	8.49	8.48	8.48	8.48	8.48	8.48
15.198	8.48	8.47	8.47	8.47	8.47	8.47	8.46
15.297	8.46	8.46	8.46	8.46	8.46	8.45	8.45
15.396	8.45	8.45	8.44	8.44	8.44	8.44	8.44
15.494	8.43	8.43	8.43	8.43	8.43	8.42	8.42

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223	

STREAM REACH:

15.593	8.42	8.42	8.41	8.41	8.41	8.41	8.41
15.691	8.40	8.40	8.40	8.39	8.39	8.39	8.39
15.790	8.39	8.38	8.38	8.38	8.37	8.37	8.37
15.889	8.37	8.36	8.36	8.36	8.36	8.35	8.35
15.987	8.35	8.34	8.34	8.34	8.34	8.33	8.33
16.086	8.33	8.32	8.32	8.32	8.32	8.31	8.31
16.184	8.31	8.30	8.30	8.30	8.29	8.29	8.29
16.283	8.28	8.28	8.28	8.27	8.27	8.27	8.27
16.382	8.26	8.26	8.26	8.25	8.25	8.25	8.24
16.480	8.24	8.24	8.23	8.23	8.22	8.22	8.22
16.579	8.21	8.21	8.21	8.20	8.20	8.20	8.19
16.677	8.19	8.19	8.18	8.18	8.17	8.17	8.17
16.776	8.16	8.16	8.16	8.15	8.15	8.14	8.14
16.874	8.14	8.13	8.13	8.13	8.12	8.12	8.11
16.973	8.11	8.11	8.10	8.10	8.09	8.09	8.09
17.072	8.08	8.08	8.07	8.07	8.06	8.06	8.06
17.170	8.05	8.05	8.04	8.04	8.04	8.03	8.03
17.269	8.02	8.02	8.01	8.01	8.01	8.00	8.00
17.367	7.99	7.99	7.98	7.98	7.97	7.97	7.97
17.466	7.96	7.96	7.95	7.95	7.94	7.94	7.93
17.565	7.93	7.92	7.92	7.91	7.91	7.91	7.90
17.663	7.90	7.89	7.89	7.88	7.88	7.87	7.87
17.762	7.86	7.86	7.85	7.85	7.84	7.84	7.83
17.860	7.83	7.82	7.82	7.81	7.81	7.80	7.80
17.959	7.79	7.79	7.78	7.78	7.77	7.77	7.76
18.058	7.76	7.75	7.75	7.74	7.74	7.73	7.73
18.156	7.72	7.72	7.71	7.71	7.70	7.70	7.69
18.255	7.69	7.68	7.68	7.67	7.67	7.66	7.65
18.353	7.65	7.64	7.64	7.63	7.63	7.62	7.62
18.452	7.61	7.61	7.60	7.59	7.59	7.58	7.58
18.551	7.57	7.57	7.56	7.56	7.55	7.54	7.54
18.649	7.53	7.53	7.52	7.52	7.51	7.50	7.50

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
18.748	7.49	7.49	7.48	7.48	7.47	7.46	7.46
18.846	7.45	7.45	7.44	7.44	7.43	7.42	7.42
18.945	7.41	7.41	7.40	7.39	7.39	7.38	7.38
19.043	7.37	7.36	7.36	7.35	7.35	7.34	7.33
19.142	7.33	7.32	7.32	7.31	7.30	7.30	7.29
19.241	7.29	7.28	7.27	7.27	7.26	7.25	7.25
19.339	7.24	7.24	7.23	7.22	7.22	7.21	7.20
19.438	7.20	7.19	7.19	7.18	7.17	7.17	7.16
19.536	7.15	7.15	7.14	7.13	7.13	7.12	7.12
19.635	7.11	7.10	7.10	7.09	7.08	7.08	7.07
19.734	7.06	7.06	7.05	7.04	7.04	7.03	7.02
19.832	7.02	7.01	7.00	7.00	6.99	6.98	6.98
19.931	6.97	6.96	6.96	6.95	6.94	6.94	6.93
20.029	6.92	6.92	6.91	6.90	6.90	6.89	6.88

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223		

STREAM REACH:

20.128	6.88	6.87	6.86	6.86	6.85	6.84	6.83
20.227	6.83	6.82	6.81	6.81	6.80	6.79	6.79
20.325	6.78	6.77	6.77	6.76	6.75	6.74	6.74
20.424	6.73	6.72	6.72	6.71	6.70	6.69	6.69
20.522	6.68	6.67	6.67	6.66	6.65	6.64	6.64
20.621	6.63	6.62	6.62	6.61	6.60	6.59	6.59
20.719	6.58	6.57	6.57	6.56	6.55	6.54	6.54
20.818	6.53	6.52	6.51	6.51	6.50	6.49	6.48
20.917	6.48	6.47	6.46	6.46	6.45	6.44	6.43
21.015	6.43	6.42	6.41	6.40	6.40	6.39	6.38
21.114	6.37	6.37	6.36	6.35	6.34	6.34	6.33
21.212	6.32	6.31	6.31	6.30	6.29	6.28	6.27
21.311	6.27	6.26	6.25	6.24	6.24	6.23	6.22
21.410	6.21	6.21	6.20	6.19	6.18	6.17	6.17
21.508	6.16	6.15	6.14	6.14	6.13	6.12	6.11
21.607	6.10	6.10	6.09	6.08	6.07	6.07	6.06
21.705	6.05	6.04	6.03	6.03	6.02	6.01	6.00
21.804	5.99	5.99	5.98	5.97	5.96	5.96	5.95
21.903	5.94	5.93	5.92	5.91	5.91	5.90	5.89
22.001	5.88	5.87	5.87	5.86	5.85	5.84	5.83
22.100	5.83	5.82	5.81	5.80	5.79	5.79	5.78
22.198	5.77	5.76	5.75	5.74	5.74	5.73	5.72
22.297	5.71	5.70	5.70	5.69	5.68	5.67	5.66
22.395	5.65	5.65	5.64	5.63	5.62	5.61	5.61
22.494	5.60	5.59	5.58	5.57	5.56	5.56	5.55
22.593	5.54	5.53	5.52	5.51	5.51	5.50	5.49
22.691	5.48	5.47	5.46	5.45	5.45	5.44	5.43
22.790	5.42	5.41	5.40	5.40	5.39	5.38	5.37
22.888	5.36	5.35	5.34	5.34	5.33	5.32	5.31
22.987	5.30	5.29	5.28	5.28	5.27	5.26	5.25
23.086	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.184	5.18	5.17	5.16	5.16	5.15	5.14	5.13
23.283	5.12	5.11	5.10	5.09	5.09	5.08	5.07
23.381	5.06	5.05	5.04	5.03	5.02	5.02	5.01
23.480	5.00	4.99	4.98	4.97	4.96	4.95	4.95
23.579	4.94	4.93	4.92	4.91	4.90	4.89	4.88
23.677	4.88	4.87	4.86	4.85	4.84	4.83	4.82

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
23.776	4.81	4.80	4.80	4.79	4.78	4.77	4.76
23.874	4.75	4.74	4.73	4.72	4.71	4.71	4.70
23.973	4.69	4.68	4.67	4.65	4.60	4.53	4.41
24.072	4.24	4.00	3.71	3.38	3.04	2.69	2.35
24.170	2.03	1.73	1.47	1.23	1.04	0.89	0.75
24.269	0.64	0.54	0.46	0.39	0.33	0.28	0.24
24.367	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.466	0.06	0.05					

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24167	53.	.223

STREAM REACH:

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 5	0.242	Upstream	0.829	0.11	10.09	39.97	165.38

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
9.776	0.05	0.13	0.27	0.54	1.00	1.70	2.73
9.875	4.15	6.03	8.38	11.14	14.22	17.54	20.97
9.973	24.38	27.65	30.74	33.53	35.91	37.83	39.20
10.072	39.95	39.97	39.36	38.30	36.95	35.43	33.79
10.170	32.16	30.57	29.07	27.74	26.64	25.74	24.96
10.269	24.28	23.67	23.12	22.62	22.18	21.78	21.42
10.368	21.07	20.74	20.42	20.11	19.82	19.54	19.26
10.466	18.99	18.70	18.41	18.12	17.83	17.56	17.29
10.565	17.03	16.77	16.52	16.27	16.05	15.84	15.65
10.663	15.47	15.31	15.16	15.03	14.91	14.81	14.72
10.762	14.63	14.55	14.47	14.39	14.32	14.26	14.20
10.861	14.13	14.07	14.01	13.94	13.88	13.82	13.76
10.959	13.70	13.64	13.58	13.51	13.45	13.38	13.32
11.058	13.26	13.21	13.15	13.09	13.04	12.99	12.95
11.156	12.91	12.87	12.84	12.81	12.78	12.76	12.74
11.255	12.72	12.70	12.69	12.67	12.66	12.64	12.63
11.353	12.62	12.61	12.59	12.58	12.57	12.56	12.54
11.452	12.53	12.52	12.51	12.49	12.48	12.47	12.45
11.551	12.44	12.43	12.41	12.40	12.38	12.36	12.35
11.649	12.33	12.32	12.30	12.28	12.26	12.24	12.23
11.748	12.21	12.19	12.17	12.15	12.13	12.11	12.09
11.846	12.07	12.05	12.03	12.00	11.98	11.96	11.93
11.945	11.91	11.89	11.87	11.84	11.82	11.79	11.77
12.044	11.74	11.72	11.70	11.67	11.65	11.63	11.61
12.142	11.59	11.57	11.55	11.53	11.51	11.50	11.48
12.241	11.47	11.45	11.44	11.42	11.41	11.40	11.38
12.339	11.37	11.36	11.34	11.33	11.32	11.30	11.29
12.438	11.28	11.26	11.25	11.24	11.22	11.21	11.19
12.537	11.18	11.16	11.15	11.13	11.12	11.10	11.09
12.635	11.07	11.06	11.04	11.03	11.01	10.99	10.97
12.734	10.96	10.94	10.93	10.91	10.89	10.87	10.86
12.832	10.84	10.82	10.80	10.79	10.77	10.75	10.73

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
12.931	10.71	10.69	10.67	10.65	10.63	10.61	10.59
13.029	10.57	10.55	10.54	10.52	10.49	10.47	10.45
13.128	10.43	10.41	10.39	10.37	10.35	10.33	10.30
13.227	10.28	10.26	10.24	10.22	10.20	10.17	10.15

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223	

STREAM REACH:

13.325	10.13	10.10	10.08	10.06	10.04	10.01	9.99
13.424	9.96	9.94	9.92	9.90	9.87	9.85	9.82
13.522	9.80	9.77	9.75	9.72	9.70	9.67	9.65
13.621	9.62	9.60	9.57	9.55	9.52	9.50	9.47
13.720	9.44	9.42	9.39	9.37	9.34	9.31	9.29
13.818	9.26	9.23	9.21	9.18	9.15	9.12	9.10
13.917	9.07	9.04	9.01	8.99	8.96	8.93	8.90
14.015	8.87	8.85	8.82	8.79	8.77	8.75	8.72
14.114	8.70	8.68	8.66	8.65	8.63	8.62	8.61
14.213	8.60	8.59	8.58	8.58	8.57	8.57	8.56
14.311	8.56	8.56	8.56	8.55	8.55	8.55	8.55
14.410	8.55	8.54	8.54	8.54	8.54	8.54	8.54
14.508	8.54	8.54	8.54	8.54	8.53	8.53	8.53
14.607	8.53	8.53	8.53	8.53	8.53	8.53	8.53
14.706	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.804	8.52	8.52	8.51	8.51	8.51	8.51	8.51
14.903	8.51	8.51	8.51	8.50	8.50	8.50	8.50
15.001	8.50	8.50	8.50	8.49	8.49	8.49	8.49
15.100	8.49	8.49	8.48	8.48	8.48	8.48	8.48
15.198	8.48	8.47	8.47	8.47	8.47	8.47	8.46
15.297	8.46	8.46	8.46	8.46	8.46	8.45	8.45
15.396	8.45	8.45	8.44	8.44	8.44	8.44	8.44
15.494	8.43	8.43	8.43	8.43	8.43	8.42	8.42
15.593	8.42	8.42	8.41	8.41	8.41	8.41	8.41
15.691	8.40	8.40	8.40	8.39	8.39	8.39	8.39
15.790	8.39	8.38	8.38	8.38	8.37	8.37	8.37
15.889	8.37	8.36	8.36	8.36	8.36	8.35	8.35
15.987	8.35	8.34	8.34	8.34	8.34	8.33	8.33
16.086	8.33	8.32	8.32	8.32	8.32	8.31	8.31
16.184	8.31	8.30	8.30	8.30	8.29	8.29	8.29
16.283	8.28	8.28	8.28	8.27	8.27	8.27	8.27
16.382	8.26	8.26	8.26	8.25	8.25	8.25	8.24
16.480	8.24	8.24	8.23	8.23	8.22	8.22	8.22
16.579	8.21	8.21	8.21	8.20	8.20	8.20	8.19
16.677	8.19	8.19	8.18	8.18	8.17	8.17	8.17
16.776	8.16	8.16	8.16	8.15	8.15	8.14	8.14
16.874	8.14	8.13	8.13	8.13	8.12	8.12	8.11
16.973	8.11	8.11	8.10	8.10	8.09	8.09	8.09
17.072	8.08	8.08	8.07	8.07	8.06	8.06	8.06
17.170	8.05	8.05	8.04	8.04	8.04	8.03	8.03
17.269	8.02	8.02	8.01	8.01	8.01	8.00	8.00
17.367	7.99	7.99	7.98	7.98	7.97	7.97	7.97
17.466	7.96	7.96	7.95	7.95	7.94	7.94	7.93
17.565	7.93	7.92	7.92	7.91	7.91	7.91	7.90
17.663	7.90	7.89	7.89	7.88	7.88	7.87	7.87
17.762	7.86	7.86	7.85	7.85	7.84	7.84	7.83
17.860	7.83	7.82	7.82	7.81	7.81	7.80	7.80

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time	Flow Values @ time increment of 0.014 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5 Basin 5 .24167 53. .223

STREAM REACH:

17.959	7.79	7.79	7.78	7.78	7.77	7.77	7.76
18.058	7.76	7.75	7.75	7.74	7.74	7.73	7.73
18.156	7.72	7.72	7.71	7.71	7.70	7.70	7.69
18.255	7.69	7.68	7.68	7.67	7.67	7.66	7.65
18.353	7.65	7.64	7.64	7.63	7.63	7.62	7.62
18.452	7.61	7.61	7.60	7.59	7.59	7.58	7.58
18.551	7.57	7.57	7.56	7.56	7.55	7.54	7.54
18.649	7.53	7.53	7.52	7.52	7.51	7.50	7.50
18.748	7.49	7.49	7.48	7.48	7.47	7.46	7.46
18.846	7.45	7.45	7.44	7.44	7.43	7.42	7.42
18.945	7.41	7.41	7.40	7.39	7.39	7.38	7.38
19.043	7.37	7.36	7.36	7.35	7.35	7.34	7.33
19.142	7.33	7.32	7.32	7.31	7.30	7.30	7.29
19.241	7.29	7.28	7.27	7.27	7.26	7.25	7.25
19.339	7.24	7.24	7.23	7.22	7.22	7.21	7.20
19.438	7.20	7.19	7.19	7.18	7.17	7.17	7.16
19.536	7.15	7.15	7.14	7.13	7.13	7.12	7.12
19.635	7.11	7.10	7.10	7.09	7.08	7.08	7.07
19.734	7.06	7.06	7.05	7.04	7.04	7.03	7.02
19.832	7.02	7.01	7.00	7.00	6.99	6.98	6.98
19.931	6.97	6.96	6.96	6.95	6.94	6.94	6.93
20.029	6.92	6.92	6.91	6.90	6.90	6.89	6.88
20.128	6.88	6.87	6.86	6.86	6.85	6.84	6.83
20.227	6.83	6.82	6.81	6.81	6.80	6.79	6.79
20.325	6.78	6.77	6.77	6.76	6.75	6.74	6.74
20.424	6.73	6.72	6.72	6.71	6.70	6.69	6.69
20.522	6.68	6.67	6.67	6.66	6.65	6.64	6.64
20.621	6.63	6.62	6.62	6.61	6.60	6.59	6.59
20.719	6.58	6.57	6.57	6.56	6.55	6.54	6.54
20.818	6.53	6.52	6.51	6.51	6.50	6.49	6.48
20.917	6.48	6.47	6.46	6.46	6.45	6.44	6.43
21.015	6.43	6.42	6.41	6.40	6.40	6.39	6.38
21.114	6.37	6.37	6.36	6.35	6.34	6.34	6.33
21.212	6.32	6.31	6.31	6.30	6.29	6.28	6.27
21.311	6.27	6.26	6.25	6.24	6.24	6.23	6.22
21.410	6.21	6.21	6.20	6.19	6.18	6.17	6.17
21.508	6.16	6.15	6.14	6.14	6.13	6.12	6.11
21.607	6.10	6.10	6.09	6.08	6.07	6.07	6.06
21.705	6.05	6.04	6.03	6.03	6.02	6.01	6.00
21.804	5.99	5.99	5.98	5.97	5.96	5.96	5.95
21.903	5.94	5.93	5.92	5.91	5.91	5.90	5.89
22.001	5.88	5.87	5.87	5.86	5.85	5.84	5.83
22.100	5.83	5.82	5.81	5.80	5.79	5.79	5.78
22.198	5.77	5.76	5.75	5.74	5.74	5.73	5.72
22.297	5.71	5.70	5.70	5.69	5.68	5.67	5.66
22.395	5.65	5.65	5.64	5.63	5.62	5.61	5.61
22.494	5.60	5.59	5.58	5.57	5.56	5.56	5.55
22.593	5.54	5.53	5.52	5.51	5.51	5.50	5.49
22.691	5.48	5.47	5.46	5.45	5.45	5.44	5.43
22.790	5.42	5.41	5.40	5.40	5.39	5.38	5.37
22.888	5.36	5.35	5.34	5.34	5.33	5.32	5.31

CCCVC

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24167	53.	.223

STREAM REACH:

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.987	5.30	5.29	5.28	5.28	5.27	5.26	5.25
23.086	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.184	5.18	5.17	5.16	5.16	5.15	5.14	5.13
23.283	5.12	5.11	5.10	5.09	5.09	5.08	5.07
23.381	5.06	5.05	5.04	5.03	5.02	5.02	5.01
23.480	5.00	4.99	4.98	4.97	4.96	4.95	4.95
23.579	4.94	4.93	4.92	4.91	4.90	4.89	4.88
23.677	4.88	4.87	4.86	4.85	4.84	4.83	4.82
23.776	4.81	4.80	4.80	4.79	4.78	4.77	4.76
23.874	4.75	4.74	4.73	4.72	4.71	4.71	4.70
23.973	4.69	4.68	4.67	4.65	4.60	4.53	4.41
24.072	4.24	4.00	3.71	3.38	3.04	2.69	2.35
24.170	2.03	1.73	1.47	1.23	1.04	0.89	0.75
24.269	0.64	0.54	0.46	0.39	0.33	0.28	0.24
24.367	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.466	0.06	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.242	Downstream	0.829	0.11	10.09	39.97	165.38

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.776	0.05	0.13	0.27	0.54	0.99	1.70	2.73
9.875	4.15	6.02	8.37	11.12	14.21	17.52	20.96
9.973	24.37	27.64	30.73	33.52	35.90	37.82	39.20
10.072	39.94	39.97	39.37	38.31	36.96	35.44	33.80
10.170	32.17	30.58	29.07	27.74	26.64	25.75	24.96
10.269	24.28	23.67	23.12	22.62	22.18	21.78	21.42
10.368	21.07	20.74	20.42	20.11	19.82	19.54	19.26
10.466	18.99	18.70	18.41	18.12	17.83	17.56	17.29
10.565	17.03	16.77	16.52	16.28	16.05	15.84	15.65
10.663	15.47	15.31	15.16	15.03	14.91	14.81	14.72
10.762	14.63	14.55	14.47	14.40	14.32	14.26	14.20
10.861	14.13	14.07	14.01	13.94	13.88	13.82	13.76
10.959	13.70	13.64	13.58	13.51	13.45	13.38	13.32
11.058	13.27	13.21	13.15	13.09	13.04	12.99	12.95
11.156	12.91	12.87	12.84	12.81	12.78	12.76	12.74
11.255	12.72	12.70	12.69	12.67	12.66	12.64	12.63
11.353	12.62	12.61	12.59	12.58	12.57	12.56	12.54
11.452	12.53	12.52	12.51	12.49	12.48	12.47	12.45
11.551	12.44	12.43	12.41	12.40	12.38	12.36	12.35
11.649	12.33	12.32	12.30	12.28	12.26	12.24	12.23
11.748	12.21	12.19	12.17	12.15	12.13	12.11	12.09
11.846	12.07	12.05	12.03	12.00	11.98	11.96	11.93
11.945	11.91	11.89	11.87	11.84	11.82	11.79	11.77

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 53. .223

STREAM REACH:
12.044 11.74 11.72 11.70 11.67 11.65 11.63 11.61

CCCVC
PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.142	11.59	11.57	11.55	11.53	11.51	11.50	11.48
12.241	11.47	11.45	11.44	11.42	11.41	11.40	11.38
12.339	11.37	11.36	11.34	11.33	11.32	11.30	11.29
12.438	11.28	11.26	11.25	11.24	11.22	11.21	11.19
12.537	11.18	11.16	11.15	11.13	11.12	11.10	11.09
12.635	11.07	11.06	11.04	11.03	11.01	10.99	10.97
12.734	10.96	10.94	10.93	10.91	10.89	10.87	10.86
12.832	10.84	10.82	10.80	10.79	10.77	10.75	10.73
12.931	10.71	10.69	10.67	10.65	10.63	10.61	10.59
13.029	10.57	10.55	10.54	10.52	10.49	10.47	10.45
13.128	10.43	10.41	10.39	10.37	10.35	10.33	10.30
13.227	10.28	10.26	10.24	10.22	10.20	10.17	10.15
13.325	10.13	10.10	10.08	10.06	10.04	10.01	9.99
13.424	9.96	9.94	9.92	9.90	9.87	9.85	9.82
13.522	9.80	9.77	9.75	9.72	9.70	9.67	9.65
13.621	9.62	9.60	9.57	9.55	9.52	9.50	9.47
13.720	9.44	9.42	9.39	9.37	9.34	9.31	9.29
13.818	9.26	9.23	9.21	9.18	9.15	9.12	9.10
13.917	9.07	9.04	9.01	8.99	8.96	8.93	8.90
14.015	8.87	8.85	8.82	8.79	8.77	8.75	8.72
14.114	8.70	8.68	8.66	8.65	8.63	8.62	8.61
14.213	8.60	8.59	8.58	8.58	8.57	8.57	8.56
14.311	8.56	8.56	8.56	8.55	8.55	8.55	8.55
14.410	8.55	8.54	8.54	8.54	8.54	8.54	8.54
14.508	8.54	8.54	8.54	8.54	8.53	8.53	8.53
14.607	8.53	8.53	8.53	8.53	8.53	8.53	8.53
14.706	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.804	8.52	8.52	8.51	8.51	8.51	8.51	8.51
14.903	8.51	8.51	8.51	8.50	8.50	8.50	8.50
15.001	8.50	8.50	8.50	8.49	8.49	8.49	8.49
15.100	8.49	8.49	8.48	8.48	8.48	8.48	8.48
15.198	8.48	8.47	8.47	8.47	8.47	8.47	8.46
15.297	8.46	8.46	8.46	8.46	8.46	8.45	8.45
15.396	8.45	8.45	8.44	8.44	8.44	8.44	8.44
15.494	8.43	8.43	8.43	8.43	8.43	8.42	8.42
15.593	8.42	8.42	8.41	8.41	8.41	8.41	8.41
15.691	8.40	8.40	8.40	8.39	8.39	8.39	8.39
15.790	8.39	8.38	8.38	8.38	8.37	8.37	8.37
15.889	8.37	8.36	8.36	8.36	8.36	8.35	8.35
15.987	8.35	8.34	8.34	8.34	8.34	8.33	8.33
16.086	8.33	8.32	8.32	8.32	8.32	8.31	8.31
16.184	8.31	8.30	8.30	8.30	8.29	8.29	8.29
16.283	8.28	8.28	8.28	8.27	8.27	8.27	8.27
16.382	8.26	8.26	8.26	8.25	8.25	8.25	8.24
16.480	8.24	8.24	8.23	8.23	8.22	8.22	8.22

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 53. .223

STREAM REACH:

16.579	8.21	8.21	8.21	8.20	8.20	8.20	8.19
16.677	8.19	8.19	8.18	8.18	8.17	8.17	8.17
16.776	8.16	8.16	8.16	8.15	8.15	8.14	8.14
16.874	8.14	8.13	8.13	8.13	8.12	8.12	8.11
16.973	8.11	8.11	8.10	8.10	8.09	8.09	8.09
17.072	8.08	8.08	8.07	8.07	8.06	8.06	8.06

CCCVC
PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
17.170	8.05	8.05	8.04	8.04	8.04	8.03	8.03
17.269	8.02	8.02	8.01	8.01	8.01	8.00	8.00
17.367	7.99	7.99	7.98	7.98	7.97	7.97	7.97
17.466	7.96	7.96	7.95	7.95	7.94	7.94	7.93
17.565	7.93	7.92	7.92	7.92	7.91	7.91	7.90
17.663	7.90	7.89	7.89	7.88	7.88	7.87	7.87
17.762	7.86	7.86	7.85	7.85	7.84	7.84	7.83
17.860	7.83	7.82	7.82	7.81	7.81	7.80	7.80
17.959	7.79	7.79	7.78	7.78	7.77	7.77	7.76
18.058	7.76	7.75	7.75	7.74	7.74	7.73	7.73
18.156	7.72	7.72	7.71	7.71	7.70	7.70	7.69
18.255	7.69	7.68	7.68	7.67	7.67	7.66	7.65
18.353	7.65	7.64	7.64	7.63	7.63	7.62	7.62
18.452	7.61	7.61	7.60	7.59	7.59	7.58	7.58
18.551	7.57	7.57	7.56	7.56	7.55	7.54	7.54
18.649	7.53	7.53	7.52	7.52	7.51	7.50	7.50
18.748	7.49	7.49	7.48	7.48	7.47	7.46	7.46
18.846	7.45	7.45	7.44	7.44	7.43	7.42	7.42
18.945	7.41	7.41	7.40	7.39	7.39	7.38	7.38
19.043	7.37	7.36	7.36	7.35	7.35	7.34	7.33
19.142	7.33	7.32	7.32	7.31	7.30	7.30	7.29
19.241	7.29	7.28	7.27	7.27	7.26	7.25	7.25
19.339	7.24	7.24	7.23	7.22	7.22	7.21	7.20
19.438	7.20	7.19	7.19	7.18	7.17	7.17	7.16
19.536	7.15	7.15	7.14	7.13	7.13	7.12	7.12
19.635	7.11	7.10	7.10	7.09	7.08	7.08	7.07
19.734	7.06	7.06	7.05	7.04	7.04	7.03	7.02
19.832	7.02	7.01	7.00	7.00	6.99	6.98	6.98
19.931	6.97	6.96	6.96	6.95	6.94	6.94	6.93
20.029	6.92	6.92	6.91	6.90	6.90	6.89	6.88
20.128	6.88	6.87	6.86	6.86	6.85	6.84	6.83
20.227	6.83	6.82	6.81	6.81	6.80	6.79	6.79
20.325	6.78	6.77	6.77	6.76	6.75	6.74	6.74
20.424	6.73	6.72	6.72	6.71	6.70	6.69	6.69
20.522	6.68	6.67	6.67	6.66	6.65	6.64	6.64
20.621	6.63	6.62	6.62	6.61	6.60	6.59	6.59
20.719	6.58	6.57	6.57	6.56	6.55	6.54	6.54
20.818	6.53	6.52	6.51	6.51	6.50	6.49	6.48
20.917	6.48	6.47	6.46	6.46	6.45	6.44	6.43
21.015	6.43	6.42	6.41	6.40	6.40	6.39	6.38

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223	

STREAM REACH:

21.114	6.37	6.37	6.36	6.35	6.34	6.34	6.33
21.212	6.32	6.31	6.31	6.30	6.29	6.28	6.27
21.311	6.27	6.26	6.25	6.24	6.24	6.23	6.22
21.410	6.21	6.21	6.20	6.19	6.18	6.18	6.17
21.508	6.16	6.15	6.14	6.14	6.13	6.12	6.11
21.607	6.10	6.10	6.09	6.08	6.07	6.07	6.06
21.705	6.05	6.04	6.03	6.03	6.02	6.01	6.00
21.804	5.99	5.99	5.98	5.97	5.96	5.96	5.95
21.903	5.94	5.93	5.92	5.92	5.91	5.90	5.89
22.001	5.88	5.87	5.87	5.86	5.85	5.84	5.83
22.100	5.83	5.82	5.81	5.80	5.79	5.79	5.78

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
22.198	5.77	5.76	5.75	5.75	5.74	5.73	5.72
22.297	5.71	5.70	5.70	5.69	5.68	5.67	5.66
22.395	5.65	5.65	5.64	5.63	5.62	5.61	5.61
22.494	5.60	5.59	5.58	5.57	5.56	5.56	5.55
22.593	5.54	5.53	5.52	5.51	5.51	5.50	5.49
22.691	5.48	5.47	5.46	5.45	5.45	5.44	5.43
22.790	5.42	5.41	5.40	5.40	5.39	5.38	5.37
22.888	5.36	5.35	5.34	5.34	5.33	5.32	5.31
22.987	5.30	5.29	5.28	5.28	5.27	5.26	5.25
23.086	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.184	5.18	5.17	5.16	5.16	5.15	5.14	5.13
23.283	5.12	5.11	5.10	5.09	5.09	5.08	5.07
23.381	5.06	5.05	5.04	5.03	5.02	5.02	5.01
23.480	5.00	4.99	4.98	4.97	4.96	4.95	4.95
23.579	4.94	4.93	4.92	4.91	4.90	4.89	4.88
23.677	4.88	4.87	4.86	4.85	4.84	4.83	4.82
23.776	4.81	4.80	4.80	4.79	4.78	4.77	4.76
23.874	4.75	4.74	4.73	4.72	4.71	4.71	4.70
23.973	4.69	4.68	4.67	4.65	4.60	4.53	4.41
24.072	4.24	4.00	3.71	3.38	3.04	2.69	2.35
24.170	2.03	1.73	1.47	1.23	1.04	0.89	0.75
24.269	0.64	0.54	0.46	0.39	0.33	0.28	0.24
24.367	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.466	0.06	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.242		0.829		10.09	39.97	165.38

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24167 53. .223

STREAM REACH:

9.776	0.05	0.13	0.27	0.54	0.99	1.70	2.73
9.875	4.15	6.02	8.37	11.12	14.21	17.52	20.96
9.973	24.37	27.64	30.73	33.52	35.90	37.82	39.20
10.072	39.94	39.97	39.37	38.31	36.96	35.44	33.80
10.170	32.17	30.58	29.07	27.74	26.64	25.75	24.96
10.269	24.28	23.67	23.12	22.62	22.18	21.78	21.42
10.368	21.07	20.74	20.42	20.11	19.82	19.54	19.26
10.466	18.99	18.70	18.41	18.12	17.83	17.56	17.29
10.565	17.03	16.77	16.52	16.28	16.05	15.84	15.65
10.663	15.47	15.31	15.16	15.03	14.91	14.81	14.72
10.762	14.63	14.55	14.47	14.40	14.32	14.26	14.20
10.861	14.13	14.07	14.01	13.94	13.88	13.82	13.76
10.959	13.70	13.64	13.58	13.51	13.45	13.38	13.32
11.058	13.27	13.21	13.15	13.09	13.04	12.99	12.95
11.156	12.91	12.87	12.84	12.81	12.78	12.76	12.74
11.255	12.72	12.70	12.69	12.67	12.66	12.64	12.63

CCCVC
PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
11.353	12.62	12.61	12.59	12.58	12.57	12.56	12.54
11.452	12.53	12.52	12.51	12.49	12.48	12.47	12.45
11.551	12.44	12.43	12.41	12.40	12.38	12.36	12.35
11.649	12.33	12.32	12.30	12.28	12.26	12.24	12.23
11.748	12.21	12.19	12.17	12.15	12.13	12.11	12.09
11.846	12.07	12.05	12.03	12.00	11.98	11.96	11.93
11.945	11.91	11.89	11.87	11.84	11.82	11.79	11.77
12.044	11.74	11.72	11.70	11.67	11.65	11.63	11.61
12.142	11.59	11.57	11.55	11.53	11.51	11.50	11.48
12.241	11.47	11.45	11.44	11.42	11.41	11.40	11.38
12.339	11.37	11.36	11.34	11.33	11.32	11.30	11.29
12.438	11.28	11.26	11.25	11.24	11.22	11.21	11.19
12.537	11.18	11.16	11.15	11.13	11.12	11.10	11.09
12.635	11.07	11.06	11.04	11.03	11.01	10.99	10.97
12.734	10.96	10.94	10.93	10.91	10.89	10.87	10.86
12.832	10.84	10.82	10.80	10.79	10.77	10.75	10.73
12.931	10.71	10.69	10.67	10.65	10.63	10.61	10.59
13.029	10.57	10.55	10.54	10.52	10.49	10.47	10.45
13.128	10.43	10.41	10.39	10.37	10.35	10.33	10.30
13.227	10.28	10.26	10.24	10.22	10.20	10.17	10.15
13.325	10.13	10.10	10.08	10.06	10.04	10.01	9.99
13.424	9.96	9.94	9.92	9.90	9.87	9.85	9.82
13.522	9.80	9.77	9.75	9.72	9.70	9.67	9.65
13.621	9.62	9.60	9.57	9.55	9.52	9.50	9.47
13.720	9.44	9.42	9.39	9.37	9.34	9.31	9.29
13.818	9.26	9.23	9.21	9.18	9.15	9.12	9.10
13.917	9.07	9.04	9.01	8.99	8.96	8.93	8.90
14.015	8.87	8.85	8.82	8.79	8.77	8.75	8.72
14.114	8.70	8.68	8.66	8.65	8.63	8.62	8.61
14.213	8.60	8.59	8.58	8.58	8.57	8.57	8.56

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223			

STREAM REACH:

14.311	8.56	8.56	8.56	8.55	8.55	8.55	8.55
14.410	8.55	8.54	8.54	8.54	8.54	8.54	8.54
14.508	8.54	8.54	8.54	8.54	8.53	8.53	8.53
14.607	8.53	8.53	8.53	8.53	8.53	8.53	8.53
14.706	8.52	8.52	8.52	8.52	8.52	8.52	8.52
14.804	8.52	8.52	8.51	8.51	8.51	8.51	8.51
14.903	8.51	8.51	8.51	8.50	8.50	8.50	8.50
15.001	8.50	8.50	8.50	8.49	8.49	8.49	8.49
15.100	8.49	8.49	8.48	8.48	8.48	8.48	8.48
15.198	8.48	8.47	8.47	8.47	8.47	8.47	8.46
15.297	8.46	8.46	8.46	8.46	8.46	8.45	8.45
15.396	8.45	8.45	8.44	8.44	8.44	8.44	8.44
15.494	8.43	8.43	8.43	8.43	8.43	8.42	8.42
15.593	8.42	8.42	8.41	8.41	8.41	8.41	8.41
15.691	8.40	8.40	8.40	8.39	8.39	8.39	8.39
15.790	8.39	8.38	8.38	8.38	8.37	8.37	8.37
15.889	8.37	8.36	8.36	8.36	8.36	8.35	8.35
15.987	8.35	8.34	8.34	8.34	8.34	8.33	8.33
16.086	8.33	8.32	8.32	8.32	8.32	8.31	8.31
16.184	8.31	8.30	8.30	8.30	8.29	8.29	8.29
16.283	8.28	8.28	8.28	8.27	8.27	8.27	8.27

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
16.382	8.26	8.26	8.26	8.25	8.25	8.25	8.24
16.480	8.24	8.24	8.23	8.23	8.22	8.22	8.22
16.579	8.21	8.21	8.21	8.20	8.20	8.20	8.19
16.677	8.19	8.19	8.18	8.18	8.17	8.17	8.17
16.776	8.16	8.16	8.16	8.15	8.15	8.14	8.14
16.874	8.14	8.13	8.13	8.13	8.12	8.12	8.11
16.973	8.11	8.11	8.10	8.10	8.09	8.09	8.09
17.072	8.08	8.08	8.07	8.07	8.06	8.06	8.06
17.170	8.05	8.05	8.04	8.04	8.04	8.03	8.03
17.269	8.02	8.02	8.01	8.01	8.01	8.00	8.00
17.367	7.99	7.99	7.98	7.98	7.97	7.97	7.97
17.466	7.96	7.96	7.95	7.95	7.94	7.94	7.93
17.565	7.93	7.92	7.92	7.92	7.91	7.91	7.90
17.663	7.90	7.89	7.89	7.88	7.88	7.87	7.87
17.762	7.86	7.86	7.85	7.85	7.84	7.84	7.83
17.860	7.83	7.82	7.82	7.81	7.81	7.80	7.80
17.959	7.79	7.79	7.78	7.78	7.77	7.77	7.76
18.058	7.76	7.75	7.75	7.74	7.74	7.73	7.73
18.156	7.72	7.72	7.71	7.71	7.70	7.70	7.69
18.255	7.69	7.68	7.68	7.67	7.67	7.66	7.65
18.353	7.65	7.64	7.64	7.63	7.63	7.62	7.62
18.452	7.61	7.61	7.60	7.59	7.59	7.58	7.58
18.551	7.57	7.57	7.56	7.56	7.55	7.54	7.54
18.649	7.53	7.53	7.52	7.52	7.51	7.50	7.50
18.748	7.49	7.49	7.48	7.48	7.47	7.46	7.46

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223	

STREAM REACH:

18.846	7.45	7.45	7.44	7.44	7.43	7.42	7.42
18.945	7.41	7.41	7.40	7.39	7.39	7.38	7.38
19.043	7.37	7.36	7.36	7.35	7.35	7.34	7.33
19.142	7.33	7.32	7.32	7.31	7.30	7.30	7.29
19.241	7.29	7.28	7.27	7.27	7.26	7.25	7.25
19.339	7.24	7.24	7.23	7.22	7.22	7.21	7.20
19.438	7.20	7.19	7.19	7.18	7.17	7.17	7.16
19.536	7.15	7.15	7.14	7.13	7.13	7.12	7.12
19.635	7.11	7.10	7.10	7.09	7.08	7.08	7.07
19.734	7.06	7.06	7.05	7.04	7.04	7.03	7.02
19.832	7.02	7.01	7.00	7.00	6.99	6.98	6.98
19.931	6.97	6.96	6.96	6.95	6.94	6.94	6.93
20.029	6.92	6.92	6.91	6.90	6.90	6.89	6.88
20.128	6.88	6.87	6.86	6.86	6.85	6.84	6.83
20.227	6.83	6.82	6.81	6.81	6.80	6.79	6.79
20.325	6.78	6.77	6.77	6.76	6.75	6.74	6.74
20.424	6.73	6.72	6.72	6.71	6.70	6.69	6.69
20.522	6.68	6.67	6.67	6.66	6.65	6.64	6.64
20.621	6.63	6.62	6.62	6.61	6.60	6.59	6.59
20.719	6.58	6.57	6.57	6.56	6.55	6.54	6.54
20.818	6.53	6.52	6.51	6.51	6.50	6.49	6.48
20.917	6.48	6.47	6.46	6.46	6.45	6.44	6.43
21.015	6.43	6.42	6.41	6.40	6.40	6.39	6.38
21.114	6.37	6.37	6.36	6.35	6.34	6.34	6.33
21.212	6.32	6.31	6.31	6.30	6.29	6.28	6.27
21.311	6.27	6.26	6.25	6.24	6.24	6.23	6.22

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Line Start Time (hr)	Flow Values @ time increment of 0.014 hr (cfs)						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
21.410	6.21	6.21	6.20	6.19	6.18	6.18	6.17
21.508	6.16	6.15	6.14	6.14	6.13	6.12	6.11
21.607	6.10	6.10	6.09	6.08	6.07	6.07	6.06
21.705	6.05	6.04	6.03	6.03	6.02	6.01	6.00
21.804	5.99	5.99	5.98	5.97	5.96	5.96	5.95
21.903	5.94	5.93	5.92	5.92	5.91	5.90	5.89
22.001	5.88	5.87	5.87	5.86	5.85	5.84	5.83
22.100	5.83	5.82	5.81	5.80	5.79	5.79	5.78
22.198	5.77	5.76	5.75	5.75	5.74	5.73	5.72
22.297	5.71	5.70	5.70	5.69	5.68	5.67	5.66
22.395	5.65	5.65	5.64	5.63	5.62	5.61	5.61
22.494	5.60	5.59	5.58	5.57	5.56	5.56	5.55
22.593	5.54	5.53	5.52	5.51	5.51	5.50	5.49
22.691	5.48	5.47	5.46	5.45	5.45	5.44	5.43
22.790	5.42	5.41	5.40	5.40	5.39	5.38	5.37
22.888	5.36	5.35	5.34	5.34	5.33	5.32	5.31
22.987	5.30	5.29	5.28	5.28	5.27	5.26	5.25
23.086	5.24	5.23	5.22	5.22	5.21	5.20	5.19
23.184	5.18	5.17	5.16	5.16	5.15	5.14	5.13
23.283	5.12	5.11	5.10	5.09	5.09	5.08	5.07

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24167	53.	.223	

STREAM REACH:

23.381	5.06	5.05	5.04	5.03	5.02	5.02	5.01
23.480	5.00	4.99	4.98	4.97	4.96	4.95	4.95
23.579	4.94	4.93	4.92	4.91	4.90	4.89	4.88
23.677	4.88	4.87	4.86	4.85	4.84	4.83	4.82
23.776	4.81	4.80	4.80	4.79	4.78	4.77	4.76
23.874	4.75	4.74	4.73	4.72	4.71	4.71	4.70
23.973	4.69	4.68	4.67	4.65	4.60	4.53	4.41
24.072	4.24	4.00	3.71	3.38	3.04	2.69	2.35
24.170	2.03	1.73	1.47	1.23	1.04	0.89	0.75
24.269	0.64	0.54	0.46	0.39	0.33	0.28	0.24
24.367	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.466	0.06	0.05					

CCCVC

PR- Basin 5 - Proposed Phase 1-2

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 100-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Basin 5	0.242		39.97				
Basin 5	0.242		39.97				
DOWNSTREAM			39.97				
OUTLET	0.242		39.97				

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05

(continued)

PR- Basin 5 - Proposed Phase 1-2

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24167	53.	.223

STREAM REACH:

Worksheet for Existing channel

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.05390	ft/ft
Normal Depth	0.33	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.33
0+01	0.00
0+05	0.00
0+06	0.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.33)	(0+06, 0.33)	0.011

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	21.62	ft³/s
Elevation Range	0.00 to 0.33 ft	
Flow Area	1.65	ft²
Wetted Perimeter	6.10	ft
Hydraulic Radius	0.27	ft
Top Width	5.99	ft
Normal Depth	0.33	ft
Critical Depth	0.79	ft
Critical Slope	0.00241	ft/ft

Worksheet for Existing channel

Results

Velocity		13.11	ft/s
Velocity Head		2.67	ft
Specific Energy		3.00	ft
Froude Number		4.41	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.79	ft
Channel Slope	0.05390	ft/ft
Critical Slope	0.00241	ft/ft

Worksheet for PR (Ph 1-2) channel

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.05520	ft/ft
Normal Depth	0.33	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.33
0+01	0.00
0+05	0.00
0+06	0.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.33)	(0+06, 0.33)	0.011

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	21.88	ft³/s
Elevation Range	0.00 to 0.33 ft	
Flow Area	1.65	ft²
Wetted Perimeter	6.10	ft
Hydraulic Radius	0.27	ft
Top Width	5.99	ft
Normal Depth	0.33	ft
Critical Depth	0.80	ft
Critical Slope	0.00241	ft/ft

Worksheet for PR (Ph 1-2) channel

Results

Velocity		13.27	ft/s
Velocity Head		2.74	ft
Specific Energy		3.07	ft
Froude Number		4.46	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.80	ft
Channel Slope	0.05520	ft/ft
Critical Slope	0.00241	ft/ft

Slope calculations

Existing condition

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
441	438	100	0.0300	Sheet flow
438	379	500	0.1180	Shallow concentrated
379	272.6	1974	0.0539	Existing channel in flowmaster

Proposed condition (Phases 1-2)

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
441	438	100	0.0300	Sheet flow
438	379	500	0.1180	Shallow concentrated
379	270	1974	0.0552	PR (Ph 1-2) channel in flowmaster

Ultimate condition (Phases 1-11)

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
416.1	410	100	0.0610	Sheet flow
410	327.1	514	0.1613	Shallow concentrated
327.1	316	408	0.0272	Shallow concentrated
310.5	266	1545	0.0288	Proposed pipe in flowmaster

CCCVC Impervious Areas

PHASE 1	Area (ac)
Total Area (ac)	10.86
ROAD	
Impervious Fraction	0.9
Area (ac)	1.93
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	7.82
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	0.00
COLUMBARIUMS/BUILDINGS/IMP.WALKWAYS	
Impervious Fraction	0.9
Area (ac)	1.11
Total Impervious Area (ac)	2.73

PHASE 2	Area (ac)
Total Area (ac)	2.97
ROAD	
Impervious Fraction	0.9
Area (ac)	0.30
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	1.34
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	1.33
COLUMBARIUMS	
Impervious Fraction	0.9
Area (ac)	0
Total Impervious Area (ac)	0.27

ULTIMATE PHASE 3-11	Area (ac)
Total Area (ac)	70.57
ROAD	
Impervious Fraction	0.9
Area (ac)	4.86
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	49.36
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	12.47
COLUMBARIUMS	
Impervious Fraction	0.9
Area (ac)	3.88
Total Impervious Area (ac)	7.86

EXISTING ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	2.9%

Phase 1&2 ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	3.0%

ULTIMATE (Phase 1-11) ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	8.0%

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	4.42
Oak- aspen, fair	91.77
Desert shrub, poor	50.83
Pervious development	7.65
TOTAL existing cover, undeveloped	142.60
Total Basin 5 Area (ac)	154.67

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	4.69
Crypts - treated as pervious, bare soil (CN=77)	1.33
Oak- aspen, fair	90.02
Desert shrub, poor	48.59
Pervious development	10.05
TOTAL offsite pervious area:	138.60
Total Basin 5 Area (ac)	154.67

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	12.55
Crypts - treated as pervious, bare soil (CN=77)	13.80
Oak- aspen, fair	56.85
Desert shrub, poor	46.92
Pervious development	27.23
TOTAL offsite pervious area:	103.77
Total Basin 5 Area (ac)	157.35

NOAA Atlas 14, Volume 6, Version 2
Location name: Seaside, California, USA*
Latitude: 36.6366°, Longitude: -121.7974°
Elevation: 296.13 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.135** (0.117-0.157)	**0.165** (0.143-0.192)	**0.208** (0.180-0.243)	**0.246** (0.211-0.291)	**0.304** (0.251-0.373)	**0.353** (0.284-0.444)	**0.408** (0.318-0.528)	**0.469** (0.355-0.628)	**0.562** (0.404-0.789)	**0.642** (0.444-0.938)
10-min	**0.193** (0.168-0.225)	**0.236** (0.205-0.275)	**0.298** (0.258-0.348)	**0.353** (0.303-0.417)	**0.436** (0.359-0.535)	**0.507** (0.407-0.637)	**0.585** (0.456-0.757)	**0.673** (0.508-0.900)	**0.805** (0.580-1.13)	**0.920** (0.636-1.34)
15-min	**0.234** (0.203-0.272)	**0.286** (0.248-0.332)	**0.360** (0.312-0.421)	**0.427** (0.366-0.504)	**0.527** (0.434-0.647)	**0.613** (0.492-0.770)	**0.707** (0.552-0.915)	**0.814** (0.615-1.09)	**0.974** (0.701-1.37)	**1.11** (0.769-1.63)
30-min	**0.334** (0.290-0.388)	**0.408** (0.354-0.475)	**0.515** (0.445-0.601)	**0.610** (0.523-0.719)	**0.753** (0.620-0.924)	**0.875** (0.703-1.10)	**1.01** (0.788-1.31)	**1.16** (0.878-1.55)	**1.39** (1.00-1.95)	**1.59** (1.10-2.32)
60-min	**0.423** (0.368-0.492)	**0.517** (0.449-0.602)	**0.653** (0.564-0.762)	**0.773** (0.663-0.912)	**0.955** (0.786-1.17)	**1.11** (0.891-1.40)	**1.28** (0.999-1.66)	**1.47** (1.11-1.97)	**1.76** (1.27-2.48)	**2.02** (1.39-2.94)
2-hr	**0.594** (0.516-0.690)	**0.724** (0.628-0.843)	**0.908** (0.786-1.06)	**1.07** (0.916-1.26)	**1.31** (1.08-1.60)	**1.50** (1.21-1.89)	**1.72** (1.34-2.23)	**1.96** (1.48-2.62)	**2.31** (1.66-3.24)	**2.61** (1.80-3.81)
3-hr	**0.730** (0.634-0.848)	**0.892** (0.774-1.04)	**1.12** (0.967-1.31)	**1.32** (1.13-1.55)	**1.60** (1.32-1.97)	**1.84** (1.48-2.31)	**2.10** (1.64-2.71)	**2.38** (1.79-3.18)	**2.79** (2.01-3.91)	**3.13** (2.17-4.57)
6-hr	**0.961** (0.835-1.12)	**1.18** (1.03-1.38)	**1.49** (1.29-1.74)	**1.76** (1.50-2.07)	**2.13** (1.76-2.62)	**2.45** (1.97-3.08)	**2.78** (2.17-3.60)	**3.14** (2.37-4.20)	**3.66** (2.64-5.14)	**4.09** (2.83-5.98)
12-hr	**1.18** (1.03-1.37)	**1.48** (1.28-1.72)	**1.88** (1.63-2.20)	**2.23** (1.91-2.63)	**2.74** (2.25-3.36)	**3.14** (2.53-3.95)	**3.58** (2.79-4.63)	**4.05** (3.06-5.42)	**4.73** (3.41-6.65)	**5.30** (3.66-7.74)
24-hr	**1.55** (1.42-1.73)	**1.98** (1.80-2.21)	**2.56** (2.33-2.86)	**3.05** (2.76-3.44)	**3.76** (3.31-4.36)	**4.33** (3.74-5.11)	**4.93** (4.18-5.95)	**5.59** (4.63-6.90)	**6.53** (5.21-8.34)	**7.30** (5.66-9.61)
2-day	**1.95** (1.78-2.18)	**2.50** (2.28-2.80)	**3.24** (2.95-3.63)	**3.86** (3.50-4.36)	**4.74** (4.17-5.49)	**5.43** (4.70-6.41)	**6.16** (5.22-7.42)	**6.93** (5.73-8.55)	**8.02** (6.41-10.2)	**8.90** (6.90-11.7)
3-day	**2.23** (2.04-2.49)	**2.87** (2.62-3.21)	**3.72** (3.39-4.16)	**4.42** (4.00-4.99)	**5.40** (4.75-6.26)	**6.17** (5.34-7.28)	**6.97** (5.90-8.40)	**7.81** (6.46-9.63)	**8.98** (7.17-11.5)	**9.91** (7.68-13.0)
4-day	**2.44** (2.23-2.73)	**3.16** (2.88-3.53)	**4.09** (3.73-4.58)	**4.86** (4.40-5.49)	**5.93** (5.22-6.87)	**6.76** (5.84-7.98)	**7.61** (6.45-9.17)	**8.51** (7.04-10.5)	**9.74** (7.78-12.5)	**10.7** (8.32-14.1)
7-day	**2.99** (2.73-3.34)	**3.88** (3.54-4.34)	**5.04** (4.59-5.65)	**5.99** (5.41-6.75)	**7.27** (6.40-8.43)	**8.26** (7.14-9.75)	**9.28** (7.86-11.2)	**10.3** (8.55-12.7)	**11.8** (9.40-15.0)	**12.9** (10.0-17.0)
10-day	**3.37** (3.08-3.77)	**4.39** (4.01-4.91)	**5.71** (5.20-6.39)	**6.77** (6.13-7.64)	**8.21** (7.22-9.52)	**9.31** (8.05-11.0)	**10.4** (8.83-12.6)	**11.6** (9.58-14.3)	**13.1** (10.5-16.8)	**14.4** (11.1-18.9)
20-day	**4.40** (4.03-4.92)	**5.76** (5.26-6.44)	**7.48** (6.81-8.38)	**8.85** (8.00-9.98)	**10.7** (9.37-12.4)	**12.0** (10.4-14.2)	**13.4** (11.3-16.1)	**14.7** (12.2-18.2)	**16.6** (13.2-21.2)	**18.0** (13.9-23.7)
30-day	**5.36** (4.90-5.99)	**7.01** (6.40-7.83)	**9.07** (8.26-10.2)	**10.7** (9.66-12.1)	**12.8** (11.3-14.8)	**14.4** (12.4-16.9)	**15.9** (13.5-19.2)	**17.5** (14.4-21.5)	**19.5** (15.6-24.9)	**21.1** (16.3-27.7)
45-day	**6.70** (6.12-7.48)	**8.71** (7.95-9.73)	**11.2** (10.2-12.5)	**13.1** (11.9-14.8)	**15.6** (13.7-18.1)	**17.4** (15.1-20.6)	**19.2** (16.3-23.1)	**21.0** (17.3-25.8)	**23.2** (18.6-29.7)	**25.0** (19.4-32.8)
60-day	**7.97** (7.28-8.90)	**10.3** (9.39-11.5)	**13.1** (12.0-14.7)	**15.3** (13.9-17.3)	**18.1** (16.0-21.0)	**20.1** (17.4-23.8)	**22.1** (18.7-26.6)	**24.0** (19.9-29.6)	**26.5** (21.2-33.9)	**28.3** (22.0-37.3)

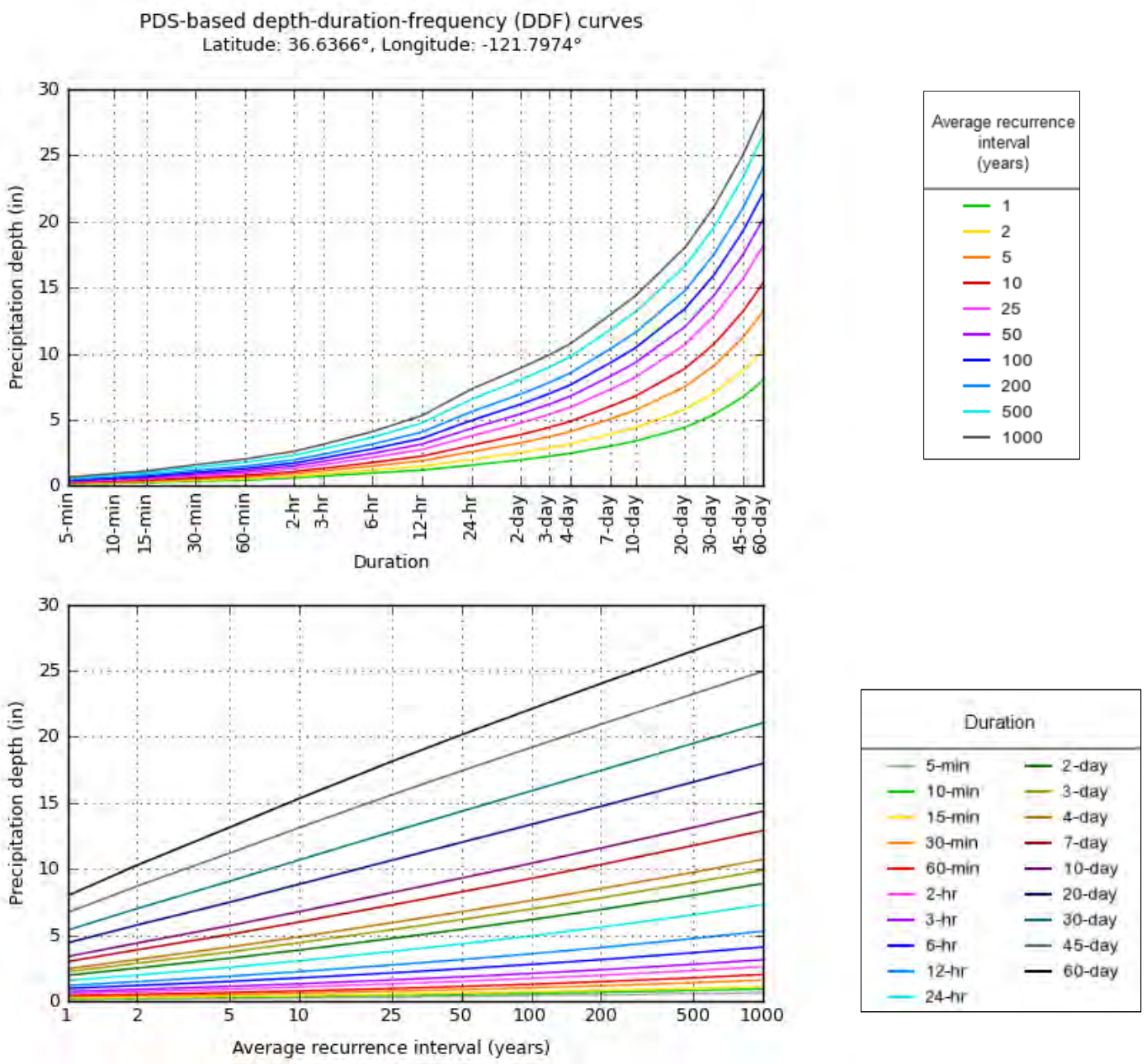
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



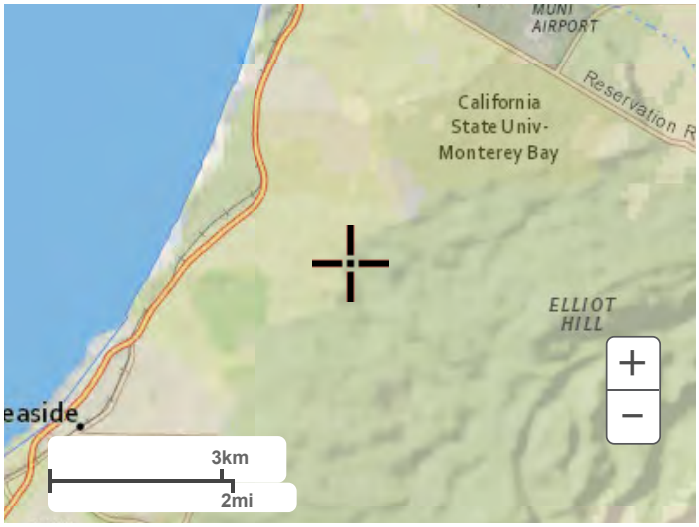
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Thu Dec 27 16:55:29 2018

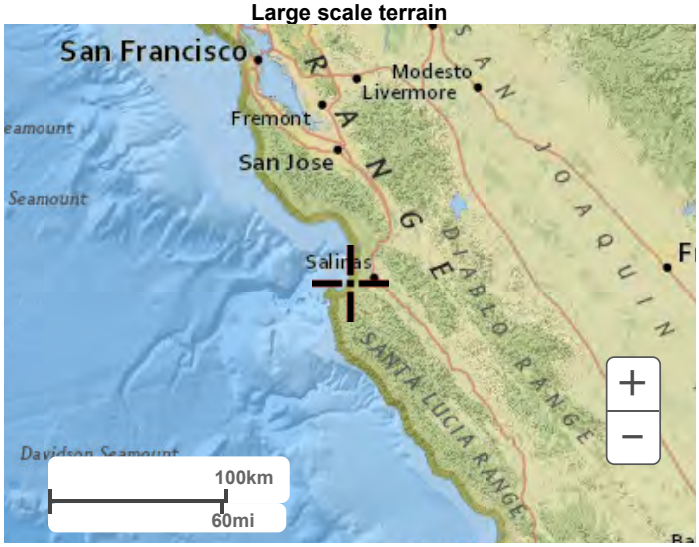
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

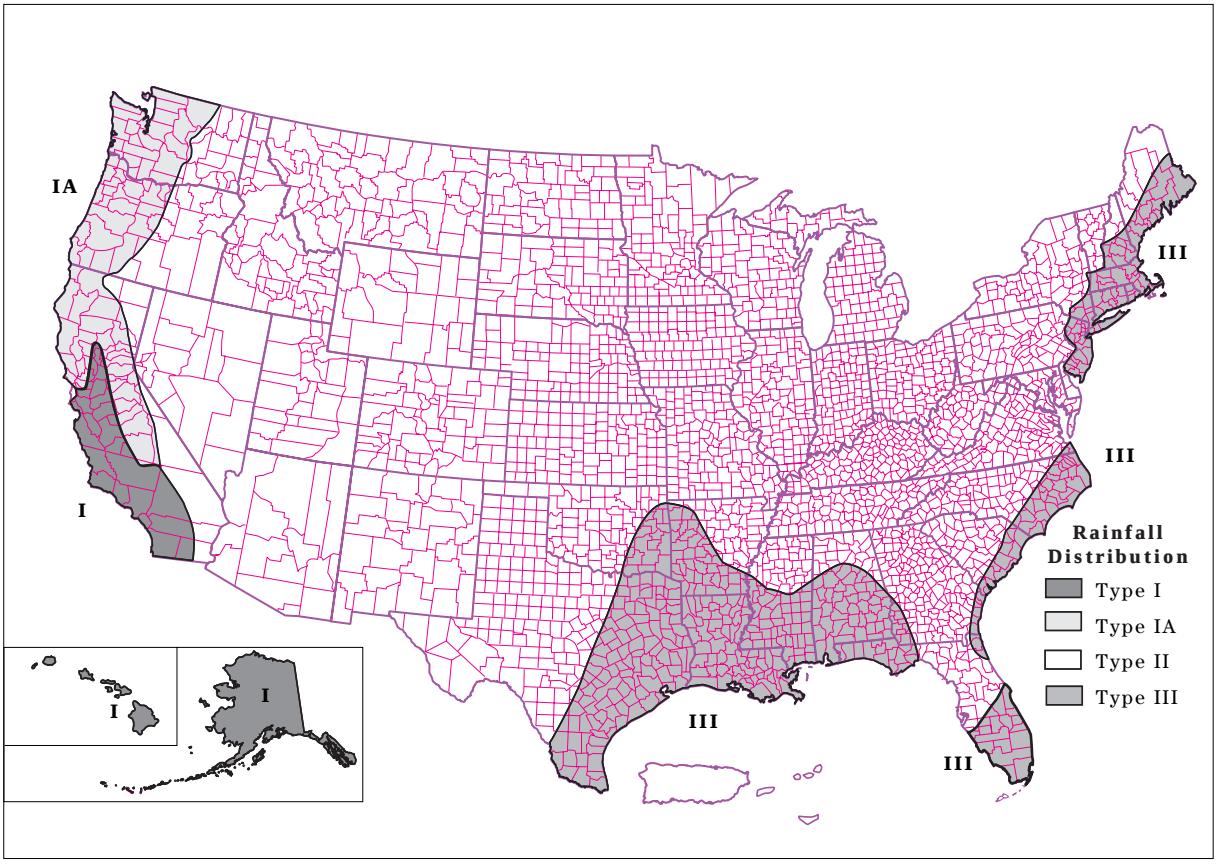


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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

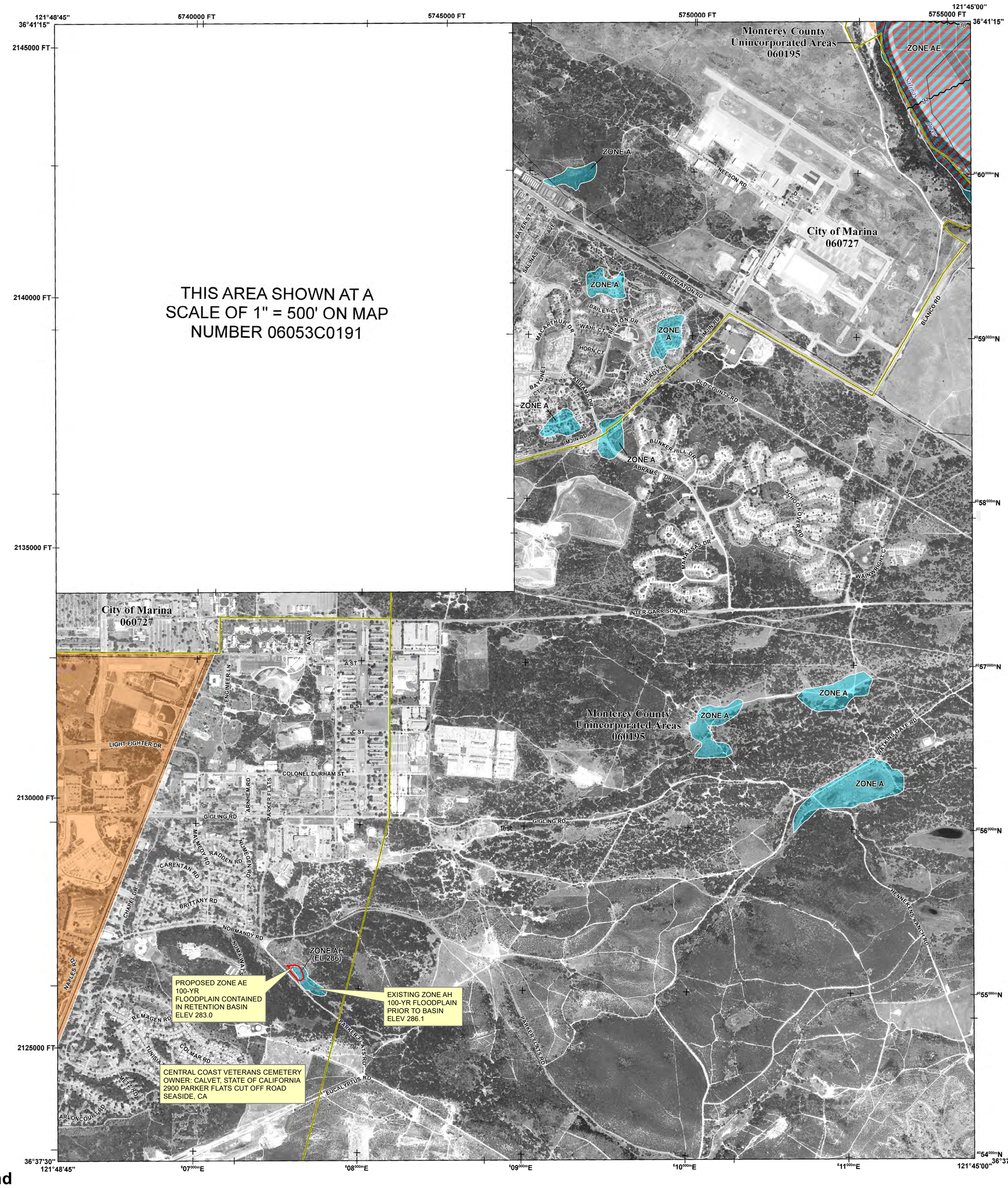
Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

Attachment 7

Annotated DFIRM Map

THIS AREA SHOWN AT A
SCALE OF 1" = 500' ON MAP
NUMBER 06053C0191



Legend

Revised 100-yr Floodplain

0 1,000 2,000 4,000 Feet

VERTICAL DATUM: NAVD 88

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall

OTHER FEATURES
- E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from Coastal California LiDAR and Digital Imagery dated 2011. USDA NAIP 2010 imagery is used in areas not covered by the Coastal California digital imagery.

SCALE

N

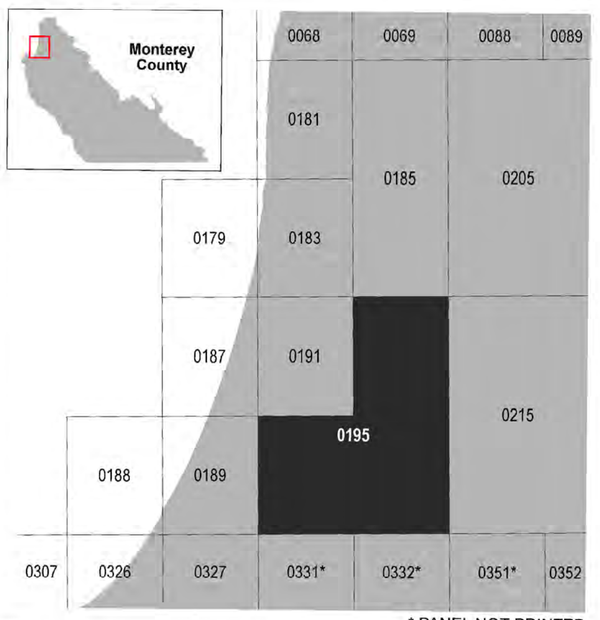
Map Projection:
Universal Transverse Mercator Zone 10N; North American Datum 1983; Western Hemisphere; Vertical Datum; NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 260 520 1,040 Meters

PANEL LOCATOR



* PANEL NOT PRINTED



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MONTEREY COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 195 OF 2050

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARINA, CITY OF	060727	0195	H
MONTEREY COUNTY	060195	0195	H
SEASIDE, CITY OF	060203	0195	H

VERSION NUMBER
2.3.2.1

MAP NUMBER
06053C0195H

MAP REVISED
June 21, 2017

Attachment 8

"Letter of Map Revision Application for Central Coast Veterans Cemetery"

May 27, 2014 Wood Rodgers, Inc.

LETTER OF MAP REVISION
APPLICATION
for
CENTRAL COAST VETERANS CEMETERY
Located in
The City of Seaside, California



May 27, 2014

Prepared by: Wood Rodgers, Inc.

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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1.3 Proposed LOMR 1
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2.2 Form 2 – Riverine Hydrology & Hydraulics Form 2
SECTION III RIVERINE HYDROLOGY & HYDRAULICS 3
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3.2 Hydrology and Hydraulics Report 3
3.3 Model Data CD 3
3.4 Geotech Report 3

FIGURES

1. **Location Map**
2. **Effective FEMA FIRM**
3. **Proposed LOMR Map**

SECTION I INTRODUCTION

This "*Letter of Map Revision (LOMR) Application for the Central Coast Veterans Cemetery, located in the City of Seaside, Ca*", is submitted to document a proposed revision to the one percent annual chance floodplain boundary on the site, based on new topographic data and a new HEC-HMS model that reflects the watershed and the new topography.

The application proposes to change an effective approximate Zone A on the site to a new refined Zone AH.

1.1 LOMR Application Submittal Summary

The LOMR Application is submitted with all supporting documentation and electronic data as required by the FEMA MT-2 forms.

The LOMR Application is presented in the following sections:

Section I Introduction – Includes background narrative of the LOMR application and format of the submittal.

Section II MT-2 Form – Includes the completed LOMR forms with references to the supporting as-built documentation.

Section III Riverine Hydrology and Hydraulics – Includes the Hydrologic and Hydraulic Report and supporting data as approved by the City of Seaside.

1.2 Effective Flood Insurance Rate Map

The one percent annual chance floodplain boundary reported on the Effective Flood Insurance Rate map is provided on Figure 2 of this LOMR Application. The Effective FIRM map 06053C0195G is dated April 2009. The immediate area does not have riverine flooding and therefore the location of the flooding on the MT-2 forms is referred to as the “local depression north east of Parker Flats Cut Off Road.”

The source of flooding cited on the MT-2 forms is the “watershed runoff upstream of the Parker Flats Cut Off Road” given that the local geologic formation (depression) collects the runoff into a ponded low point from the surrounding watershed at the vicinity of the Effective Zone A boundary.

1.3 Proposed LOMR

The proposed Zone AH based on the refined analysis is provided on Figure 3. The proposed Zone AH has been calculated to peak at elevation 286 ft. The analysis is documented in Section 3.2 of this application, "*Hydrologic and Hydraulic Report for California Central Coast Veterans Cemetery*".

Zone X

General Jim Moore Blvd

Malmedy Rd

Carentan Rd

Normandy Rd

City of Seaside 060203

Parker Flats Rd

Parker Flats Cut Off Rd

ZONE AH (EL. 286')

LIMITS OF LOMR

LOMR SFHA

Zone X

CITY OF SEASIDE MONTEREY COUNTY

8th Ave

Parker Flats Rd

Eucalyptus Rd

Zone A

Watkins Gate Rd

Watkins Gate Rd

Parker Flats Cut Off Rd

Eucalyptus Rd

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X, ZONE D — Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
- *Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Culvert, Flume, Penstock or Aqueduct
- Road or Railroad Bridge
- Footbridge
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000 mN — 1000-meter Universal Transverse Mercator grid values, zone 10
- 600000 FT — 5000-foot grid values: California State Plane coordinate system, zone II (FIPSZONE 0402), Lambert Conformal Conic projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

NOTE: ELEVATIONS ARE FEET NAVD88

NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

FEMA Flood Hazard Zones*

- A
- X
- X**

- FEMA_StudyLimits
- Proposed Zone AH
- City Boundary

*Effective FEMA FIRM Map 06053C0195G

**0.2 PCT ANNUAL CHANCE FLOOD HAZARD

PROPOSED LOMR MAP
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

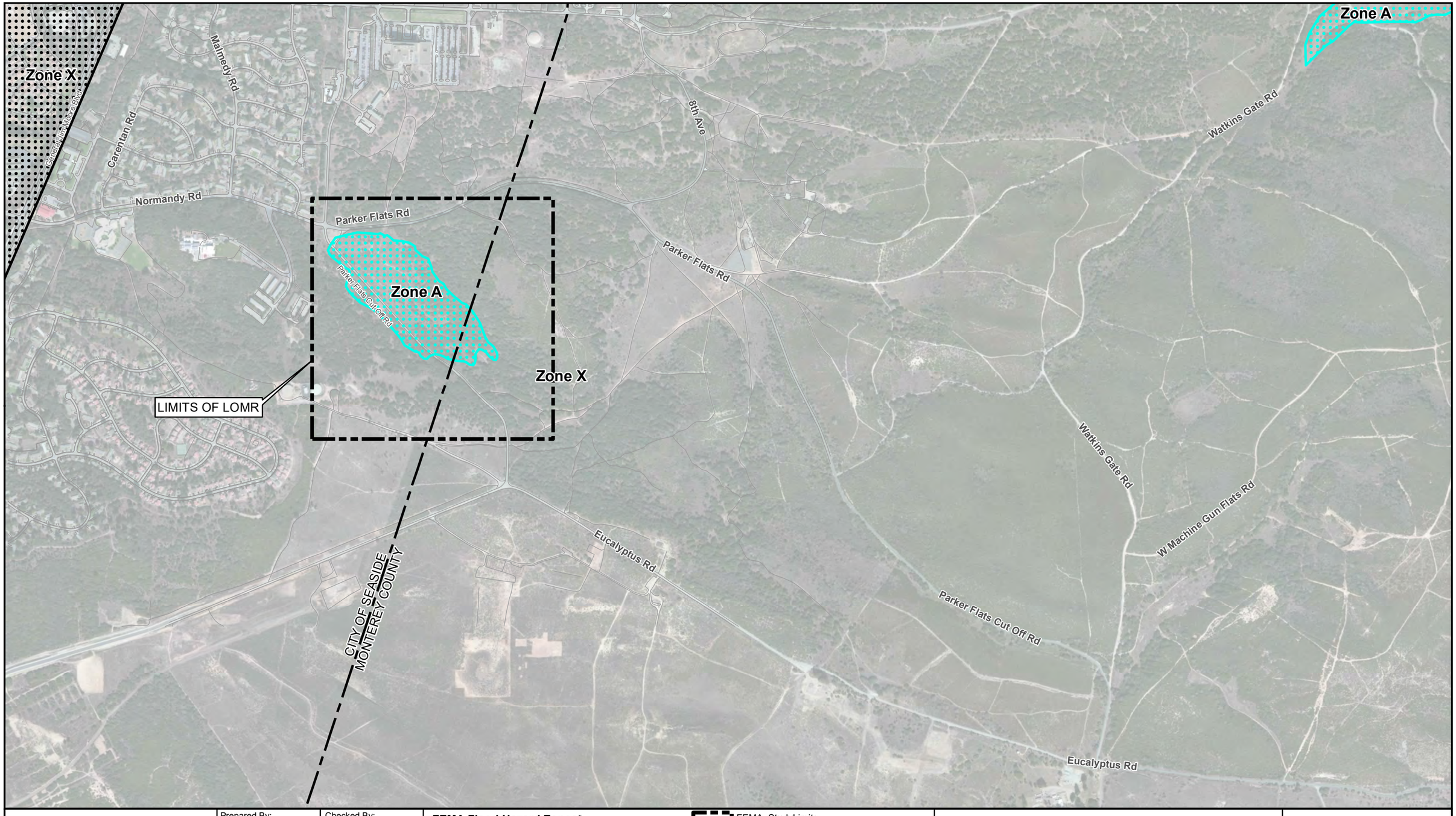
PRELIMINARY

FIGURE 3

Date: MAY, 2014

Job Number: 8482

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NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

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DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

FEMA Flood Hazard Zones*

- A
- X
- X (0.2 PCT ANNUAL CHANCE FLOOD HAZARD)
- City Boundary
- Road

FEMA_StudyLimits

*Effective FEMA FIRM Map 06053C0195G, April 2009

EFFECTIVE FEMA FIRM
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

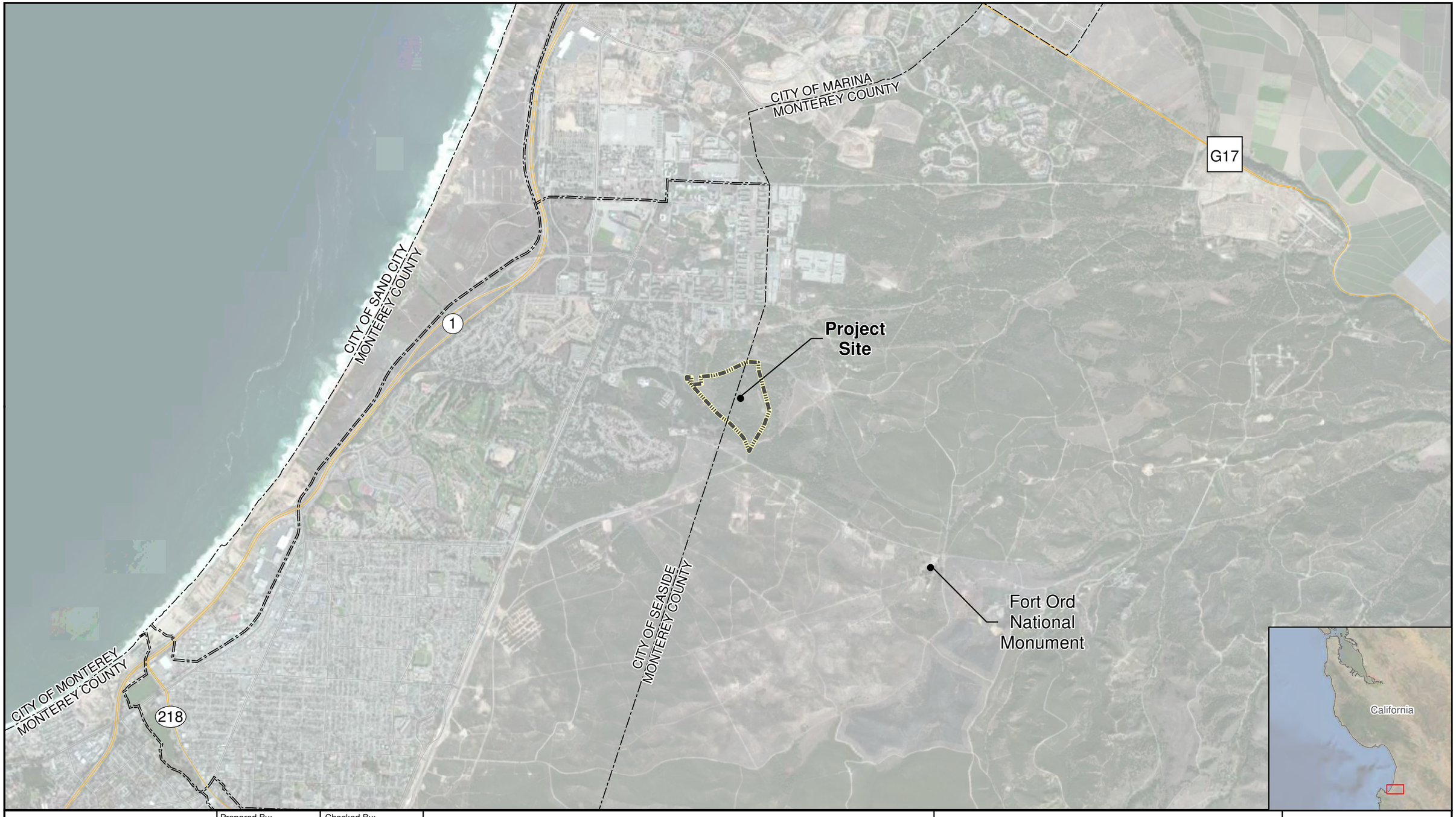
PRELIMINARY

FIGURE 2

Date: MAY, 2014

Job Number: 8482

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NORTH

0 1,500 3,000 6,000

Feet

Prepared By:	Checked By:
AM	DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

Project Boundary
City Boundary
Interstate/Highway
Major Road

LOCATION MAP
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 1

Date: MAY, 2014

Job Number: 8482

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SECTION II MT-2 FORMS

2.1 Form 1 – Overview & Concurrence Form

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014 **

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☐ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
060203	CITY OF SEASIDE MONTEREY COUNTY	CA	06053C	0195G	04/02/2009

2. a. Flooding Source: WATERSHED RUNOFF UPSTREAM OF PARKER FLATS CUT OFF

b. Types of Flooding: ☐ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
☐ Alluvial fan ☐ Lakes ☒ Other (Attach Description)

3. Project Name/Identifier: CENTRAL COAST VETERANS CEMETERY

4. FEMA zone designations affected: A (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☐ Physical Change ☒ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
☐ Coastal Analysis ☒ Hydraulic Analysis ☒ Hydrologic Analysis ☐ Corrections
☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
☒ New Topographic Data ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.
**PER FEMA WEBSITE AS OF 5/23/14: EXPIRED MT-EZ, MT-1, AND MT-2 FORMS MAY BE USED UNTIL FURTHER NOTICE.

b. The area of revision encompasses the following structures (check all that apply) N/A

Structures: ☐ Channelization ☐ Levee/Floodwall ☐ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $FREE

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: DARREN BONFANTINE, PE, CFM	Company: WOOD RODGERS, INC.	
Mailing Address: 180 GRAND AVE, STE 400 OAKLAND, CA 94612	Daytime Telephone No.: (510) 208-0343	Fax No.: (510) 208-2401
	E-Mail Address: DBONFANTINE@WOODRODGERS.COM	
Signature of Requester (required):	Date: 05/23/2014	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: TIM O'HALLORAN CITY ENGINEER/PUBLIC WORKS SERVICES MANAGER	Community Name: CITY OF SEASIDE, MONTEREY COUNTY	
Mailing Address: 440 HARCOURT AVENUE SEASIDE, CA 93955	Daytime Telephone No.: (831) 899-6825	Fax No.: (831) 899-6233
	E-Mail Address: TO'HALLORAN@CI.SEASIDE.CA.US	
Community Official's Signature (required):	Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: DARREN BONFANTINE	License No.: 72293	Expiration Date: 06/30/2014	
Company Name: WOOD RODGERS, INC.	Telephone No.: (510) 208-0343	Fax No.: (510) 208-2401	
Signature:	Date: 05/23/2014	E-Mail Address: DBONFANTINE@WOODRODGERS.COM	

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if …
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

2.2 Form 2 – Riverine Hydrology & Hydraulics Form

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014 **

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: WATERSHED RUNOFF UPSTREAM OF PARKER FLATS CUT OFF ROAD

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B)	☒ No existing analysis	☒ Improved data
☐ Alternative methodology	☐ Proposed Conditions (CLOMR)	☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
LOCAL DEPRESSION NORTH EAST OF PARKER FLATS CUT OFF RD	0.259	N/A	47.9

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records	☒ Precipitation/Runoff Model → Specify Model: HEC-HMS
☐ Regional Regression Equations	☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

**PER FEMA WEBSITE AS OF 5/23/14: EXPIRED MT-EZ, MT-1, AND MT-2 FORMS MAY BE USED UNTIL FURTHER NOTICE.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	N.E. OF PARKER FLATS CUT OFF RD	N/A	N/A	286.1
Upstream Limit*	N/A	N/A	N/A	N/A

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-HMS RESERVOIR STORAGE CURVE

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
	File Name:	Plan Name:	File Name:	Plan Name:	
Duplicate Effective Model*	APPROXIMATE ZONE A, NO MODEL AVAILABLE (SEE FEMA CORRESPONDENCE)				
Corrected Effective Model*	File Name: CCVC.HMS	Plan Name: EXISTING	File Name: N/A	Plan Name: N/A	NAVD88, FT
Existing or Pre-Project Conditions Model	File Name: N/A	Plan Name: N/A	File Name: N/A	Plan Name: N/A	N/A
Revised or Post-Project Conditions Model	File Name: N/A	Plan Name: N/A	File Name: N/A	Plan Name: N/A	N/A
Other - (attach description)	File Name: N/A	Plan Name: N/A	File Name: N/A	Plan Name: N/A	N/A

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: ONE-FOOT CONTOURS FOR ON-SITE PROJECT EXTENT; USGS DEM FOR OFF-SITE TOPOGRAPHY

Source: AERIAL PHOTOMAPPING SERVICES Date: 07/27/2010

Accuracy: NATIONAL MAP ACCURACY STANDARDS

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required) SEE FIGURE 3

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). N/A

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

SECTION III RIVERINE HYDROLOGY & HYDRAULICS

3.1 FEMA Correspondence

Michael Baker Jr. Inc.
FEMA Engineering Library
847 South Pickett Street
Alexandria, Virginia 22304

February 19, 2014

IN REPLY REFER TO:
Request No.: B1409069

Alexander MA
Wood Rodgers, Inc.
180 Grand Ave., Suite 400
Oakland CA 94612

Dear Mr. MA,

This is in response to your February 18, 2014, letter requesting FEMA back up data for Local Flooding in City of Seaside, Monterey County, CA. The area you have requested is designated as Zone A on the Flood Insurance Rate Map. The Zone A designation identifies areas having a one-percent chance of being equaled or exceeded in any given year (base flood) that is determined by approximate methods. There is no detailed modeling for this area. Please go to www.FEMA.gov and obtain a copy of the FEMA publication "Managing Floodplain Development in Approximate Zone A Areas". This will help you in developing the base flood elevations for the Zone A area. Thank you for your request and we look forward to serving you again in the future

If you have any questions regarding your request or this letter please contact me by telephone at (703) 212-4049, or by electronic mail at alan.mejia@riskmapcds.com

Sincerely,

Alan Mejia
FEMA Engineering Library

3.2 Hydrology and Hydraulics Report

HYDROLOGIC & HYDRAULIC STUDY REPORT
for

California Central Coast Veterans Cemetery
Located in the Monterey County, California

March 7, 2014

CITY OF SEASIDE
DEPARTMENT OF PUBLIC WORKS

Prepared by: Wood Rodgers, Inc.

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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3. **Existing Drainage Conditions**
4. **NRCS Soils Map**
5. **Existing Flood Extents**
6. **LOMR Work Map**

APPENDIX

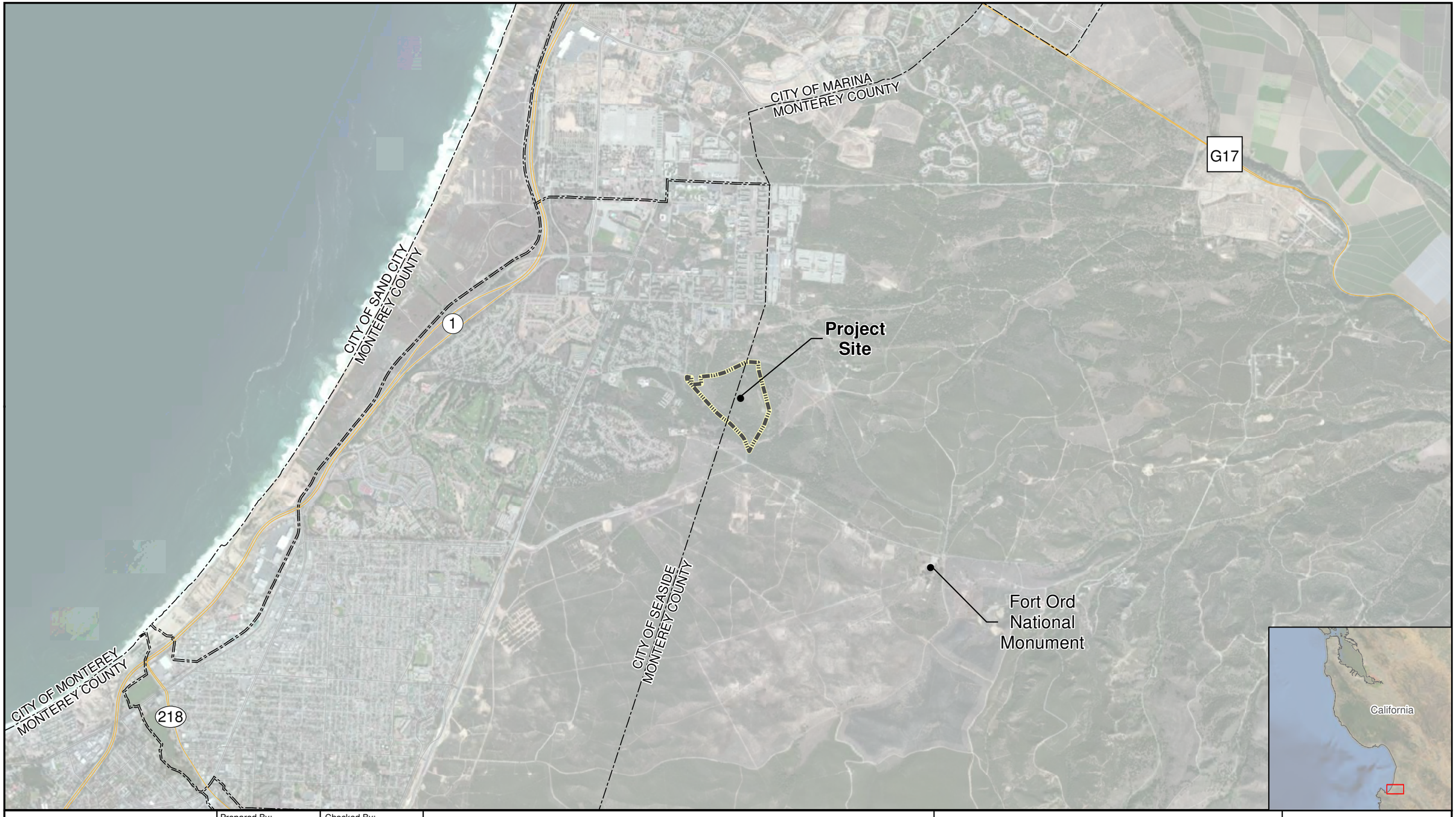
A. FEMA Correspondence
B. Vertical Datum Conversion
C. Precipitation Data

SECTION 1 INTRODUCTION

The California Central Coast Veteran's Cemetery site (Site) is located partially in the City of Seaside and partially in unincorporated Monterey County, California. The site is located west of the foot of the Coastal Range, approximately two miles east of the Pacific Ocean, and two miles northwest of Fort Ord National Monument. The 88 acre site was formerly part of the Fort Ord Army Base, and is currently owned by the Fort Ord Reuse Authority. The property is in the process of being transferred to the State of California (*See Figure 1- Location Map*).

The Site, bounded by Parker Flats Road on the north, Parker Flats Cut Off Road on the south/west is proposed to be developed for use as a veteran's cemetery that will be owned and operated by the State of California. The Site is currently partially within a Federal Emergency Management Agency (FEMA) Special Flood Hazard Area (SFHA).

This report documents an analysis to modify the FEMA SFHA limits based on more detailed data.



NORTH

0 1,500 3,000 6,000

Feet

Prepared By: AM

Checked By: DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

Project Boundary

City Boundary

Interstate/Highway

Major Road

LOCATION MAP
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

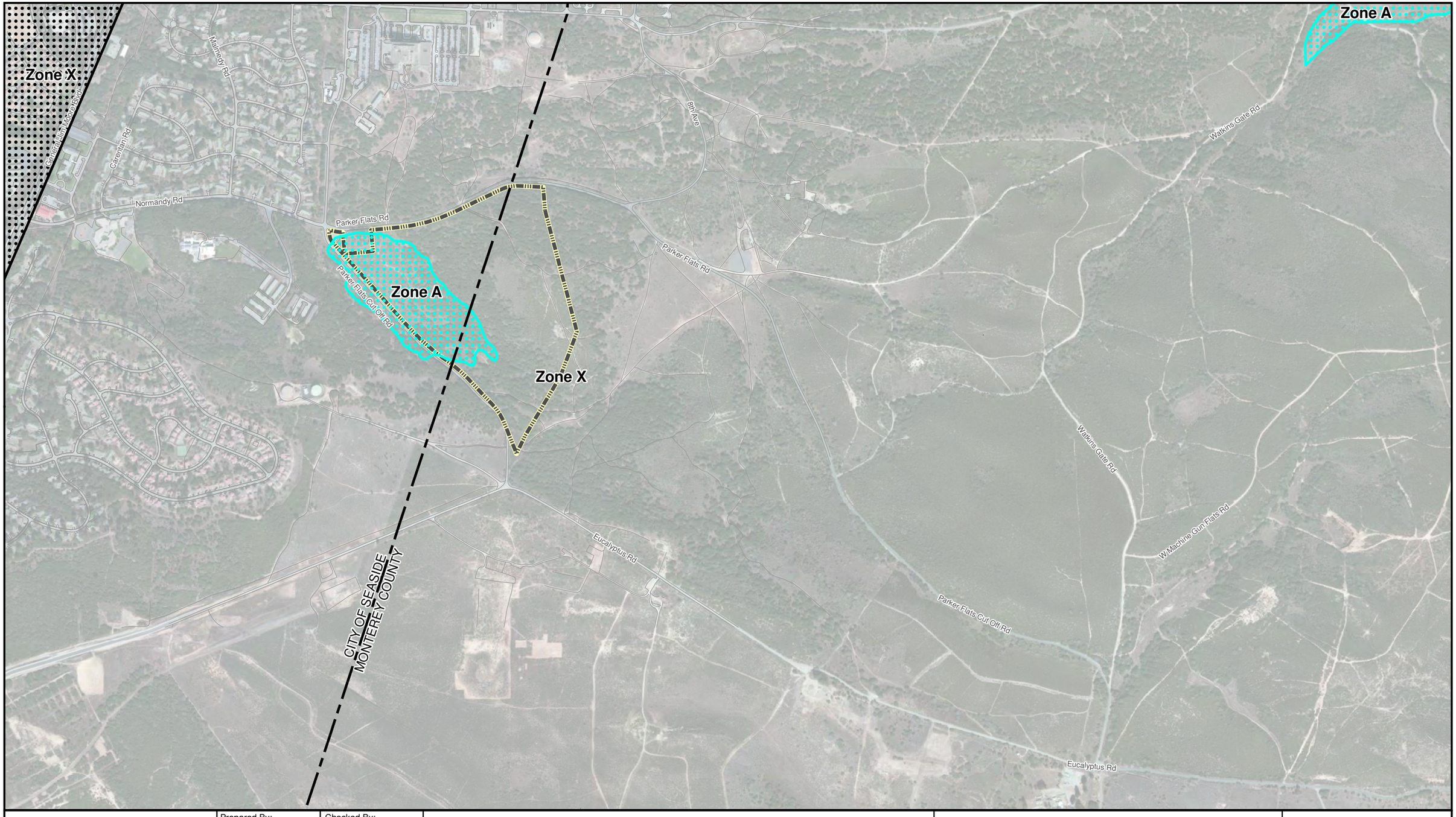
PRELIMINARY

FIGURE 1

Date: MARCH, 2014

Job Number: 8482

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NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

FEMA Flood Hazard Zones*

- A
- X
- X (0.2 PCT ANNUAL CHANCE FLOOD HAZARD)

*Effective FEMA FIRM Map 06053C0195G

- Project Boundary
- City Boundary
- Road

EFFECTIVE FEMA FIRM
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 2

Date: MARCH, 2014

Job Number: 8482

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SECTION 2 EXISTING SITE & STUDY LIMITS

2.1 Existing Site

The Site is undeveloped and is populated with trees and scrub, and located in a coastal region amidst sandy hills with varied terrain. The Site ranges from elevation 416 feet NAVD88 on the east boundary to the lowest elevation of 283 feet NAVD88 in a topographic depression located along the west boundary.

The Site is isolated from rainfall runoff from most of the adjacent hillside watersheds due to the topography. Rainfall runoff from each adjacent hillside watershed is prevented from leaving the Site due to adjacent deep depressions that lie 4 to 30 feet below the nearest release point.

The Site contains one deep depression that was originally mapped as a SFHA as noted in Section 2.2 below. (See *Figure 3 - Existing Drainage Conditions*).

2.2 Effective Flood Insurance Rate Map

The northwestern portion of the Site is mapped on the effective Flood Insurance Rate Map (FIRM) April 23, 2009 as a SFHA, Zone A – "Approximate 100-year Floodplain". The Effective map shows the plan view of the approximate floodplain extent with no Base Flood Elevations shown. (See *Figure 2 – Effective FEMA FIRM*).

2.3 Study Limits

This study refines the existing 100-year floodplain elevation and the extent of the 100-year floodplain. The adjacent watersheds that contribute to their respective local depressions are studied to determine if they contribute runoff to the Site.

The study area is limited to the onsite depression and the contributing watershed. Adjacent watersheds and depressions are not proposed to be remapped as part of this study. They have been included in the study for the sole purpose of determining whether they would fully contain runoff from the design storm. (See *Figure 6 – LOMR Floodplain Map*).

2.4 Flood Risk

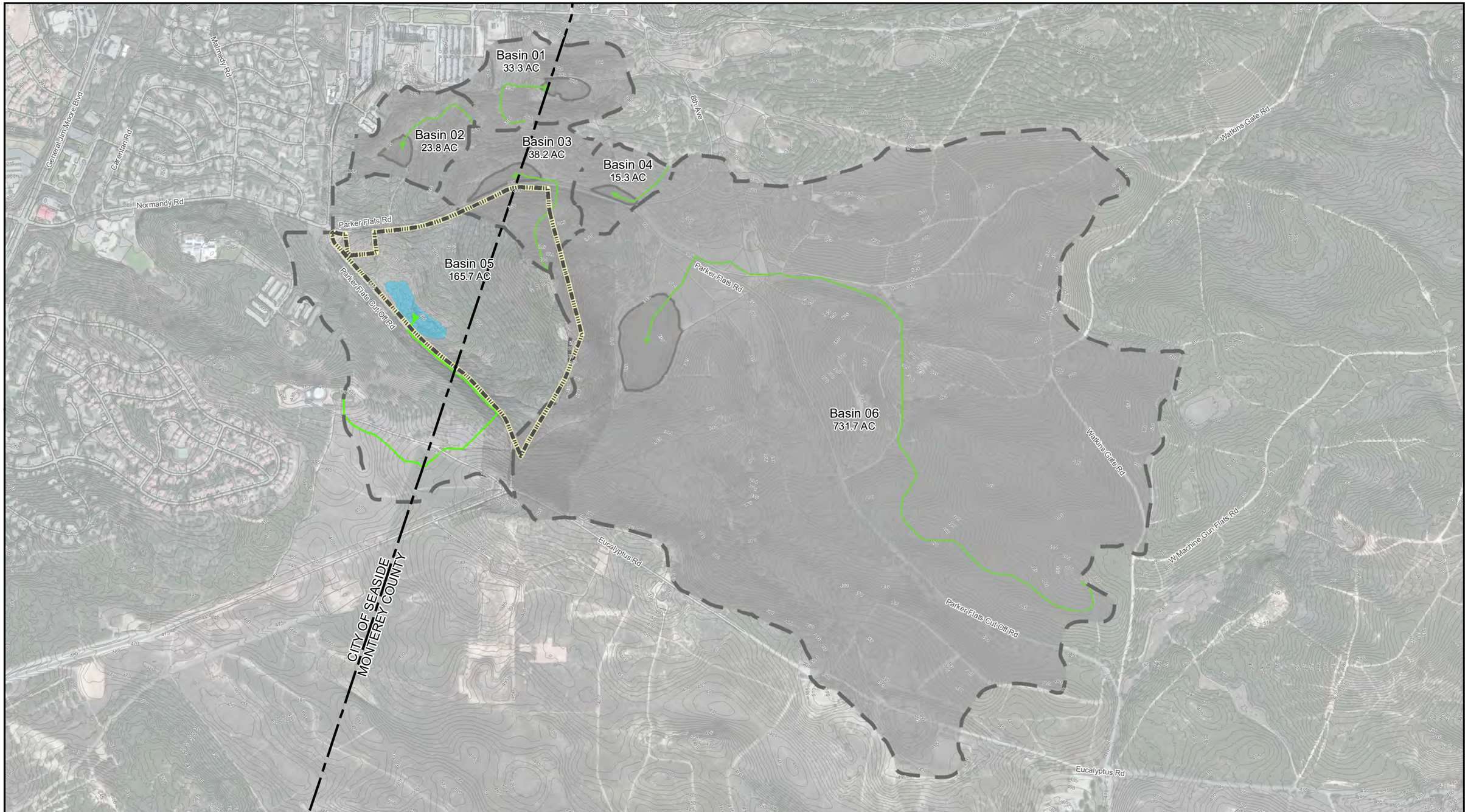
The adjacent local depressions in this area appear sufficient contain and infiltrate the 100-year runoff from the contributing watersheds.

To verify this, the adjacent local depressions and adjacent watersheds were modeled to confirm that these depressions provide sufficient storage to contain the runoff and prevent overtopping into the Site.

2.5 Previous Hydrologic and Hydraulic Modeling

A request was made to FEMA to acquire the data used to delineate the effective A Zone. According to FEMA (in *Response to Request Number B1409069*), "The area you have requested is designated as Zone A on the Flood Insurance Rate Map. The Zone A designation identifies areas having a one-percent chance of being equaled or exceeded in any given year (base flood) that is determined by approximate methods. There is no detailed modeling for this area." The letter is provided in *Appendix A – FEMA Correspondence*.

A Letter of Map Revision application will be submitted along with this drainage report to request a map revision based on the submission of more detailed data.



NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

- Area of Shed Analysis
- Flowpath - Existing
- Intermediate Contour
- Road
- City Boundary
- Onsite Drainage Depression
- Local Drainage Depression*
- Offsite Shed*
- Project Boundary

*Does not drain to Project Site.

EXISTING DRAINAGE CONDITION
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 3

Date: MARCH, 2014

Job Number: 8482

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SECTION 3 ENGINEERING METHODS

3.1 General

Standard hydrologic and hydraulic methods using numerical models were used for this application.

3.1.1 Overview of Numerical Hydrologic and Hydraulic Models

The watersheds boundaries were analyzed using the National Elevation Dataset topo data and the NRCS soil maps to determine hydrologic soil group. The existing land use was determined using aerial photography of the site. Design rainfall was acquired from similar projects in Monterey County, consistent with Monterey County Water Resources Agency standards. The runoff from the watersheds was modeled using the U.S. Army HEC-HMS version 3.5 (Hydrologic Engineering Center – Hydrologic Modeling System) program by applying the Snyder Watershed Transformation with the Initial and Constant infiltration loss methods. The hydrologic methods and parameters are described in subsequent sections of this study.

The hydraulic calculations were conducted in HEC-HMS as well. HEC-HMS was utilized for determining the storage behavior of the local depressions and calculating the 100-year base flood elevation for the site.

3.1.2 Vertical Datum

The proposed LOMR map will be presented in North American Vertical Datum of 1988 (NAVD88). Onsite topography of one foot contours is provided by Aerial Photomapping Services (July 7, 2010) which was reported in NAVD88. The National Elevation Dataset (NED, February 2013) was acquired from the United States Geological Survey website and is documented in NAVD88 in vertical units of meters. The vertical units were converted to feet in GIS for computational purposes. The 3 meter grid size equates to 9.8 feet grid spacing. The NED topo is used for areas outside the project site.

The below relationship between NGVD29 and NAVD88 is provided for reference as derived from the NGS Vertcon Website application. The results are provided in Appendix B – Vertical Datum Conversion.

The datum conversion formula is:

El. NAVD88 = El. NGVD29 + 2.8 ft.

3.2 Hydrologic Analysis

3.2.1 Effective Hydrology

The effective FEMA study data was not available and therefore the only information for a comparative analysis is the Approximate Zone A extent. Interpolating the Zone A flood extent onto the one foot contour data gives an estimate of volume equal to 300 ac-ft at an elevation of 305 feet (NAVD88). The detailed analysis will allow a comparison with this volume.

3.2.2 Existing Hydrology - Watershed Boundaries

The USGS NED topographic data was used to delineate the watershed boundaries of the watershed contributing to the onsite depression (Basin 05) as well as the adjacent watersheds (Basins 01-04 and Basin 06) as shown in Figure 3.

3.2.3 Existing Hydrology - Soils

The soils in the Seaside area consist primarily of sandy soils with high infiltration rates. The soil types found in the area are Type A soils Oceanic Loamy and Baywood Sands, and Type B soil Arnold-Santo (*See Figure 4 – Soils Map*). Hydrologic Soils Group Type A soils are characterized as sandy soils with high infiltration rates and low runoff potential. Hydrologic Soils Group Type B soils are characterized as loamy soils with moderately high infiltration rates and moderately low runoff potential.

Two independent percolation tests on the Site reported infiltration rates of 7.5 in/hr and 13.6 in/hr, which are in the range found in the *East Garrison Hydrology Report* (see Reference 2). This report indicated a range of permeability of 6-20 in/hr. The NRCS guidance in Chapter 7 of the *National Engineering Handbook* puts the low end of infiltration rates for Type A soils at 1.42 in/hr and the low end for Type B soils at 0.57 in/hr (see Reference 3). While the site conditions testing supports higher values, the NRCS values were used as a more conservative (lower) infiltration rate for watershed infiltration losses.

The weighted infiltration loss rates for each watershed were calculated by averaging the infiltration rate by the respective area of each soil type. The summary of infiltration rates are provided in **Table 1**.

Table 1 – Infiltration Loss Parameters

Watershed Name	Hydrologic Group Area (AC)		Grand Total (AC)	Total Area (SM)	Initial Loss (IN)	Constant Loss (IN)	Impervious (%)
	A	B					
BASIN 01	33.3		33.3	0.052	0.1	1.42	1
BASIN 02	23.8		23.8	0.037	0.1	1.42	1
BASIN 03	38.2	0.0	38.2	0.060	0.1	1.42	1
BASIN 04	14.8	0.5	15.3	0.024	0.1	1.39	1
BASIN 05	146.7	19.1	165.7	0.259	0.1	1.32	1
BASIN 06	102.9	628.7	731.7	1.143	0.1	0.69	1

3.2.4 Existing Hydrology – Land Use

The existing land use of the Site and surrounding watersheds is open space with sparse county roads throughout. The open space is wooded with low trees and bushes. The imperviousness of the existing land use is estimated to be 1%.

3.2.5 Existing Hydrology - Precipitation

A design storm for the Site was selected based on National Flood Insurance Program (NFIP) requirements, and on the fact that the onsite topographic depression allows the site to operate as a retention basin.

The 100-year storm was selected consistent with NFIP standards. Basin design requires the use of long duration storms. Since the Monterey County Water Resources Agency (MCWRA) has used the 100-year 72-hour storm for basin design, this design storm was selected.

The precipitation depths for the site were acquired from the NOAA Atlas 14 website, as reported in Appendix C – Precipitation Data. The total depth of precipitation at this location for the 100-year 72-hour event is 7.05 inches.

The 100-year 72-hour rainfall distribution was obtained from the "*Zone 9 and Reclamation Ditch Drainage System Operations Study*", Schaaf & Wheeler (See Reference 4). This report based the rainfall temporal distribution on a pattern developed by the Corps of Engineers for the December 1955 storm event over portions of San Benito and Santa Cruz Counties. The total depth was scaled up to 7.05 inches in the HEC-HMS model for this report.

3.2.5 Existing Hydrology – Rainfall Runoff Transformation

The Snyder Watershed Transformation Method was used to route the excess runoff to the point of concentration. Parameters are developed and are used to calculate the lag time for each shed. The Snyder parameters are provided in Table 2.

Table 2 – Snyder Routing Parameters

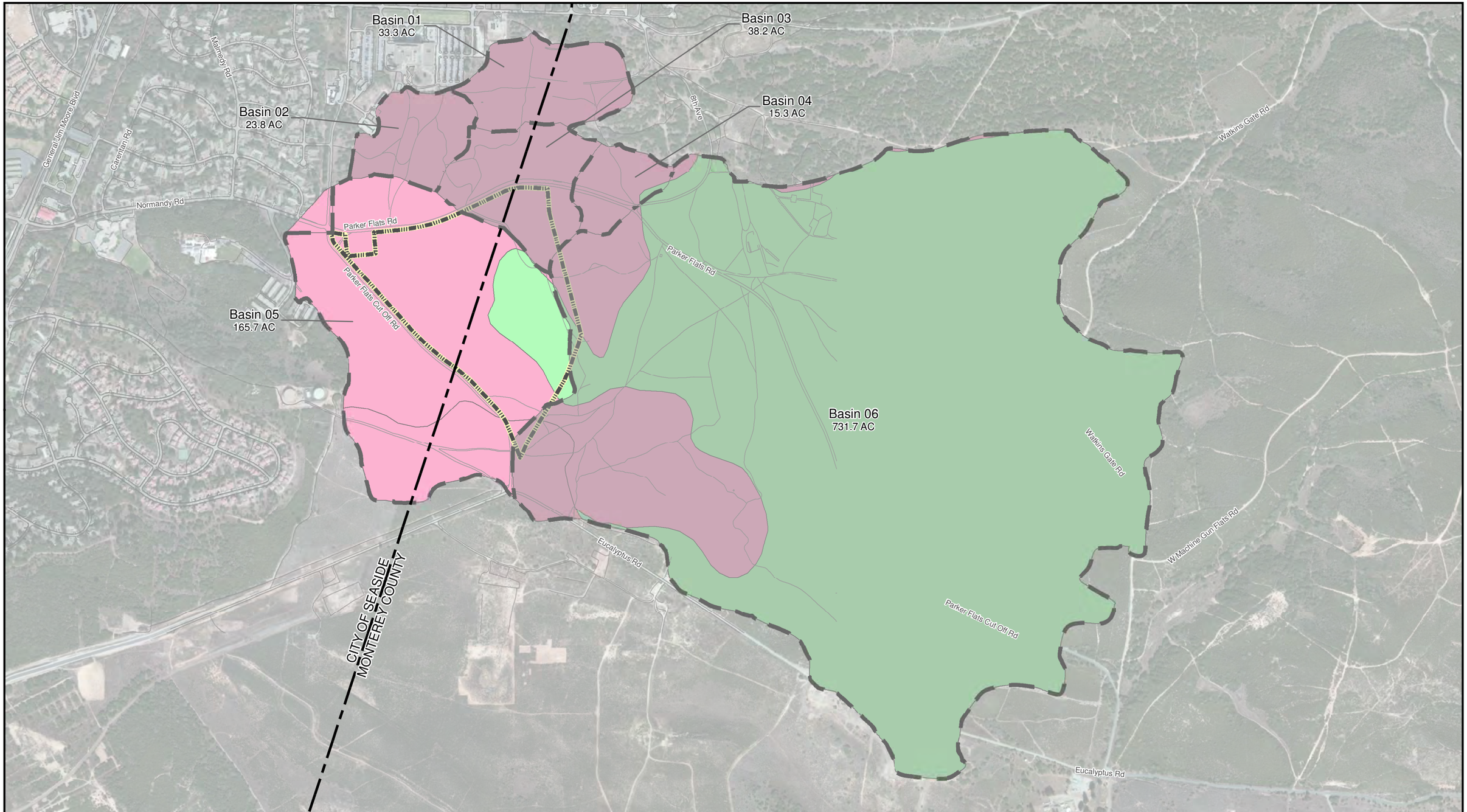
Watershed Name	L (ft)	L (mi)	Lc (ft)	Lc (mi)	s (ft/mi)	n	C	Lag (min)	Lag (hr)	Peaking Coefficient
BASIN 01	1,130	0.214	43	0.008	195.4	0.13	1560	10.4	0.17	0.6
BASIN 02	1,133	0.215	203	0.039	181.1	0.13	1560	17.7	0.29	0.6
BASIN 03	1,641	0.311	171	0.032	320.5	0.13	1560	17.1	0.29	0.6
BASIN 04	812	0.154	20	0.004	288.3	0.13	1560	6.8	0.11	0.6
BASIN 05	3,850	0.729	446	0.084	285.1	0.13	1560	31.8	0.53	0.6
BASIN 06	8,566	1.622	4,621	0.875	145.2	0.13	1560	100.1	1.67	0.6

3.2.6 Existing Hydrology – Results

The existing peak 100-year runoff flow generated from the refined hydrology model for each watershed averages 0.3 cfs per acre as shown on Table 3. The peak runoff is within an expected range given the existing Type A and B soils along with an open space land use. The existing runoff volume results illustrate that the infiltration of the soil has a large impact on runoff volume. It is important to note that the infiltration rate that was used in the analysis (1.42 in/hr) is 80% lower than the lowest rate witnessed in lesser of the two independent percolation tests (7.5 in/hr). The runoff volume is within an expected range given the sandy soils of the region.

Table 3 – Watershed Runoff Results

Watershed Name	Drainage Area (ACRE)	100-Year Peak Discharge (CFS)	100-Year Runoff Volume (ACFT)	Peak Discharge per Watershed Area (CFS/AC)
BASIN 01	33.3	8.5	0.9	0.3
BASIN 02	23.8	6.0	0.6	0.3
BASIN 03	38.2	9.8	1.0	0.3
BASIN 04	15.3	4.1	0.4	0.3
BASIN 05	165.7	47.9	4.9	0.3
BASIN 06	731	188.4	48.7	0.3



NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

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Hydrologic Group

- A
- B

- Project Boundary
- City Boundary
- Offsite Shed*
- Road

*Does not drain to Project Site.

NRCS SOILS

CALIFORNIA CENTRAL COAST VETERANS CEMETERY

MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 4

Date: MARCH, 2014

Job Number: 8482

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3.3 Hydraulic Analysis

The hydraulic analysis for the individual basins is limited to the filling of each of the depressions (retention basins). As described in the results section of this report, the individual depressions did not fill to capacity and therefore a hydrodynamic model routing flows between the depressions is not necessary.

3.3.1 Duplicate Effective Model

An effective model was not available as described in the previous section of this report and therefore a duplicate effective model is not required.

3.3.2 Existing Hydraulic Model

Individual stage and storage relationships for each depression (retention basin) were developed using the local one foot contour data and NED topographic data. These stage storage curves are input into the HEC-HMS model as “Reservoirs” without discharge values.

In order to remain conservative, infiltration into the soil for each retention basin was not taken into account although each basin is expected in infiltrate and evaporate to release the stored volume. The analysis for the release of the stored volume is not included in this report.

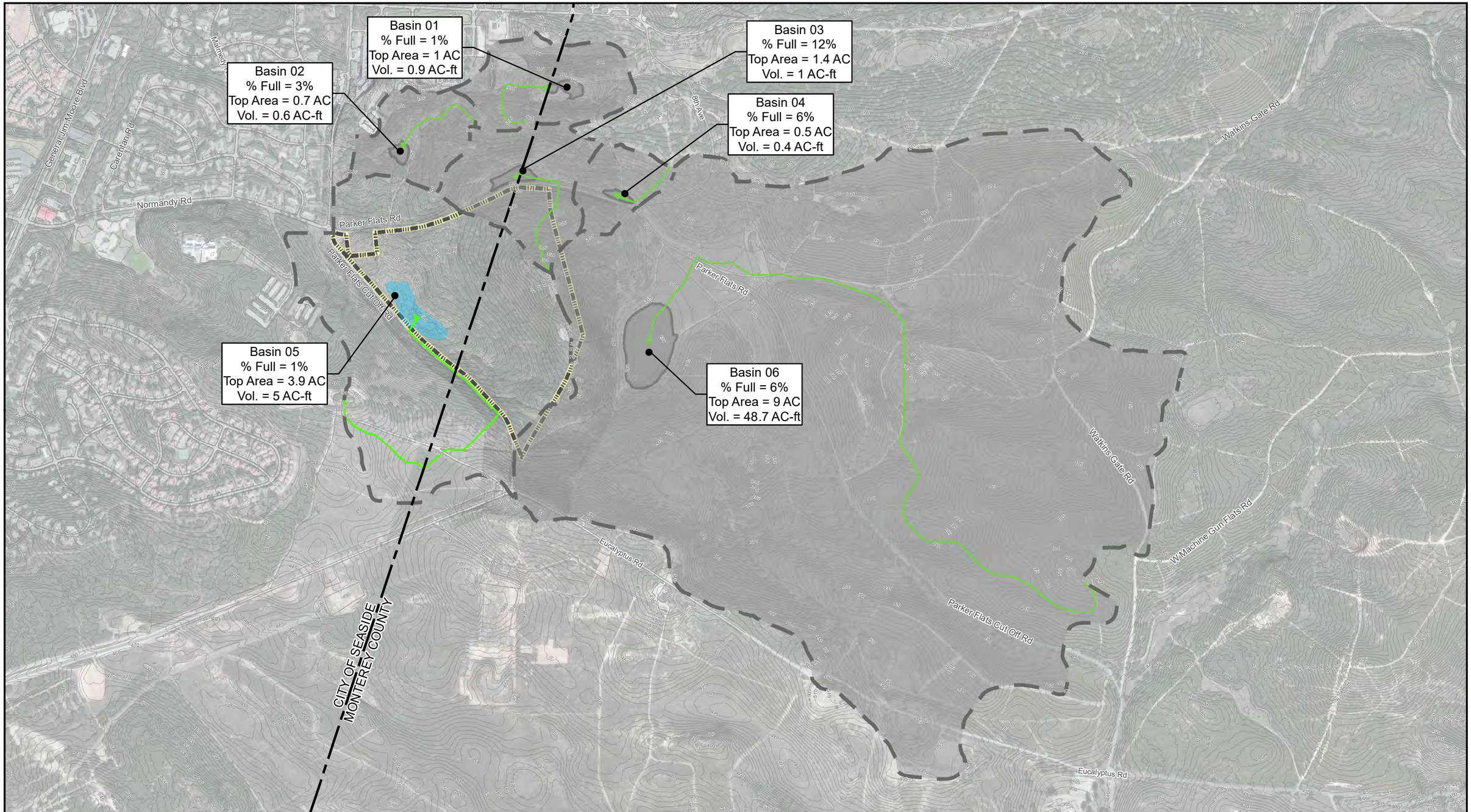
3.3.3 Existing Hydraulic Model - Results

The resulting 100-year stage from the refined HEC-HMS model shows that the local depressions (retention basins) are of adequate size to consider each watershed as an isolated hydraulic feature.

The resulting flood extents of each depression are provided in Figure 5.

Table 5 – Retention Basin Storage Results

Watershed Name	100-year Stage (FT NAVD88)	100-year Storage (ACFT NAVD88)	Available Storage (ACFT)	Invert Elevation (FT NAVD88)	Top of Basin Elevation (Spill Point) (FT NAVD88)	Percent Full (%Volume)
BASIN 01	324.7	0.9	135.2	321.7	342.9	1%
BASIN 02	323.7	0.6	23.9	322.0	331.0	3%
BASIN 03	318.4	1.0	8.2	317.0	321.3	12%
BASIN 04	317.7	0.4	6.3	316.3	321.8	6%
BASIN 05	286.1	5.0	718.5	283.0	315.6	1%
BASIN 06	300.8	48.7	786.7	290.7	323.0	6%



NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

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- Area of Shed Analysis
- Flowpath - Existing
- Intermediate Contour
- Road
- City Boundary
- Onsite Drainage Depression
- Local Drainage Depression*
- Offsite Shed*
- Project Boundary

*Does not drain to Project Site.

EXISTING FLOOD EXTENTS
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 5

Date: MARCH, 2014

Job Number: 8482

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SECTION 4 CONCLUSIONS

The results from the refined analysis illustrate that the watershed contributing to the effective FEMA FIRM SFHA Zone A can be limited to runoff from watershed “Basin 05”. The surrounding watersheds have been shown to be hydraulically disconnected from the onsite retention basin (Basin 05) in a design 100-year event.

4.1 Proposed Base Flood Elevation

The original estimate of the Zone A extent results in an approximate elevation of 305 ft (NAVD88) which corresponds to approximately 300 ac-ft.

A refined Base Flood Elevation of 286.1 ft (NAVD88) is submitted as the Proposed Zone AH elevation. This refined analysis indicates that the effective Zone A is over-estimated.

4.2 LOMR Map

The intent of the proposed LOMR map is to provide a defined Base Flood Elevation within the onsite retention basin (Basin 05). The Proposed LOMR map is presented in *Figure 6 – Proposed LOMR Map*. Note that elevations are presented in NAVD88.

Zone X

General Jim Moore Blvd

Malmedy Rd

Carentan Rd

Normandy Rd

City of Seaside 060203

Parker Flats Rd

Parker Flats Cut Off Rd

ZONE AH (EL. 286.1')

LIMITS OF LOMR

LOMR SFHA

Zone X

8th Ave

Parker Flats Rd

Zone A

Watkins Gate Rd

Watkins Gate Rd

Eucalyptus Rd

CITY OF SEASIDE MONTEREY COUNTY

Parker Flats Cut Off Rd

Eucalyptus Rd

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X, ZONE D — Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- Culvert, Flume, Penstock or Aqueduct
- Road or Railroad Bridge
- Footbridge
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 10
- 5000-foot grid values: California State Plane coordinate system, zone II (FIPSZONE 0402), Lambert Conformal Conic projection
- DX5510 — Bench mark. (see explanation in notes to Users section of this FIRM panel)
- River Mile

NOTE: ELEVATIONS ARE FEET NAVD88

NORTH

0 500 1,000 2,000

Feet

Prepared By:	Checked By:
AM	DB

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FEMA Flood Hazard Zones*

- A
- X
- X**

- FEMA_StudyLimits
- Proposed Zone AH
- City Boundary

*Effective FEMA FIRM Map 06053C0195G

**0.2 PCT ANNUAL CHANCE FLOOD HAZARD

PROPOSED LOMR MAP

CALIFORNIA CENTRAL COAST VETERANS CEMETERY

MONTEREY COUNTY, CA

PRELIMINARY

FIGURE 6

Date: MARCH, 2014

Job Number: 8482

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SECTION 5 REFERENCES

1. *FEMA,* Flood Insurance Rate Map, City of Seaside, April 23, 2009
2. *Balance Hydrologics*, Preliminary Hydrology Report for the East Garrison Project, Monterey County, California, October 2003
3. *NRCS,* Part 630 Hydrology, of National Engineering Handbook, Chapter 7 Hydrologic Soils Groups, May 2007.
4. *Schaaf & Wheeler*, Zone 9 and Reclamation Ditch Drainage System Operations Study, May 1999.

APPENDIX A – FEMA Correspondence

Michael Baker Jr. Inc.
FEMA Engineering Library
847 South Pickett Street
Alexandria, Virginia 22304

February 19, 2014

IN REPLY REFER TO:
Request No.: B1409069

Alexander MA
Wood Rodgers, Inc.
180 Grand Ave., Suite 400
Oakland CA 94612

Dear Mr. MA,

This is in response to your February 18, 2014, letter requesting FEMA back up data for Local Flooding in City of Seaside, Monterey County, CA. The area you have requested is designated as Zone A on the Flood Insurance Rate Map. The Zone A designation identifies areas having a one-percent chance of being equaled or exceeded in any given year (base flood) that is determined by approximate methods. There is no detailed modeling for this area. Please go to www.FEMA.gov and obtain a copy of the FEMA publication "Managing Floodplain Development in Approximate Zone A Areas". This will help you in developing the base flood elevations for the Zone A area. Thank you for your request and we look forward to serving you again in the future

If you have any questions regarding your request or this letter please contact me by telephone at (703) 212-4049, or by electronic mail at alan.mejia@riskmapcds.com

Sincerely,

Alan Mejia
FEMA Engineering Library

APPENDIX B – Vertical Datum Conversion

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 36.636854

Longitude: 121.798349

NGVD 29 height: 470.1

Datum shift(NAVD 88 minus NGVD 29): 0.848 meter

Converted to NAVD 88 height: 470.948 meters

APPENDIX C – Precipitation Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Seaside, California, US*
Coordinates: 36.6298, -121.7840
Elevation: 380 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.132 (0.115-0.153)	0.161 (0.140-0.186)	0.202 (0.175-0.235)	0.239 (0.205-0.280)	0.294 (0.243-0.360)	0.341 (0.274-0.428)	0.393 (0.307-0.508)	0.452 (0.342-0.604)	0.542 (0.390-0.760)	0.619 (0.428-0.905)
10-min	0.189 (0.165-0.219)	0.230 (0.200-0.267)	0.289 (0.251-0.337)	0.342 (0.294-0.402)	0.421 (0.348-0.515)	0.489 (0.393-0.613)	0.564 (0.441-0.728)	0.648 (0.490-0.866)	0.776 (0.559-1.09)	0.887 (0.614-1.30)
15-min	0.229 (0.200-0.265)	0.278 (0.242-0.323)	0.350 (0.303-0.407)	0.414 (0.355-0.486)	0.509 (0.420-0.623)	0.591 (0.476-0.742)	0.682 (0.533-0.881)	0.784 (0.593-1.05)	0.939 (0.676-1.32)	1.07 (0.742-1.57)
30-min	0.325 (0.284-0.377)	0.396 (0.344-0.459)	0.497 (0.431-0.578)	0.588 (0.505-0.691)	0.724 (0.598-0.886)	0.840 (0.676-1.05)	0.969 (0.757-1.25)	1.11 (0.843-1.49)	1.33 (0.961-1.87)	1.52 (1.05-2.23)
60-min	0.418 (0.365-0.485)	0.509 (0.443-0.590)	0.639 (0.555-0.744)	0.756 (0.650-0.889)	0.931 (0.769-1.14)	1.08 (0.870-1.36)	1.25 (0.974-1.61)	1.43 (1.08-1.92)	1.72 (1.24-2.41)	1.96 (1.36-2.87)
2-hr	0.594 (0.518-0.688)	0.722 (0.628-0.837)	0.902 (0.783-1.05)	1.06 (0.912-1.25)	1.29 (1.07-1.58)	1.49 (1.20-1.87)	1.70 (1.33-2.20)	1.94 (1.47-2.59)	2.29 (1.65-3.21)	2.59 (1.79-3.78)
3-hr	0.733 (0.640-0.849)	0.893 (0.777-1.03)	1.12 (0.969-1.30)	1.31 (1.13-1.54)	1.59 (1.32-1.95)	1.83 (1.47-2.30)	2.08 (1.63-2.69)	2.37 (1.79-3.16)	2.78 (2.00-3.90)	3.13 (2.16-4.57)
6-hr	0.975 (0.851-1.13)	1.20 (1.04-1.39)	1.50 (1.30-1.75)	1.76 (1.52-2.08)	2.15 (1.77-2.63)	2.46 (1.98-3.08)	2.79 (2.18-3.61)	3.16 (2.39-4.22)	3.69 (2.66-5.18)	4.14 (2.86-6.04)
12-hr	1.22 (1.06-1.41)	1.51 (1.31-1.75)	1.92 (1.66-2.23)	2.27 (1.95-2.66)	2.77 (2.29-3.39)	3.18 (2.56-4.00)	3.63 (2.83-4.68)	4.11 (3.11-5.49)	4.81 (3.46-6.75)	5.39 (3.73-7.88)
24-hr	1.60 (1.47-1.78)	2.02 (1.84-2.25)	2.59 (2.36-2.90)	3.08 (2.79-3.47)	3.79 (3.33-4.38)	4.36 (3.77-5.14)	4.97 (4.22-5.98)	5.64 (4.67-6.95)	6.60 (5.28-8.42)	7.40 (5.74-9.72)
2-day	2.02 (1.84-2.25)	2.56 (2.34-2.85)	3.29 (3.00-3.68)	3.91 (3.54-4.40)	4.78 (4.21-5.54)	5.48 (4.75-6.46)	6.22 (5.28-7.49)	7.01 (5.81-8.64)	8.14 (6.51-10.4)	9.06 (7.03-11.9)
3-day	2.30 (2.10-2.56)	2.93 (2.68-3.27)	3.77 (3.44-4.22)	4.47 (4.05-5.04)	5.45 (4.80-6.32)	6.23 (5.40-7.35)	7.05 (5.98-8.48)	7.91 (6.55-9.74)	9.12 (7.29-11.6)	10.1 (7.84-13.3)
4-day	2.52 (2.31-2.82)	3.23 (2.95-3.60)	4.15 (3.79-4.64)	4.92 (4.46-5.54)	5.99 (5.28-6.94)	6.83 (5.91-8.05)	7.70 (6.53-9.27)	8.62 (7.14-10.6)	9.90 (7.92-12.6)	10.9 (8.48-14.4)
7-day	3.09 (2.83-3.45)	3.97 (3.63-4.43)	5.11 (4.66-5.71)	6.04 (5.47-6.81)	7.32 (6.45-8.48)	8.32 (7.20-9.81)	9.35 (7.93-11.2)	10.4 (8.63-12.8)	11.9 (9.52-15.2)	13.1 (10.2-17.2)
10-day	3.48 (3.19-3.88)	4.48 (4.10-5.00)	5.78 (5.27-6.46)	6.83 (6.18-7.69)	8.25 (7.27-9.56)	9.35 (8.09-11.0)	10.5 (8.88-12.6)	11.6 (9.64-14.3)	13.2 (10.6-16.9)	14.5 (11.3-19.1)
20-day	4.54 (4.15-5.06)	5.87 (5.36-6.55)	7.55 (6.89-8.45)	8.90 (8.06-10.0)	10.7 (9.41-12.4)	12.0 (10.4-14.2)	13.4 (11.3-16.1)	14.7 (12.2-18.2)	16.6 (13.3-21.2)	18.0 (14.0-23.7)
30-day	5.53 (5.06-6.16)	7.15 (6.54-7.99)	9.19 (8.38-10.3)	10.8 (9.77-12.1)	12.9 (11.3-14.9)	14.4 (12.5-17.0)	15.9 (13.5-19.2)	17.5 (14.5-21.5)	19.5 (15.6-24.9)	21.1 (16.4-27.7)
45-day	6.88 (6.30-7.68)	8.88 (8.12-9.92)	11.4 (10.4-12.7)	13.3 (12.0-14.9)	15.7 (13.8-18.2)	17.5 (15.1-20.6)	19.2 (16.3-23.2)	21.0 (17.4-25.8)	23.2 (18.6-29.7)	25.0 (19.4-32.8)
60-day	8.17 (7.47-9.11)	10.5 (9.59-11.7)	13.3 (12.2-14.9)	15.5 (14.1-17.5)	18.3 (16.1-21.2)	20.3 (17.5-23.9)	22.2 (18.8-26.7)	24.1 (19.9-29.7)	26.5 (21.2-33.9)	28.3 (22.0-37.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

3.3 Model Data CD

3.4 Geotech Report

KLEINFELDER
Bright People. Right Solutions.

GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

Prepared For: Whitson Engineers
9699 Blue Larkspur Lane, Suite 105
Monterey, California 93940

Attention: Mr. Richard Weber

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THIS STUDY WAS PREPARED UNDER CONTRACT WITH THE FORT ORD REUSE AUTHORITY, CALIFORNIA, WITH FINANCIAL SUPPORT FROM THE OFFICE OF ECONOMIC ADJUSTMENT, DEPARTMENT OF DEFENSE. THE CONTENT REFLECTS THE VIEWS OF THE FORT ORD REUSE AUTHORITY AND DOES NOT NECESSARILY REFLECT THE VIEWS OF THE OFFICE OF ECOMOMIC ADJUSTMENT

ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.

September 17, 2010
Revised October 7, 2010
File No.: 111946

KLEINFELDER
Bright People. Right Solutions.

40 Clark Street, Suite J
Salinas, CA
93901

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f| 831.755.7909

kleinfelder.com

September 17, 2010
Revised October 7, 2010
File No.: 111946

Whitson Engineers
9699 Blue Larkspur Lane, Suite 105
Monterey, California 93940

Attention: Mr. Richard Weber

SUBJECT: Geotechnical Investigation and Percolation Testing for the Proposed California Central Coast Veterans Cemetery, State Cemetery Site, Monterey County, California

Dear Mr. Weber:

We are pleased to submit our geotechnical investigation report for the proposed California Central Coast Veterans Cemetery, State Cemetery Site in the City of Seaside and Monterey County, California. The accompanying report provides the results of our field investigation, percolation testing, laboratory testing, and engineering analyses. Geotechnical design recommendations for site earthwork, foundations, pavements, concrete slabs-on-grade, and site drainage, are presented.

Based on the results of our investigation and from a geotechnical standpoint, the site may be developed as planned provided the recommendations presented in our report are incorporated into the design and construction of the project. The primary geotechnical concerns at the site include excavation and fill stability of the on-site sandy soils and the presence of near-surface loose soil. Also of concern are areas of unexploded ordinance (UXO) where clearing has not been finalized such as under existing on-site pavements. Please refer to the report for detailed recommendations.

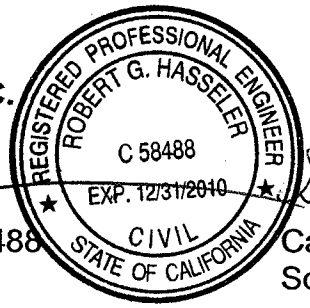
As noted in our report, Kleinfelder should be retained to review project plans and specifications prior to the start of construction, and to observe and test during earthwork and foundation construction. This will allow us to compare conditions exposed during construction with those encountered during our investigation and to present supplemental recommendations if warranted by different site conditions.

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We appreciate the opportunity of providing our services to you on this project. If any questions should arise regarding the interpretation of the contents of this report, please contact us at (831) 755-7900.

Respectfully Submitted,

KLEINFELDER WEST, INC.



Robert G. Hasseler, CE 58488
Project Engineer

Stephanie Sanchez FOR:
Catherine H. Ellis, CE, GE 2650
South Bay Area Manager

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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

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Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING PROPOSED CALIFORNIA CENTRAL COAST VETERANS CEMETERY STATE CEMETERY SITE MONTEREY COUNTY, CALIFORNIA

1. INTRODUCTION

This report presents the results of our geotechnical investigation and percolation testing for the proposed California Central Coast Veterans Cemetery (CCCVC) project on the former Fort Ord in the City of Seaside and in Monterey County, California. The approximate location of the project is shown on the Vicinity Map, Plate 1. The locations of our borings are shown on the Site Plans, Plates 2a and 2b. This geotechnical investigation and percolation testing study was performed in support of Additive Bid Item for Task 4 – Soils/hydrology testing at the approximately 80-acre State Cemetery Site, as additional deliverable for the CCCVC project. Our work was performed for the Fort Ord Reuse Authority (FORA) and Whitson Engineers.

The conclusions and recommendations presented in this report are based on the subsurface soil conditions encountered at the locations of our exploration and the provisions and requirements outlined in the Limitations section of this report. The findings, conclusions and recommendations presented herein should not be extrapolated to other areas or be used for other projects without our review.

1.1 PROJECT DESCRIPTION

The California Central Coast Veterans Cemetery Infrastructure Planning project consists of the development of preliminary infrastructure plans in support of the proposed California Central Coast Veterans Cemetery. The planning area consists of approximately 178 acres on the former Fort Ord. The study area consists of an approximately 80-acre State Cemetery site and three roadway corridors. The three roadway corridors are: the existing Parker Flats Cutoff, the existing Parker Flats Road, and the future Eastside Road (from Eucalyptus Road to Intergarrison Road).

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In support of the study, geotechnical and percolation testing was performed for the State Cemetery site and for the three roadway corridors for the development of storm water retention plans and grading plans. In addition, in support of the study, site characteristics for construction and burial and new utility construction on the State Cemetery site is needed.

Geotechnical recommendations for the three roadway corridors are presented in separate reports. In addition, utility service needs for the CCCVC and adjacent developments will be needed, but are specifically not included in Kleinfelder's scope of work. Deliverables include a separate report for the State Cemetery site and a separate report for each of the three roadway corridors (i.e. four reports). This report is for the State Cemetery Site portion of the project.

The State Cemetery site facilities will include traditional casket burial sites, casket burial sites in crypts, in-ground cremains, cremains in Columbarium wall niches, cremains in terrace niches, site buildings, parking and roads, and a storm water infiltration basin. Geotechnical considerations include site grading to prepare subgrades for engineered fills and improvements, new foundations, interior and exterior concrete slabs-on-grade, pavements, excavations for burial, excavation and backfill for site utilities, and site drainage. Other improvements will include landscaping. The site is currently occupied by the existing asphalt concrete paved roadways along the northern and southwestern sides of the State Cemetery site and undeveloped lot covered with grasses brush and scrub trees within the site. Cuts and fills are anticipated to be up to 30 feet deep in some of the off-site roadway areas to prepare the subgrade soils. Excavations for burial are anticipated to be up to 8 feet deep.

Structural loading information was not available when this investigation was completed. We have assumed column loads on the order of 50 to 200 kips of dead plus live load and wall loads on the order of 8 kips per linear foot.

If the project differs significantly from that described above, we should be contacted to review and potentially revise our recommendations.

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1.2 PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical investigation, as presented in our proposal 01202PROP (SAL10P025), dated April 28, 2010; and work order, WO-07 (Document: SAL10C025), dated April 28, 2010; was to explore and evaluate the subsurface soil conditions at the site and to provide recommendations for the geotechnical aspects of the design and construction of the proposed CCCVC improvements. After review by Whitson Engineers and discussion with us, our proposed subsurface investigation was modified. This was primarily to adjust the subsurface exploration and percolation testing coverage to better meet the designer's needs, and also to avoid drilling in areas that were off limits due to unexploded ordinance (UXO) (i.e. where UXO clearing had not been finalized). This included a prohibition on drilling through the existing site pavements. Therefore, we did not drill through the existing pavement sections, and instead drilled adjacent to the roads in the affected areas.

Our investigation was structured to perform all field work and percolation testing for the State Cemetery and three roads concurrently. Our scope of services included UXO training from Weston Solutions, Inc., for Kleinfelder staff and our vendors, a site reconnaissance by a member of our engineering staff, marking the site and notification for Underground Services Alert (USA), clearing the site with an independent utility locator Norcal Underground Locating, subsurface exploration by means of twenty-one (21) exploratory borings, and twelve (12) percolation test holes, field percolation testing, laboratory testing of selected soil samples recovered from the borings, engineering analysis, and preparation of our reports. Additionally, four (4) samples of the near-surface soils were sent to Cerco Analytical for preliminary corrosivity screening. The data obtained and the analyses performed were for the purpose of providing design and construction recommendations for earthwork, surface and subsurface drainage, building foundations (for the State Cemetery portion), excavations, and utility trench excavation and backfill, pavements, and concrete slabs-on-grade.

Environmental services such as evaluation and chemical analysis of the soil and groundwater for hazardous materials were not included in our scope of services.

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2. SITE INVESTIGATION

2.1 SITE DESCRIPTION

The California Central Coast Veterans Cemetery project site is located on the central and eastern portions of the previous Fort Ord in the City of Seaside and Monterey County, California as shown on the Vicinity Map, Plate 1. The improvement areas are depicted on the Site Plans, Plates 2a and 2b. Site surface conditions consist of asphalt concrete paved roads, unpaved trails and undeveloped land. The ground surface ranges from flat to low hills. Vegetation includes grass, weeds and scattered brush and scrub trees.

The State Cemetery Site improvements included within our study area are located on a roughly triangular shaped undeveloped lot on the former Fort Ord, in the City of Seaside, Monterey County, California. Parker Flats Cutoff is located on the southwestern border of the site, and Parker Flats Road (Normandy Road) forms the northern border of the site. The proposed Eastside Road will extend from the intersection of Parker Flats Road and Eucalyptus Road in a roughly northerly direction and intersect with Parker Flats Road on the northeastern corner of the site. The site slopes downward generally to the north and west. The site is currently an undeveloped lot covered in grass, brush and scrub trees. The Site Plan, Plate 2a shows a detail of the site and includes the locations of our borings and percolation test holes.

2.2 SUBSURFACE INVESTIGATION

Our field investigation consisted of a site reconnaissance, and a subsurface exploration program. Prior to drilling on the site we contacted Underground Service Alert (USA) and an independent locator, Norcal Underground Locating, to clear our drilling locations. The subsurface exploration program included drilling a total of twenty-one (21) exploratory borings and twelve (12) percolation test holes on July 26, through July 28, 2010, using a truck mounted B-53 drill rig equipped with 8-inch diameter hollow-stem augers and a hydraulic hammer, a minuteman portable drill rig equipped with 3½ inch solid stem augers equipped with a rope and cathead hammer, and a hand auger. The borings were drilled to depths of between about 5 to 50 feet below the

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existing ground surface. Due to limited site access two of the percolation test holes P-1 and P-2 were excavated by hand to a depth of 12 inches and a width of 12 inches using a shovel.

Our borings for the CCCVC project were numbered B-1 through B-21 and our percolation test holes were numbered P-1 through P-12. The borings pertinent to the State Cemetery Site are Boring B-1 near the intersection of Parker Flats Cutoff and Parker Flats Road, Boring B-4 off of Parker Flats Cutoff, Boring B-5 in the northeastern portion of the State Cemetery Site, Boring B-7 on the southern portion of the site, and Boring B-8 off of the proposed Eastside Road alignment. Percolation tests pertinent to the Parker Flats Cutoff are percolation test holes P-1 and P-2 on the State Cemetery site adjacent to Parker Flats Cutoff, and P-3 on the southeastern side of the site near the proposed Eastside Road.

Visual classification of the soils encountered in our exploratory borings was made in general accordance with the Unified Soil Classification System (ASTM D 2488) by our engineering staff. The results of the laboratory tests were used to refine the field classifications based on ASTM D 2487. A key for the classification of the soil is presented in Appendix A as the Boring Log Legend, Plate A-1. The logs of the borings are presented on Plates A-2 through A-22 in Appendix A.

Samples of subsurface soils were obtained from the borings as drilling progressed. Samples were obtained from the borings by driving either a 2-inch inside diameter Modified California tube sampler or a 1-3/8-inch inside diameter Standard Penetration split-spoon sampler up to a depth of 18 inches into the underlying soil with a 140-pound hydraulic hammer falling 30 inches, or bulk samples of the drilling spoils for R-value testing. The number of blows required to drive the sampler was recorded for each 6-inch penetration interval, and the number of blows required to drive the sampler the last 12 inches, is shown as blows per foot on the boring logs at the approximate sample depth. The blowcounts noted on our boring logs are field measured blowcounts and have not been corrected for energy efficiency or other parameters. The borings were backfilled with drilling spoils. The approximate locations of the borings are shown on Plates 2a and 2b. These locations were mapped using Global Positioning System (GPS) equipment, and are estimated to be accurate to approximately 20 horizontal feet.

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2.3 LABORATORY TESTING

Soil samples were obtained from the exploratory borings at selected depths. The samples were returned to our laboratory for further evaluation. Laboratory tests were performed on selected soil samples to evaluate the natural moisture content, in-place density, plasticity (Atterberg Limits), particle size analysis, direct shear, and resistance value (R-value) testing,. Most of the laboratory test results are presented on the individual boring logs. The results of the Atterberg Limits test is shown on Plate B-1, the particle size analysis test results are shown on Plates B-2and B-3, the direct shear test results are shown on Plate B-4, and the R-value test results are shown on Plates B-5 through B-8.

In addition, four (4) samples were sent to CERCO Analytical for corrosion testing. The results of the corrosivity analysis are presented in Appendix C.

2.4 SUBSURFACE CONDITIONS

The borings were drilled in undeveloped areas of the open lots along the project site. Borings were drilled adjacent to paved roadways and unpaved trails. Soils encountered across the CCCVC project site consisted of various shades of brown to gray, moist, non-plastic, poorly graded sand with silt, sand with silt, silty sand, and sandy silt to the maximum depth of exploration of about 50 feet below existing grade. Coarse grained soils were typically loose to very dense. Fine grained soils were typically hard in consistency.

Groundwater was not encountered in any of our borings drilled for this investigation to a maximum depth of about 50 feet below existing grade. It must be noted that seasonal fluctuations in the groundwater level may occur due to variations in rainfall, temperature, groundwater withdrawal, and possibly other factors that were not evident at the time of our investigation.

The above is a general description of the subsurface conditions encountered in our exploratory borings at the project site. The table below presents a summary of the borings and near-surface soils encountered. Borings B-1, B-4, B-5, B-7 and B-8 are applicable to the State Cemetery Site portion of the project. Additional information is

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provided on the Logs of Borings in Appendix A. Soil and groundwater conditions can deviate from those conditions encountered at the boring locations. Should this be revealed during construction, Kleinfelder should be notified immediately for possible revisions to the recommendation that follow.

Boring Subgrade Summary
California Central Coast Veterans Cemetery

Boring Number	Section	Location		Soil Type	R-Value*
		Latitude (Degrees North)	Longitude (Degrees West)		
B-1	Parker Flats Cutoff, Parker Flats Road & State Cemetery	36.637096	121.797791	Dark Yellow Brown SILTY SAND	(59)
B-2	Parker Flats Cutoff	36.634396	121.795824	Dark Brown SILTY SAND	(59)
B-3	Parker Flats Road	36.637805	121.794197	Dark Brown SILTY SAND	(59)
B-4	Parker Flats Cutoff & State Cemetery	36.633369	121.794166	Brown SILTY SAND	(61)
B-5	State Cemetery	36.637008	121.791745	Light Brown SILTY SAND	(61)
B-6	Parker Flats Cutoff & Eastside Road	36.629672	121.791446	Dark Brown SILTY SAND	(59)
B-7	State Cemetery	36.631802	121.790940	Poorly Graded SAND with SILT & Dark Brown SILTY SAND	(59)
B-8	Eastside Road & State Cemetery	36.636002	121.789899	Light Brown SILTY SAND	61
B-9	Parker Flats Road & Eastside Road	36.638779	121.790244	Red Brown SILTY SAND	(62)
B-10	Eastside Road	36.645885	121.780925	Light Brown SILTY SAND	66
B-11	Eastside Road	36.643789	121.783929	Red Brown SILTY SAND	(62)
B-12	Eastside Road	36.647929	121.780132	Light Brown SILTY SAND	(66)
B-13	Eastside Road	36.648597	121.773811	Red Brown SILTY SAND	(62)
B-14	Eastside Road	36.648691	121.769403	Gray Brown SILTY SAND	(66)
B-15	Eastside Road	36.650387	121.764515	Red Brown SILTY SAND	62
B-16	Eastside Road	36.652184	121.762333	Gray Brown SILTY SAND	(66)
B-17	Eastside Road	36.653911	121.760826	Gray Brown SILTY SAND	(66)
B-18	Eastside Road	36.655410	121.758021	Very Dark Brown & Red Brown SILTY SAND	(59)
B-19	Eastside Road	36.655478	121.754059	Dark Brown SILTY SAND	59
B-20	Eastside Road	36.655473	121.750100	Very Dark Brown SILTY SAND	(59)
B-21	Eastside Road	36.655407	121.746003	Dark Brown SILTY SAND	(59)

*R-Values in parenthesis are based on comparison with samples from Borings B-8, B-10, B-15 and B-19

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3. PERCOLATION TESTING

The approximate locations of the percolation test holes are shown on the Site Plans, Plates 2a and 2b. The percolation test holes were drilled to a depth of approximately 5 feet below the existing ground surface, except for percolation test holes P-1 and P-2 which were hand excavated to a depth of 12 inches below the existing ground surface. Hole depths and diameters at the time of the percolation testing are presented on the table below.

Immediately after drilling the percolation test holes, Kleinfelder installed a 3-inch diameter perforated drainpipe into the holes and backfilled the annular space with ¾ inch drain rock, except for percolation test holes P-1 and P-2 which were fitted with wooden stakes and a drain rock bedding to support rulers to measure the water depths, and percolation test hole P-8 which was fitted with a 2-inch diameter perforated drainpipe and drain rock. The percolation test holes were pre-saturated the day prior to our scheduled percolation tests. The percolation test holes were filled with water to grade when presoaked.

Percolation testing was performed on August 13, 24, and 25, 2010. A 10 minute test interval was used. The adjusted percolation test rates ranged from about 33 inches per hour to 0.7 inches per hour across the State Cemetery site and three roadway corridors. On the State Cemetery site itself, the adjusted percolation test rates ranged from about 13.6 inches per hour to 7.5 inches per hour. The table below provides a summary of the percolation test results. Percolation test holes P-1 and P-2 are applicable to the State Cemetery Site portion of the project. A record of the field measured percolation test results is located in Appendix D. The values presented in Appendix D are raw rates, uncorrected for rock, pipe and hole size. The table below presents a summary of the percolation test results with the raw and adjusted rates. The percolation tests were performed for evaluation of the storm water retention/infiltration features and should not be used for septic systems, which would require the holes to be drilled in the leach field areas under the direction of the Monterey County Environmental Heath Department. The drain pipes and stakes were removed from the percolation test holes, and the holes were backfilled with drain rock and spoils upon completion of percolation testing. Our

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scope of work was limited to field percolation testing and did not include design of the storm water retention/infiltration system.

Percolation Test Summary
California Central Coast Veterans Cemetery

Hole No.	Section	Location Latitude (Degrees North)	Location Longitude (Degrees West)	Soil Type	Hole Depth (feet)	Hole Dia. (inches)	Perc. Rate min/inch	Adjusted Perc. Rate min/inch	Adjusted Perc. Rate inch/hour
P-1	Parker Flats Cutoff & State Cemetery	36.635754	121.796814	(SM-ML)	1.0	12	4.4	4.4	13.6
P-2	Parker Flats Cutoff & State Cemetery	36.634605	121.795161	(SM-ML)	1.0	12	8.0	8.0	7.5
P-3	Eastside Road	36.632695	121.789212	(SM-ML)	5.0	8	20.0	45.3	1.3
P-4	Parker Flats Road	36.638698	121.791987	(SM)	5.0	8	4.4	10.0	6.0
P-5	Parker Flats Road & Eastside Road	36.639078	121.790234	(SM)	4.1	8	1.5	3.4	17.7
P-6	Eastside Road	36.645109	121.781575	(SM-ML)	5.0	8	40.0	90.6	0.7
P-7	Eastside Road	36.643813	121.783266	(SM)	1.2	8	8.0	18.1	3.3
P-8	Eastside Road	36.647597	121.777209	(SM)	5.0	4	7.3	14.2	4.2
P-9	Eastside Road	36.648571	121.767961	(SP-SM)	5.0	8	5.7	12.9	4.6
P-10	Eastside Road	36.655375	121.757958	(SM)	4.0	8	4.0	9.1	6.6
P-11	Eastside Road	36.655477	121.752598	(SM)	4.7	8	0.8	1.8	33.1
P-12	Eastside Road	36.655476	121.747415	(SM)	2.8	8	4.0	9.1	6.6

Notes: (SM) = Silty Sand
(SM-ML) = Sand with Silt
(SP-SM) = Poorly Graded Sand with Silt

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4. DISCUSSION AND CONCLUSIONS

Based upon the data collected during this investigation and the results of our engineering analysis, it is our opinion the site may be developed as proposed provided our recommendations are incorporated in the design and construction of the project. The opinions, conclusions and recommendations presented herein are based on our field and office studies, the properties of the soils encountered in our borings, and the results of our laboratory testing program. Geotechnical recommendations addressing site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade are presented in the remaining portions of this report.

4.1 LOOSE SOILS

Based on the results of our field exploration and laboratory testing, the near surface soils in portions of the proposed State Cemetery are loose in their current condition and could compress under the new building loads. These near surface soils should be excavated and recompacted as engineered fill to be suitable for support of structures sensitive to settlement, such as buildings. In addition, the on-site sandy soils consist of sands with little or no cohesion which are prone to sudden collapse in vertical cut areas. This could present excavation difficulties for in-ground burial areas. Excavations extending into the on-site granular soils will require substantial shoring to protect personnel and to provide temporary stability. Recommendations for excavations, subgrade preparation and engineered fill construction are presented in the section on "Earthwork," herein.

4.2 SETTLEMENT

Provided the foundations are designed and constructed in accordance with our recommendations, we estimate that total post-construction settlements will be less than about 1 inch, and post construction differential settlements will be less than about ½ inch. Dynamic compaction settlements would be in addition to the above immediate settlements and are discussed in the section on, "Liquefaction and Seismic Settlement," below.

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4.3 LIQUEFACTION AND SEISMIC SETTLEMENT

Soil liquefaction is a phenomenon in which saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure during cyclic loading such as that induced by earthquakes. The primary factors affecting the liquefaction potential of a soil deposit include: 1) intensity and duration of earthquake shaking; 2) soil type and relative density; 3) overburden pressures; and 4) depth to groundwater. Soils most susceptible to liquefaction are clean, loose, fine-grained sands, and silts that are saturated and uniformly graded. Silty sands have also been proven to be susceptible to liquefaction. Groundwater is located at least 50 feet below existing grade at the site and deeper soils were typically dense to very dense, therefore, the potential for liquefaction is considered to be low.

Dynamic compaction is the densification of granular soils as the result of earthquake shaking. This generally occurs in loose to medium dense sand above groundwater. The potential impact of dynamic compaction is settlement of the ground surface. We evaluated the potential for dynamic compaction of the sandy soils located above the groundwater elevation in the borings drilled for this study. Based on our analysis, we estimate that total and differential ground settlement as a result of dynamic compaction would be less than ½ inch.

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5. RECOMMENDATIONS

We recommend that Kleinfelder be retained to provide observation and testing services during site earthwork and foundation construction. This will allow us the opportunity to compare conditions exposed during construction with those inferred in our investigation and, if necessary, to expedite supplemental recommendations if warranted by the exposed subsurface conditions. We also recommend that Kleinfelder be retained to review your final foundation and grading plans and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings prior to the start of construction. Geotechnical recommendations addressing site preparation and grading, excavations, utility trench excavation and backfill, site drainage, building foundations, pavements, and concrete slabs-on-grade are presented herein.

5.1 EARTHWORK

5.1.1 Site Clearing and Stripping

Prior to the start of construction, obstacles and deleterious material should be removed from the construction areas. The existing asphalt concrete pavement if pulverized into fragments no larger than 2 inches in maximum size may be mixed with the underlying aggregate base and the mixture may be used as fill. Active utilities to be reused should be carefully located and protected during site clearing and construction.

All abandoned or underground utilities designated for removal, any concrete slabs-on-grade, foundations, and other obstacles and deleterious material encountered should be removed from the construction areas. Excavations from removal of foundations, underground utilities or other below ground obstructions should be cleaned of loose soil and deleterious material, and backfilled with compacted engineered fill compacted to the requirements given in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. All clearing and backfill work should be performed under the observation of a representative from Kleinfelder.

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Surface vegetation present at the time of construction should be stripped together with the organic-laden topsoil. Soils containing more than 3 percent of organic matter by weight or excessive visible organics as determined by a representative of Kleinfelder should be considered organic. The actual stripping depth should be determined at the time of construction. For planning purposes, the average stripping depth may be assumed to be approximately 3 inches in vegetated areas. Stripped material should be removed from the site or stockpiled for use in landscaping areas if approved by the project landscape architect.

5.1.2 Over-excavations

To provide adequate support for the proposed buildings and above-ground improvements, any undocumented fill and loose soils under the proposed improvements should be removed, the bottom of the excavation prepared as recommended in the section on "Subgrade Preparation," and then the excavation backfilled to finished subgrade elevation with engineered fill. Over-excavations in building and above-ground improvement areas should extend a minimum of 1 footing width below the bottoms of the proposed foundations up to a maximum of 5 feet deep under the footings, and should extend at least 5 feet horizontally beyond building perimeters (not including the construction excavation slopes, which would be additional width) and adjacent sidewalks. Excavations in pavement and in sidewalk areas not adjacent to the building pads should extend a minimum of 1 foot below the bottoms of the pavement sections or sidewalk subgrade elevation, and should extend at least 2 feet horizontally beyond the back of curb, or edge of pavements, and sidewalks unless obstructed by improvements to remain. In addition, within 5 feet horizontally of infiltration features, the bottom of the excavation should also be at least as deep as the bottom of the drain rock layer at the bottom of the infiltration feature.

After excavation is completed, the exposed subgrade should be evaluated by Kleinfelder for competency. Where competent soils are exposed, the subgrade may be prepared as recommended in the section on "Subgrade Preparation," and backfilled with engineered fill, as discussed previously. If soil conditions are soft at the bottom of the excavation, the soft material should be removed and replaced with backfill consisting of engineered fill. The overexcavation may then be backfilled with

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engineered fill. The backfill should be compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E.

5.1.3 Subgrade Preparation

Upon completion of site clearing and excavations, the exposed soil subgrades should be properly prepared prior to placement of fill or other construction activities. In areas to receive engineered fill or concrete slabs-on-grade, the upper 12 inches of soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. For the proposed buildings, the areas to be processed should include the entire building pads, extending no less than 5 feet beyond the limits of the buildings and any adjoining sidewalk areas. In exterior walkways not adjacent to building areas, and in pavement areas, subgrade preparation should extend laterally no less than 2 feet beyond the back of curb, or edge of pavements, and sidewalks unless obstructed by improvements to remain. After the subgrades are properly prepared, the areas may be raised to design grades by placement of engineered fill.

All loose or wet subgrade soil encountered during construction should be stabilized prior to placement of new fill and further construction. The method of stabilization should be evaluated by a representative of Kleinfelder at the time of construction depending on the exposed conditions. Moisture conditioning of subgrade and fill soils will consist of adding water if the soils are too dry and allowing the soils to dry if the soils are too wet.

5.1.4 Material for Fill

Inorganic on-site or imported soils approved by a representative of Kleinfelder may be used as engineered fill. Inorganic soils may be defined as soils containing less than 3 percent of organic matter by weight or free of visible organic matter deemed excessive by a representative of Kleinfelder. In general, material for use as engineered fill should be free of deleterious or oversized material, debris, or hazardous substances; should not contain rocks or lumps larger than 3 inches in greatest dimension; should not contain more than 15 percent of material larger than 1½ inches; and should contain sufficient fines (8% to 40% fines) to allow excavations to be made without caving.

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Imported soils should be "non-expansive" and meet the above requirements, should be predominantly granular, and should have a plasticity index of 15 or less.

All proposed import fill must be approved by the project geotechnical engineer prior to delivery to the site. At least five (5) working days prior to importing to the site, a representative sample of the proposed import fill should be delivered to our laboratory for evaluation and possible testing.

5.1.5 Fill Placement and Compaction

Fill materials should be placed and compacted in horizontal lifts, each not exceeding 8 inches in uncompacted thickness. Compaction of fill should be performed by mechanical means only. Due to equipment limitations, thinner lifts may be necessary to achieve the recommended level of compaction. Relative compaction or compaction is defined as the in-place dry density of the compacted soil divided by the laboratory-compacted maximum dry density as determined by ASTM Test Method D 1557 (latest edition), expressed as a percentage. A summary of our compaction recommendations is included in Appendix E.

Permanent cut slopes should be constructed no steeper than 3:1 (horizontal:vertical).

Permanent fill slopes should be fully keyed and benched into the back slope. Fill slopes should be keyed at least 8 feet width and 2 feet deep below adjacent grade. The bottom of the keyway should be sloped at least 2 percent downwards back into the slope. Benches should be level or slope back into the back slope and should be no more than 3 feet in vertical separation and wide enough to allow compaction equipment. All fill slopes to be compacted to 95 percent relative compaction full height. Compacted engineered fill for slopes shall have a minimum remolded cohesion of 100 pounds per square foot and a minimum remolded phi angle of 32 degrees. Fill slopes that are at least 3:1 (Horizontal: Vertical) or flatter may be constructed up to 35 feet in height. If higher slopes are planned, Kleinfelder should be consulted for additional recommendations. Fill slopes that are up to 2:1 (Horizontal: Vertical) may be constructed up to 20 feet in height in building areas and up to 30 feet in height for road embankments. If 2:1 (Horizontal: Vertical) fill slopes are planned that are higher than this, they will need to be reinforced with Mirafi 2XT geogrid or equivalent extending at

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least 25 feet back into the embankment, starting at the toe of the embankment and at a minimum of 4 feet vertical spacing for the full embankment height. This is due to the physical characteristics of the on-site sandy soils. Alternatively, consideration may be given to the use of import fill materials with better characteristics, or treatment of the on-site soils with cement to improve the soil's strength. Some surficial slumping will occur; proper erosion control and timely maintenance will need to be mandatory. Setback distances are essential and are generally based on slope height and the sensitivity of the structure (building or road). Kleinfelder should perform a detailed review, if the proximity of the structure (from the improvement to the top of the slope) is less than the slope height.

Maximum Recommended Embankment Fill Heights
California Central Coast Veterans Cemetery

Slope (Horizontal :Vertical)	Reinforcement	Building Areas	Roadway Embankments
3:1	Unreinforced	Up to 35 feet	Up to 35 feet
2:1	Unreinforced	Up to 20 feet	Up to 30 feet
	Reinforced	Over 20 feet and up to 35 feet	Over 30 feet and up to 35 feet

1) All fill slopes to be compacted to 95 percent relative compaction full height. Compacted engineered fill for slopes shall have a minimum remolded cohesion of 100 pounds per square foot and a minimum remolded phi angle of 32 degrees. Some surficial slumping will occur and periodic maintenance will be required.
2) Reinforcement to consist of Mirafi 2XT geogrid or equivalent extending at least 25 feet back into the embankment, starting at the toe of the embankment and at a minimum of 4 feet vertical spacing for the full embankment height.

Grading operations during the wet season or in areas where the soils are saturated may require provisions for drying prior to compaction. If the project necessitates fill placement and compaction in wet conditions, Kleinfelder can provide alternatives for drying the soil. Conversely, additional moisture may be required during the dry months. Water trucks should be available in sufficient number to provide adequate watering during subgrade preparation, fill placement and compaction.

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5.1.6 Excavations and Utility Trench Backfill

Excavations for utility trenches and foundations, as well as excavations for in-ground burial, should be readily made with either a conventional backhoe or excavator. The on-site soil consists of sands with little or no cohesion which are prone to sudden collapse. Excavations extending into the on-site granular soils will require substantial shoring to protect personnel and to provide temporary stability. Alternatively, temporary trenches may be constructed using sloping trench sidewalls. Sloping trench sidewalls should be constructed no steeper than 1.5:1 (horizontal: vertical). In addition, excavations should be located so that no structures are located above a plane project 1.5 horizontal to 1 vertical upward from any point in an excavation, regardless of whether it is shored or unshored. Trench stability should be evaluated prior to occupation by construction personnel. All trenches should be constructed in accordance with OSHA and Cal-OSHA Safety Standards. Safety in and around utility trenches is the responsibility of the underground contractors.

Since groundwater is at least 50 feet below existing grade, we do not anticipate the need for extensive dewatering of excavations. Wet weather can impact construction, especially where on-site soils have been compacted or where imported material is used. Please see the section on "Wet Weather Construction." If different soil or groundwater conditions are encountered during construction than those encountered during our subsurface exploration, Kleinfelder should be contacted to provide additional recommendations.

Utility trench pipe zone backfill, extending from the bottom of the trench to at least 1 foot above the top of pipe, should consist of free-draining sand unless lean concrete is specified. This may consist of on-site poorly graded sand with silt soils, provided the owner is willing to accept a slightly higher than standard silt content for the bedding and shading sand. Above the pipe zone, underground utility trenches should be backfilled with compacted engineered fill. Either approved on-site soil or imported sand may be used for backfilling utility trenches. Trench backfill should be capped with at least 12 inches of compacted, on-site soil similar to that of the adjoining subgrade. A summary of our compaction recommendations is included in Appendix E. Compaction should be performed by mechanical means only. Water-jetting or flooding to attain compaction of backfill should not be permitted.

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5.1.7 Surface Drainage

Final site grading should provide surface drainage away from existing and new buildings, concrete slabs-on-grade and pavements to reduce the percolation of water into the underlying soils. Ponding of surface water should not be allowed adjacent to structures and on exterior flatwork and pavements. The ground surface should be sloped away from the buildings a minimum of 4 percent in landscaped areas and 2 percent in paved areas. Rainwater collected on the roofs of buildings should be transported through gutters, downspouts and closed pipes, which discharge on pavements or lead directly to the site storm sewer system. If discharging onto the pavement, safety of pedestrian traffic should be considered.

On-site soils are highly erodible and should be planted with erosion resistant vegetation as soon as practicable. The erosion control vegetation should be planted early enough before the winter rainy season to allow the vegetation to take root before the rainy season. Ground cover will require periodic maintenance and a maintenance schedule should be developed. Specific details regarding erosion control should be determined by the Civil Engineer.

5.1.8 Seepage Control

We do not anticipate any significant seepage problems due to the porous sandy nature of the on-site soils, provided water is not allowed to pond near proposed pavements, foundations and slabs-on-grade. Features that do not impound water for extended periods of time, such as drainage swales or where water sheets over embankments do not require setbacks from road areas provided they drain away from the pavements and do not trap water adjacent to the pavements. However, water erosion of such features will need to be addressed. We also understand that several storm water retention/infiltration features are planned for the project. These features will act as impoundment areas for on-site storm water and water will concentrate in these areas for extended time periods. We recommend that these features be located to minimize the impact of the storm water on the nearby pavements and foundations. To minimize impact on pavements, we recommend infiltration features be located with the pavement soil subgrade elevation (i.e. bottom of the aggregate base layer, or the bottom of the asphalt concrete layer where aggregate base is not used) located at least 2 feet above

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a plane projected 5:1 (horizontal: vertical) downward from the highest retained water elevation (design water surface) of the adjacent impoundment area. Assuming level ground we anticipate that this would result in off sets of about 10 to 15 feet from the pavements, or closer where the bottoms of the features are excavated or lowered below the adjacent grade. To minimize impact on foundations, we recommend infiltration features be located so that the bottoms of the footings are at least 1 footing width or at least 2 feet, whichever is greater length, above a plane projected 5:1 (horizontal:vertical) downward from the highest retained water elevation (design water surface) of the adjacent impoundment area.

In areas of the site where infiltration features must be located adjacent to areas of extended flat pavements, such as in parking areas with bioswales, consideration should be given to deepening curbs at the edges of the infiltration features to the bottom of the drain rock layer. This will reduce the potential for rotation of the curb at the edge of the feature due to infiltrating water softening the supporting soils.

5.1.9 Wet Weather Construction

If site grading and construction is to be performed during or shortly after the winter rainy months, the owner and contractors should be fully aware of the potential impact of wet weather. Rainstorms can cause delay to construction and damage to previously completed work, such as saturating a compacted pad or subgrade, or flooding an excavation. Runoff can also cause erosion.

Earthwork during rainy months will require extra effort and caution by the contractors. The soils may be too wet to compact which will require processing to dry the soil. The grading contractor should be responsible to protect his work to avoid damage by rainstorms, including smooth rolling to seal off a pad or subgrade surface to facilitate drainage and to reduce rain damage, and covering the trenches with plastic sheeting. Ponded water should be pumped out immediately. Construction in wet weather, if a possibility for project construction, should be addressed in the project construction bid documents and/or specifications. We recommend the grading contractor submit a wet weather construction plan outlining procedures they will employ to protect their work and to reduce damage to their work by rainstorms.

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5.1.10 Construction Observation

Variations in soil types and conditions are possible and may be encountered during construction. In order to permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, we recommend that Kleinfelder be retained to provide observation and testing services during site earthwork and foundation construction. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to expedite supplemental recommendations if warranted by the exposed conditions. All earthwork should be performed in accordance with the recommendations presented in this report, or as recommended by Kleinfelder during construction. Kleinfelder should be notified at least two working days prior to the start of construction and prior to when observation and testing services are needed.

We also recommend that Kleinfelder be retained to review your final foundation and grading plans and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings prior to the start of construction.

5.2 STRUCTURE FOUNDATIONS

5.2.1 Spread Footings

The proposed buildings may be supported on continuous and/or isolated spread footings bearing on engineered fill prepared as discussed in the section on "Over-excavations." Footings should be embedded at least 18 inches below pad grade or lowest adjacent finished grade, whichever provides a deeper embedment. Footings may be designed for an allowable bearing pressure of 2,500 pounds per square foot due to dead plus live loads, with a one-third increase when including transient loads such as seismic or wind. Continuous footings should have a minimum width of 12 inches. Isolated spread footings should have a minimum width of 24 inches.

To maintain the desired support, footing foundations adjacent to utility trenches or other existing footings should be deepened during the design of the project so that their bearing surfaces are below an imaginary plane having an inclination of 1.5 horizontal to

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1 vertical, extending upward from the bottom edge of the adjacent footings or utility trenches.

It is important that foundation excavations not be allowed to dry before placement of concrete. The excavations should be thoroughly moisture-conditioned prior to placement of concrete. It is also important that the base of excavations not be allowed to become excessively wet, which may result in soft soils. Water should not be allowed to pond in the bottom of foundation excavations. Areas which become water damaged should be over-excavated to a firm base. The foundation excavations should be monitored by a representative of Kleinfelder for compliance with appropriate moisture control and to confirm that the soils at the bearing level are similar to those contemplated at the time this report was prepared.

5.2.2 Lateral Load Resistance

Lateral loads may be resisted by a combination of friction between the foundation bottom and the supporting engineered fill subgrade and passive resistance of the engineered fill acting against the vertical faces of the foundations. An allowable coefficient of friction of 0.45 between the foundation and supporting subgrade may be used. For calculating passive resistance, an allowable equivalent fluid weight of 400 pounds per cubic foot acting against the footings may be used. The passive pressure can be assumed to act starting at the top of the lowest adjacent grade in paved areas and at a depth of 1 foot below grade in unpaved areas. It should be noted that the lateral load resistance values discussed above are only applicable where the concrete for footings is either placed directly against undisturbed engineered fill soils or the voids created from the use of forming are backfilled with properly compacted soil.

5.2.3 Drilled Pier Foundations

Drilled, cast-in-place, reinforced concrete piers may be used to support awnings, light standards, or other light weight exterior structures. Drilled piers may be designed to derive their vertical supporting capacity by end bearing. For dead plus live loading, a net allowable end bearing capacity of 5,000 pounds per square foot due to dead plus live loads may be used. The allowable end bearing capacity may be increased by one-third by the structural engineer when considering transient loads such as seismic or

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wind loads. Drilled piers should be at least 12 inches in diameter and at least 10 feet in depth below lowest adjacent finish grade to penetrate the loose near-surface soils. Drilled piers should be located no closer together than three pier diameters, center-to-center.

For calculation of resistance to lateral loads using the balance of force and moment method, an allowable lateral passive resistance of 400 pcf effective fluid weight acting over 1.5 pier diameters may be used. The structural engineer should determine the actual embedded depth based on the lateral loads transmitted to the foundations.

5.3 SEISMIC CONSIDERATIONS - 2007 CBC

The site is located in the seismically active Monterey Bay area, but not within any of the Alquist-Priolo Earthquake Fault Zones established by the Alquist-Priolo Earthquake Fault Zoning Act of 1972. Therefore, the risk of ground rupture occurring across the site is low.

The known active faults that are close to the site include: the Rinconada fault, which is located approximately 5 kilometers (km) northeast of the site; the Monterey Bay-Tularcitos fault which is located approximately 8 km southwest of the site; the San Gregorio-Palo Colorado (Sur Region) fault which is located approximately 22 km southwest of the site; the Zayante-Vergeles fault which is located approximately 25½ km northeast of the site; and the San Andreas fault (Pajaro), which is located approximately 32 km northeast of the site. A major seismic event on these faults could cause severe ground shaking at the site. Some degree of structural damage due to stronger seismic shaking should be expected, but the risk can be reduced through adherence to seismic design codes. As a result, structures to be constructed on the site should be designed in accordance with applicable seismic provisions contained in the 2007 California Building Code (CBC).

The Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (S_S and S_1) were estimated using Section 1613.5 of 2007 CBC and the ground motion parameter calculator developed by the U.S. Geological Survey. The mapped acceleration values and associated soil amplification

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factors (F_a and F_v) based on 2007 CBC are presented in the table below. Corresponding design spectral accelerations (S_{DS} and S_{D1}) are also presented in the table below.

SEISMIC PARAMETERS BASED ON 2007 CBC – SITE CLASS D

Parameter	Value	2007 CBC Reference
S_S	1.283g	Section 1613.5.1
S_1	0.557g	Section 1613.5.1
F_a	1.0	Table 1613.5.3(1)
F_v	1.5	Table 1613.5.3(2)
S_{MS}	1.283g	Section 1613.5.3
S_{M1}	0.835	Section 1613.5.3
S_{DS}	0.855	Section 1613.5.4
S_{D1}	0.577	Section 1613.5.4

According to Section 1802.2.7 of 2007 CBC, PGA can be estimated using a site-specific study. Alternately, PGA can be taken as $S_{DS}/2.5$, where S_{DS} is determined using Section 1613. Therefore, a PGA of 0.34g can be used.

5.4 SLABS-ON-GRADE

Concrete slabs-on-grade for this project will include the building floor slabs and exterior flatwork. New concrete slabs-on-grade should be supported on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation."

5.4.1 Building Floor Slabs

In cases where the floors will be surfaced by moisture sensitive coverings, concrete floors should be supported on at least 6 inches of angular gravel or crushed rock to enhance subgrade support for the slab. The capillary break material should be 3/4-inch maximum size with no more than 10 percent by weight passing the #4 sieve. Slabs-on-grade supported on at least 6 inches of angular gravel or crushed rock may be designed using a modulus of subgrade reaction (K_{V1}) of 200 pounds per cubic inch. A

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vapor retarder should be placed between the bottom of the slab and capillary break material to reduce the potential impact of future introduced moisture.

Alternatively, in cases where the floors will not be surfaced by moisture sensitive coverings, the concrete floors may be supported directly on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation." Slabs-on-grade supported as described above may be designed using a modulus of subgrade reaction (K_{V1}) of 170 pounds per cubic inch. A vapor retarder should be placed between the bottom of the slab and subgrade soils to reduce the potential impact of future introduced moisture.

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this subsurface moisture will collect. To reduce the impact of the subsurface moisture and potential impact of future introduced moisture (such as landscape irrigation or precipitation) the current industry standard is to place a vapor retarder on the compacted crushed rock layer. This membrane typically consists of visqueen or polyvinyl plastic sheeting at least 10 mil in thickness. It should be noted that although vapor barrier systems are currently the industry standard, this system may not be completely effective in preventing floor slab moisture problems. These systems typically will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels be appropriate to inhibit mold growth. The design and construction of such systems are totally dependent on the proposed use and design of the proposed building and all elements of building design and function should be considered in the slab-on-grade floor design. Building design and construction have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may produce excessive moisture in a building and affect indoor air quality.

Various factors such as surface grades, adjacent planters, the quality of slab concrete and the hydraulic conductivity of the on-site soils affect slab moisture and can control future performance. In many cases, floor moisture problems are the result of either improper curing of floors slabs or improper application of flooring adhesives. We recommend contacting a flooring consultant experienced in the area of concrete slab on-grade floors for specific recommendations regarding your proposed flooring applications.

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Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) manual.

It is emphasized that we are not floor moisture proofing experts. We make no guarantee nor provide any assurance that use of capillary break/vapor retarder system will reduce concrete slab-on-grade floor moisture penetration to any specific rate or level, particularly those required by floor covering manufacturers. The builder and designers should consider all available measures for floor slab moisture protection.

5.4.2 Exterior Concrete Slabs-On-Grade

New exterior concrete slabs-on-grade may be supported directly on properly prepared subgrade soils as discussed in the section on "Subgrade Preparation." Slabs-on-grade supported as described above may be designed using a modulus of subgrade reaction (K_{V1}) of 170 pounds per cubic inch. Exterior concrete slabs-on-grade exposed to more than occasional light vehicle traffic should be designed as rigid pavements.

5.5 PAVEMENT RECOMMENDATIONS

5.5.1 New Flexible Pavements

Flexible pavements for this project are expected to consist of site access roads and parking areas for the State Cemetery Site. Resistance (R)-value tests were performed on four (4) bulk samples of the near surface soil collected from the CCCVC site during our field investigation. The results of our laboratory testing indicate R-values of between 59 and 66. A design R-value of 60 was used to develop the recommended pavement sections presented in the Table below. Note that Caltrans "Highway Design Manual" typically limits the R-Value to 50 (Section 614.3 "California R-Value"). Based on our experience and other geotechnical investigations in the site vicinity, we recommend using a design R-Value of 60. The design is based on the Caltrans design

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method, which includes a factor of safety applied to the asphalt thickness. Based on our experience with similar projects, we have provided a typical range of Traffic Indices for evaluation. Based on our experience with similar projects, we suggest using a Traffic Index (TI) of at least 4.5 for automobile parking areas, a TI of at least 5.5 for automobile and light truck traffic lanes, and a TI of at least 6.5 for garbage truck areas. However, the design traffic index should be determined by the project Civil Engineer. For heavy vehicle areas, a minimum asphalt concrete section of 3 inches is recommended.

Flexible Pavement Sections
Asphalt Concrete Pavement Design
State Cemetery Site
California Central Coast Veterans Cemetery
R-Value = 60

Traffic Index (TI)	Alternative 1 (Full Depth Asphalt Concrete)	Alternative 2 (Asphalt Concrete and Class 2 Aggregate Base)	
	AC (inches)	AC (inches)	AB (inches)
4.5	3.5	2.5	4.0
5.0	4.0	2.5	4.0
5.5	4.5	3.0	4.0
6.0	5.0	3.0	4.0
6.5	6.0	3.5	4.0
7.0	6.0	4.0	4.0
7.5	7.0	4.5	4.0
8.0	7.5	4.5	4.0
8.5	8.0	5.0	4.0
9.0	8.5	5.5	4.0
9.5	9.5	6.0	4.0
10.0	10.0	6.0	4.0
10.5	11.0	6.5	4.5
11.0	11.5	7.0	4.5
11.5	12.0	7.5	5.0
12.0	12.5	7.5	5.5

Notes: Thicknesses shown are in inches.
AC = Type A or B Asphalt Concrete
AB = Aggregate Base (Minimum R-Value = 78)

The anticipated traffic and the alternate pavement sections presented above should be reviewed by the project civil engineer in consultation with the owner during the development of the final grading and paving plans. We have made our pavement designs based on the pavement subgrade soil consisting of existing on-site native materials consisting of silts with various amounts of sand. If site grading exposes soil other than that utilized in our analysis, we should perform additional tests to confirm or

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revise the recommended pavement sections to reflect the actual field conditions. Note that on-site aggregate base materials are expected to be reusable as aggregate base under new pavement areas. If it is desired to reuse these materials as aggregate base or subbase, these materials should be tested for suitability based on Caltrans standards for aggregate base or subbase.

The upper 12 inches of exposed subgrade soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. Compacted pavement subgrade should be non-yielding. Removal and subsequent replacement of some material (i.e., areas of excessively wet materials, unstable subgrade, or pumping soils) may be required to obtain the required compaction.

Asphalt concrete should meet the requirements for 1/2- or 3/4-inch maximum, medium Type A or Type B asphalt concrete in vehicle areas. Asphalt concrete should comply with the specifications presented in Section 39 of the Caltrans Standard Specifications, latest edition. Class 2 aggregate base materials should conform to Section 26 of the Caltrans Standard Specifications, latest edition. Class 2 aggregate base and aggregate subbase materials should be compacted to at least 95 percent relative compaction at near the optimum moisture content. Asphalt concrete should be compacted to a minimum of 96 percent of the maximum laboratory compacted (Hveem) unit weight. ASTM test procedures should be used to assess the percent relative compaction of the pavement subgrade soils, aggregate base and asphalt concrete.

Pavement surface should be sloped at a minimum of 2 percent and drainage gradients maintained to carry all surface water off the site due to the slightly porous or permeable nature of asphalt concrete. Surface water ponding should not be allowed anywhere on the site during or after construction.

5.5.2 Rigid Concrete Pavements

Rigid pavements consisting of Portland cement concrete may be considered for use along portions of the project. We understand that Portland cement concrete pavements will be limited to approaches and aprons at driveways, or limited areas of flatwork subject to vehicle traffic.

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The upper 12 inches of exposed subgrade soil should be scarified, moisture conditioned and compacted as recommended in the "Summary of Compaction Recommendations," in Exhibit 1 of Appendix E. Compacted pavement subgrade should be non-yielding. Portland cement concrete pavements should be supported on a minimum of 6 inches of Class 2 aggregate base compacted to at least 95 percent relative compaction at near the optimum moisture content.

Using the results of our laboratory R-value test and the Portland Cement Association Simplified Design Procedure; we recommend the use of a minimum concrete pavement thickness of 5.5 inches in areas subjected to frequent heavy truck traffic; and 4.5 inches in areas where only light cars and pickup trucks, or infrequent truck traffic will occur. Our design is based on a modulus of subgrade reaction of 200 pci at the top of a 6-inch layer of aggregate base, with doweled joints or aggregate-interlock joints, with a concrete shoulder or curb, and a modulus of rupture for the concrete of 600 pounds per square inch. If there is no concrete shoulder or curb, the above recommended minimum concrete pavement thicknesses should each be increased by 1 inch. It should be noted that the modulus of rupture for concrete is based on flexural strength, not compressive strength, and should be specified accordingly. Concrete with a compressive strength of 3,000 psi is not expected to provide the desired flexural strength. Our experience is that the compressive strength will be on the order of 4,500 to 5,000 psi to achieve the required flexural strength. Laboratory testing to evaluate the design strength is recommended. Alternatives to this design may be considered, based on the final design of the site grading plans and more accurate traffic data.

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6. LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

The scope of services was limited to site reconnaissance and subsurface exploration by means of twenty-one (21) exploratory borings and twelve (12) percolation test holes. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on subsurface exploration including borings drilled to a maximum depth of about 50 feet, laboratory testing of soil moisture and dry density, plasticity, particle size analysis, direct shear, and resistance value (R-value) testing, and our geotechnical engineering analyses.

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Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil, rock or groundwater conditions could vary between or beyond the points explored. If soil, rock or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated structural loads, and the design depths or locations of the foundations, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

As the Geotechnical Engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project, and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify our recommendations if variations in the soil conditions are encountered. As a minimum Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications;

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- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, pavements, storm water retention, slabs-on-grade, cuts and placement of engineered fill;
- Confirm engineered fill for the structures, pavements, and other improvements is placed and compacted per the project specifications; and
- Observe foundation bearing soils to confirm conditions are as anticipated.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

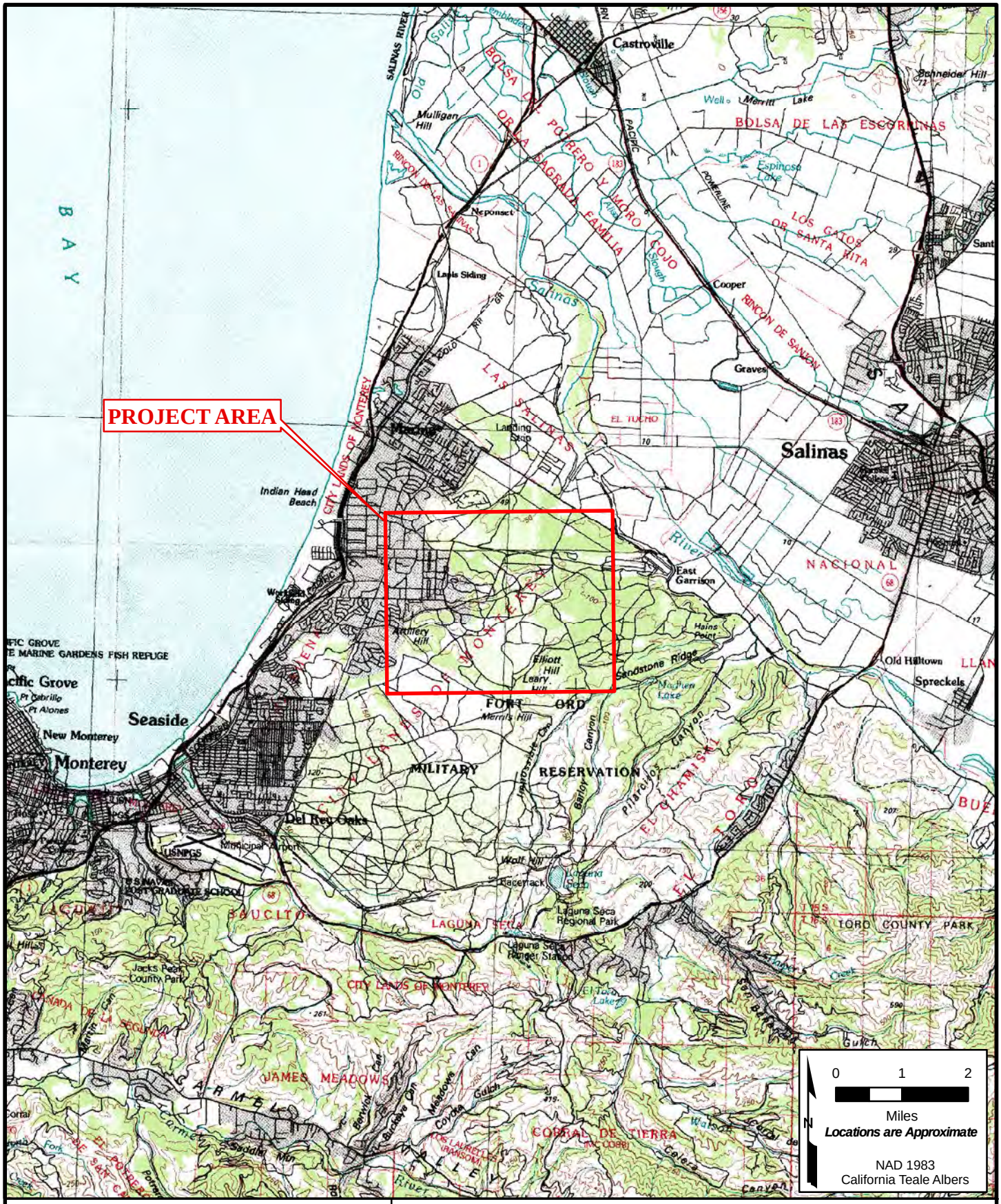
Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, cuts and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil, rock and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that

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Kleinfelder's Geotechnical Engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. Furthermore, the contractor should be prepared to handle contamination conditions if encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers.

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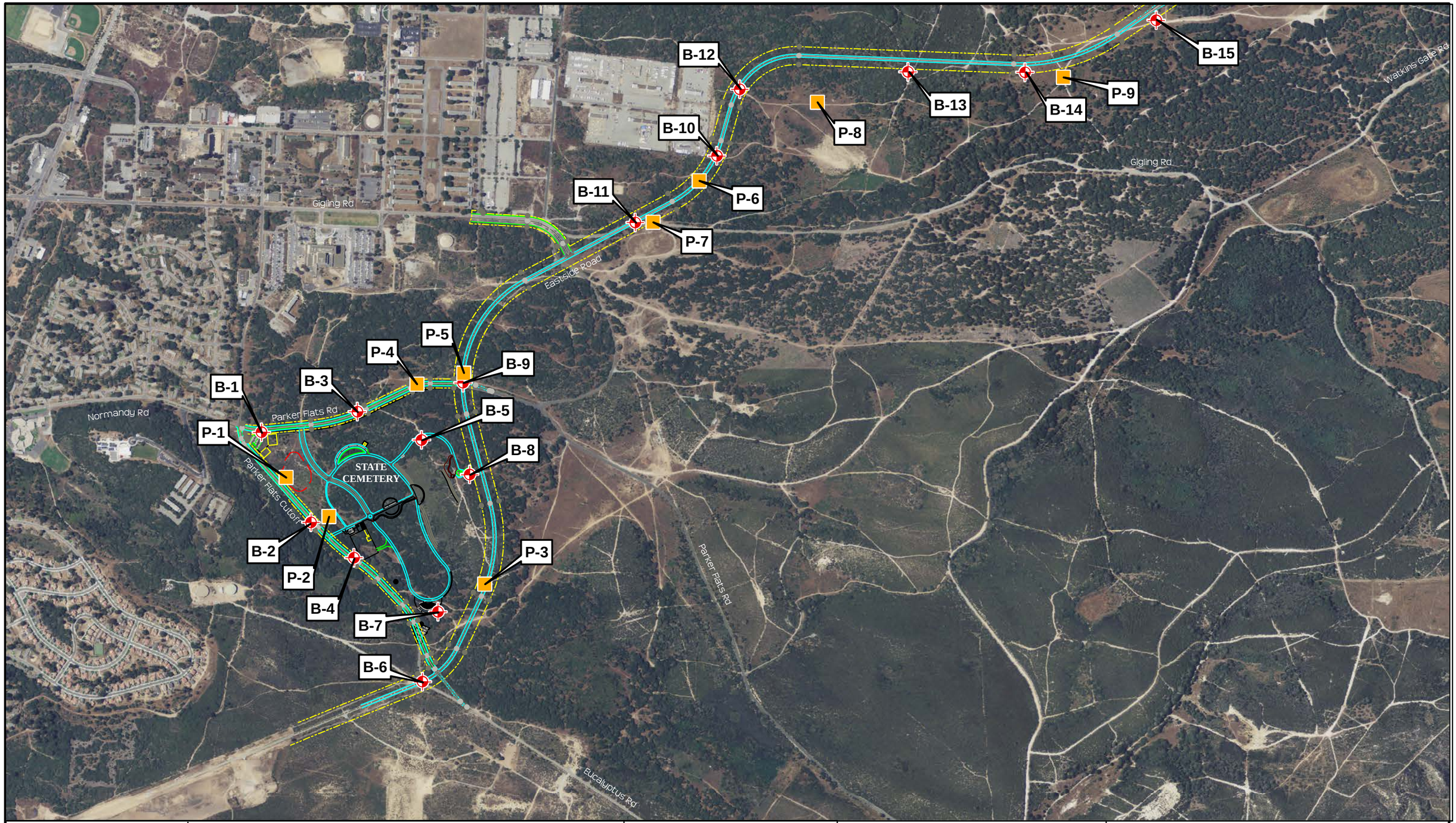
VICINITY MAP

KLEINFELDER
40 Clark Street, Unit J
Salinas, California, 93901
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Central Coast California Veterans Cemetery
Monterey County, California

Plate
1

Drawn By: KFH	Reviewed By: RH	Date: 08/31/10	Project Number: 111946	File: E:\...\GIS\111946...\Plate1.mxd



0 500 1,000 Feet

Locations are Approximate

NAD 1983 StatePlane
California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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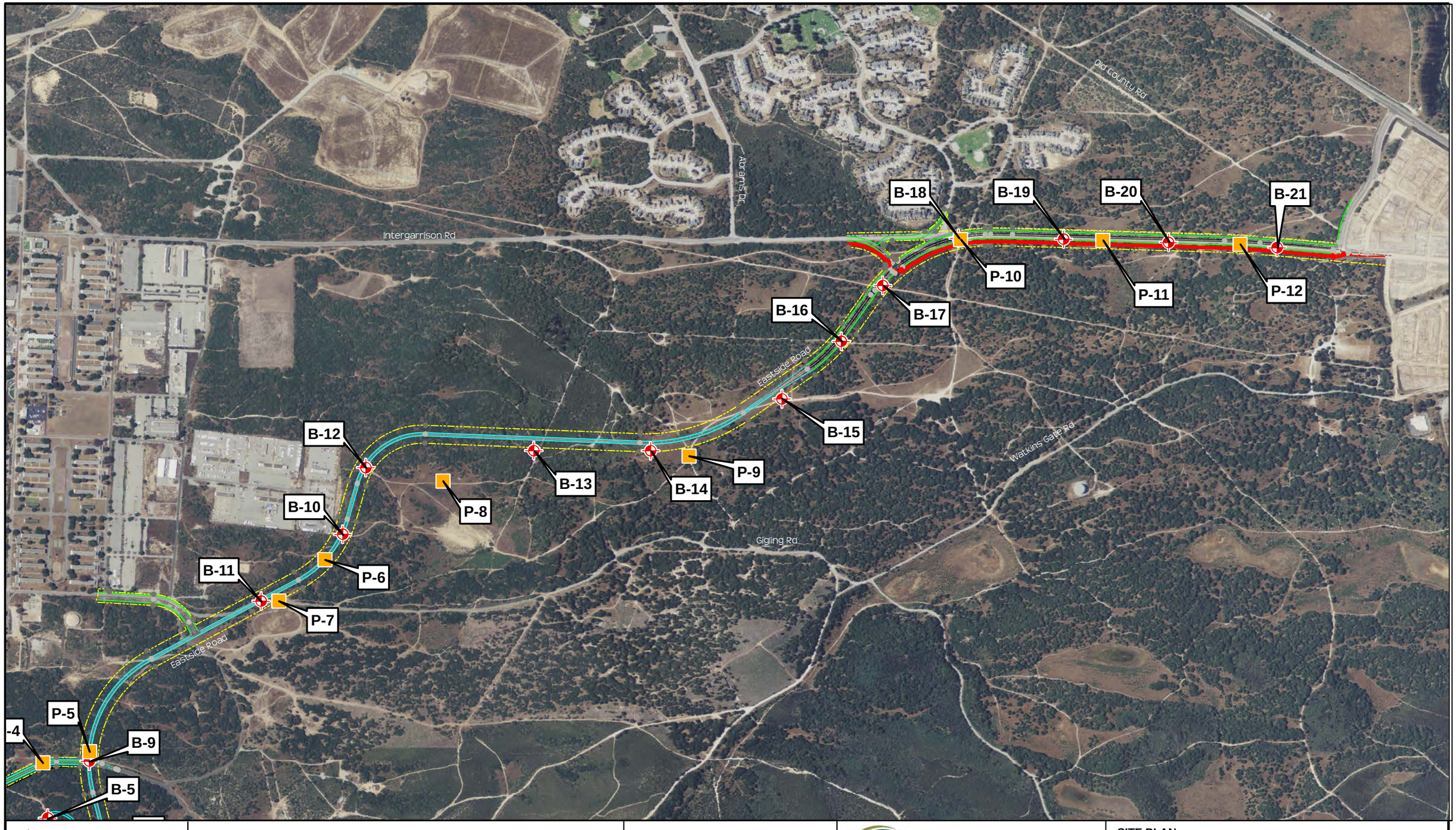
Drawn By: KFH | Checked By: RH | Date: 09/27/10

SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2a**



0 500 1,000 Feet

N

Locations are Approximate

NAD 1983 StatePlane
California IV, US Survey Feet

Legend

- Geotechnical Boring
- Percolation Test

Site Layout: Arch Base - Cemetery.dwg and Offsite Roads.dwg
Aerial: 2009 USDA NAIP

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SITE PLAN

Central Coast California Veterans Cemetery
Monterey County, California

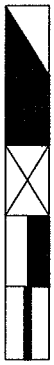
Project No: 111946 | File: E:\GIS\...111946...\Plate2.mxd

Plate **2b**

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW		Well-graded gravels or gravel with sand, little or no fines.
		GP		Poorly-graded gravels or gravel with sand, little or no fines.
		GM		Silty gravels, silty gravel with sand mixture.
		GC		Clayey gravels, clayey gravel with sand mixture.
	SAND AND SANDY	SW		Well-graded sands or gravelly sands, little or no fines.
		SP		Poorly-graded sands or gravelly sands, little or no fines.
		SM		Silty sand.
		SC		Clayey sand.

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS	ML		Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity.
		CL		Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL		Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS	MH		Inorganic elastic silts, micaceous or diatomaceous or silty soils.
		CH		Inorganic fat clays (high plasticity).
		OH		Organic clays of medium high to high plasticity.
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils.



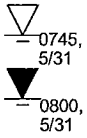
Standard Penetration Split Spoon Sampler 2.0 inch O.D., 1.4 inch I.D.

Modified California Sampler 2.5 inch O.D., 2.0 inch I.D.

Bulk Sample

California Sampler, 3.0 inch O.D., 2.5 inch I.D.

Shelby Tube 3.0 inch O.D.



Approximate water level first observed in boring. Time recorded in reference to a 24 hour clock.

Approximate water level observed in boring following drilling

PEN Pocket Penetrometer reading, in tsf

TV:Su Torvane shear strength, in ksf

LL	LIQUID LIMIT	TX	TRIAXIAL SHEAR
PI	PLASTICITY INDEX	CONSOL	CONSOLIDATION
%-#200	SIEVE ANALYSIS (#200 SCREEN)	R-Value	RESISTANCE VALUE
DS	DIRECT SHEAR	SE	SAND EQUIVALENT
C	COHESION (PSF)	EI	EXPANSION INDEX
PHI	FRICTION ANGLE	FS	FREE SWELL (U.S.B.R.)

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

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PROJECT NO. 111946/ PWGEO

BORING LOG LEGEND

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-1

9/7/2010 9:10:17 AM

Date Completed: 7/26/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 309 feet (MSL)**
0		41	104	5.6		LL=0; PI=0		**SILTY SAND (SM)** - dark yellow-brown, moist, dense, fine to medium grained sand
5		9				SA Passing #200=14%		-loose
								-red-brown
10		20		13.0				-medium dense
15		16		8.5				
20		23		12.7				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, medium dense, fine grained sand
25		31						-dense
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 1

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-2

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9/7/2010 9:12:22 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		21						**POORLY GRADED SAND WITH SILT (SP-SM)** - continued, medium dense
35		26						
40		37						-dense
45		50						-dense to very dense
		59						-very dense
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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PROJECT NO. **111946/ PWGEO**

LOG OF BORING NO. B- 1

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-2
(cont'd)

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9/7/2010 9:12:22 AM

Date Completed: 7/26/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 296 feet (MSL)**
	X							**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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LOG OF BORING NO. B- 2

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-3

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9/7/2010 9:12:30 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 322 feet (MSL)**
								SILTY SAND (SM) - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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LOG OF BORING NO. B- 3

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-4

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9/7/2010 9:12:35 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 308 feet (MSL)**
		21	99	4.0		LL=0; PI=0		**SILTY SAND (SM)** - brown, moist, medium dense, fine grained sand
5		17	110	10.7				
10		4		6.9				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, loose, fine grained sand
15		46		10.9				-dense
20		30						-medium dense to dense
25		26						-medium dense
30								

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LOG OF BORING NO. B- 4

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-5

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9/7/2010 9:12:36 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		35						**POORLY GRADED SAND WITH SILT (SP-SM)** - continued, dense
35		35						
40		32						
45		34						
		43						
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 4

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-5
(cont'd)

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9/7/2010 9:12:36 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 373 feet (MSL)**
								SILTY SAND (SM) - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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LOG OF BORING NO. B- 5

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-6

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9/7/2010 9:12:38 AM

Date Completed: 7/26/10

Logged By: R. Hasseler

Total Depth: Approximately 20.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 446 feet (MSL)**
0								**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								-red-brown
								-yellow-brown
10								-red-brown
15	X							-yellow-brown
20								Bottom of boring at 20 feet Groundwater not encountered Boring backfilled with cuttings
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 6

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-7

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9/7/2010 9:12:40 AM

Date Completed: 7/27/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 50.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 353 feet (MSL)**
								POORLY GRADED SAND WITH SILT (SP-SM) - yellow-brown, moist, loose, fine grained sand
		8	84	4.4		direct shear c=0, ø = 24° LL=0; PI=0		**SILTY SAND (SM)** - dark brown, moist, loose, fine grained sand
5		19	95	4.3				**POORLY GRADED SAND WITH SILT (SP-SM)** - yellow-brown, moist, medium dense, fine grained sand
						SA		
10		22				Passing -#200=50%		**SANDY SILT (ML)** - olive-brown, moist, hard, fine to medium grained sand, low plasticity silt
15		45		3.5				
20		29		8.2				
25		25		8.2				
30								

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LOG OF BORING NO. B- 7

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-8

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9/7/2010 9:12:42 AM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		29		12.4				**SANDY SILT (ML)** - continued
35		28						-red-brown
40		21						
45		33						
		49						
50								Bottom of boring at 50 feet Groundwater not encountered Boring backfilled with cuttings
55								
60								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 7

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-8
(cont'd)

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9/7/2010 9:12:42 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 15.0 ft

Drilling method: Minuteman 3.5" solid stem auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 409 feet (MSL)**
0								**SILTY SAND (SM)** - light brown, moist, fine grained sand
5								-yellow-brown
10								
15	X					R-Value = 61		
								Bottom of boring at 15 feet Groundwater not encountered Boring backfilled with cuttings
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 8

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-9

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:44 AM

Date Completed: 7/27/10 | Drilling method: 8" Hollow Stem Auger

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft | Hammer Wt: 140 lbs., 30" drop | Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 321 feet (MSL)**
						LL=0; PI=0		**SILTY SAND (SM)** - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B- 9

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-10

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9/7/2010 9:12:45 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 353 feet (MSL)**
						R-Value = 66		**SILTY SAND (SM)** - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-10

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-11

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9/7/2010 9:12:47 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 334 feet (MSL)**
								SILTY SAND (SM) - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-11

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-12

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:49 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 347 feet (MSL)**
								SILTY SAND (SM) - light brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-12

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-13

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9/7/2010 9:12:50 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 364 feet (MSL)**
								SILTY SAND (SM) - red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-13

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-14

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:52 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 298 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-14

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-15

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9/7/2010 9:12:53 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 311 feet (MSL)**
						R-Value = 62		**SILTY SAND (SM)**- red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-15

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-16

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9/7/2010 9:12:55 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 306 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-16

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-17

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9/7/2010 9:12:57 AM

Date Completed: 7/28/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: Hand Auger

Hammer Wt:

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 280 feet (MSL)**
								SILTY SAND (SM) - gray-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-17

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-18

\\192.168.35.1\VOL1\USERS\GINT\PROJECTS\111946\111946.GPJ

9/7/2010 9:12:58 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 237 feet (MSL)**
								SILTY SAND (SM) - very dark brown and red-brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-18

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-19

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9/7/2010 9:13:00 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 226 feet (MSL)**
						R-Value = 59		**SILTY SAND (SM)** - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-19

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-20

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9/7/2010 9:13:01 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 229 feet (MSL)**
								SILTY SAND (SM) - very dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-20

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-21

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9/7/2010 9:13:03 AM

Date Completed: 7/27/10

Logged By: R. Hasseler

Total Depth: Approximately 5.0 ft

Drilling method: 8" Hollow Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 233 feet (MSL)**
								SILTY SAND (SM) - dark brown, moist, fine grained sand
5								Bottom of boring at 5 feet Groundwater not encountered Boring backfilled with cuttings
10								
15								
20								
25								
30								

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PROJECT NO. 111946/ PWGEO

LOG OF BORING NO. B-21

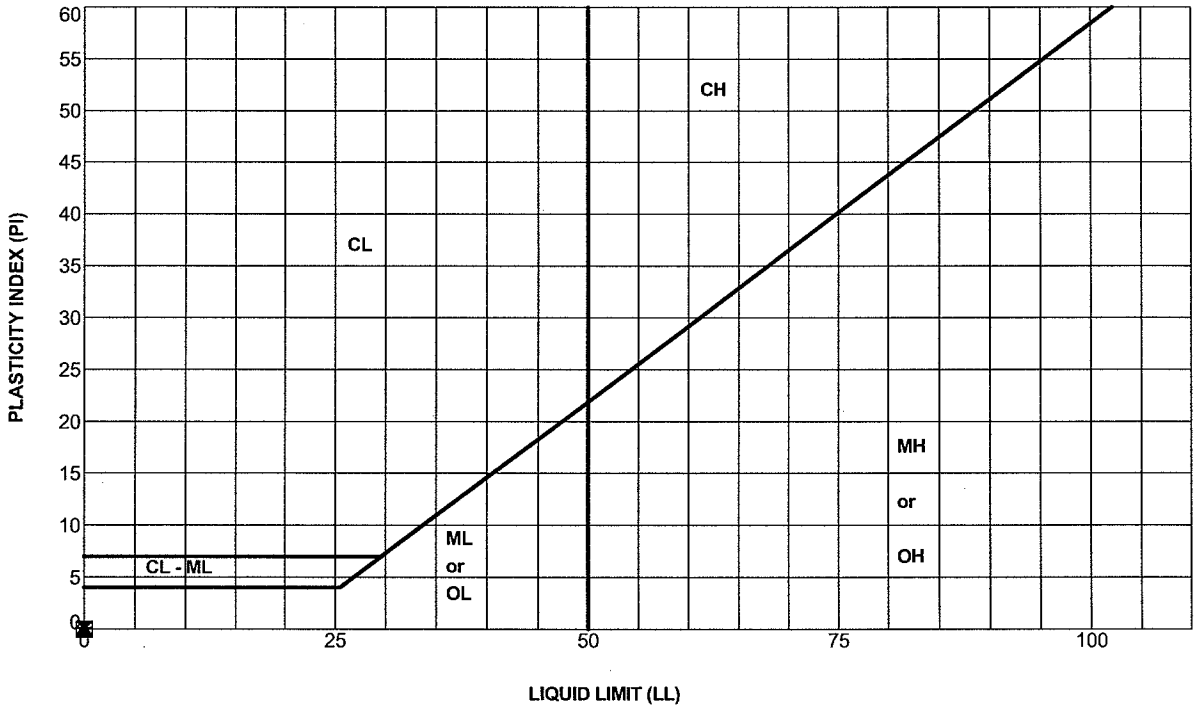
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

A-22

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9/7/2010 9:13:05 AM



SYMBOL	BORING	DEPTH, ft	LL	PL	PI	SAMPLE DESCRIPTION
□	B- 1	1.5	NP	NP	NP	Dark Yellow-Brown Silty Sand
⊠	B- 4	1.5	NP	NP	NP	Brown Silty Sand
▲	B- 7	2.0	NP	NP	NP	Dark Brown Silty Sand
★	B- 9	0.0	NP	NP	NP	Red Brown Silty Sand

Unified Soil Classification

Fine Grained Soil Groups

Symbol	LL < 50	Symbol	LL > 50
ML	Inorganic clayey silts to very fine sands of slight plasticity	MH	Inorganic silts and clayey silts of high plasticity
CL	Inorganic clays of low to medium plasticity	CH	Inorganic clays of high plasticity
OL	Organic silts and organic silty clays of low plasticity	OH	Organic clays of medium to high plasticity, organic silts

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318 (WET PREP)

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PROJECT NO. 111946/ PWGEO

ATTERBERG LIMITS*

Central Coast California Veterans Cemetery
Monterey County, California

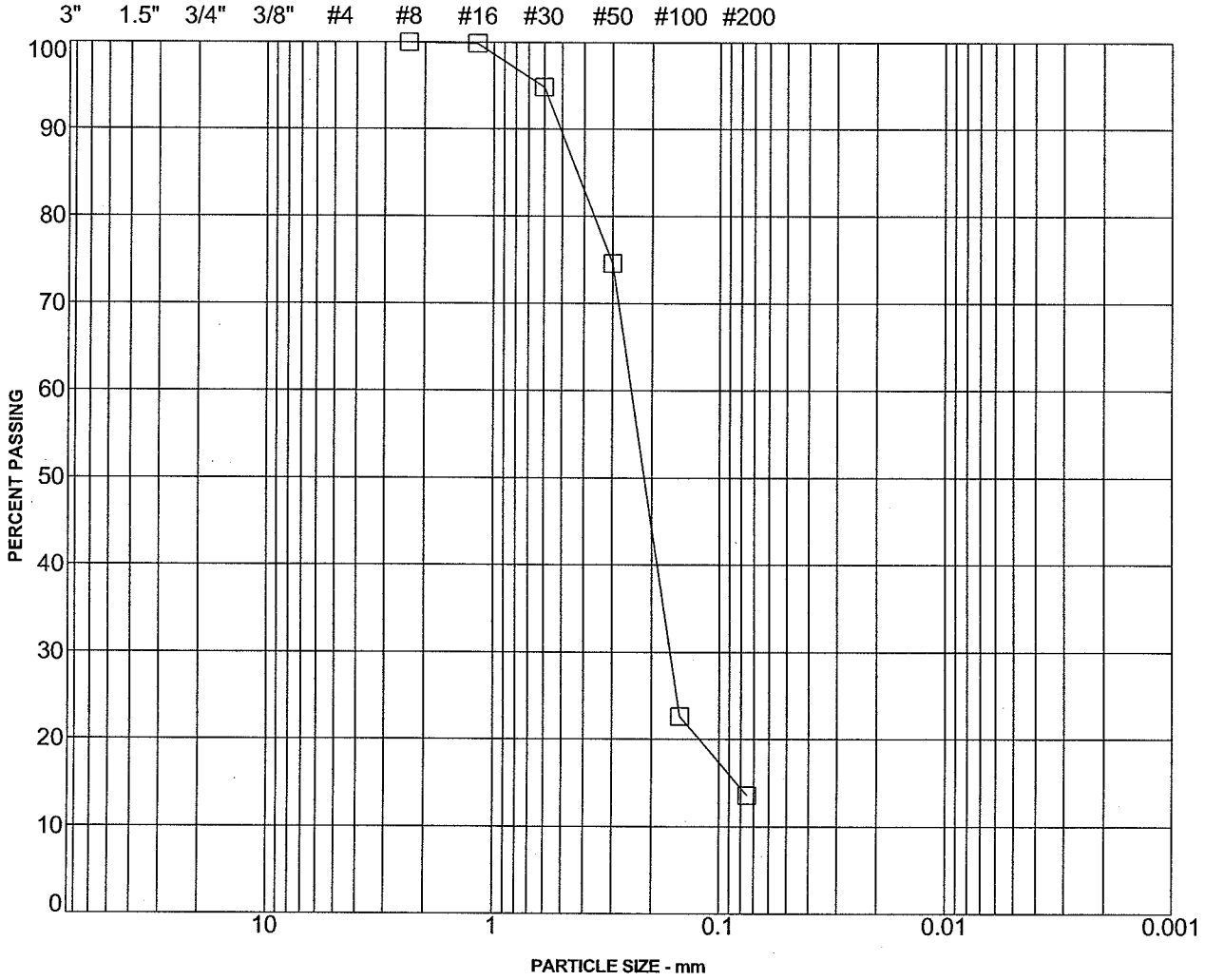
PLATE

B-1

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9/7/2010 9:24:47 AM

SIEVE ANALYSIS	HYDROMETER



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
☐	B- 1	6.0	Dark Yellow-Brown Silty Sand

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

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PROJECT NO. 111946/ PWGEO

PARTICLE SIZE ANALYSIS*

Central Coast California Veterans Cemetery
Monterey County, California

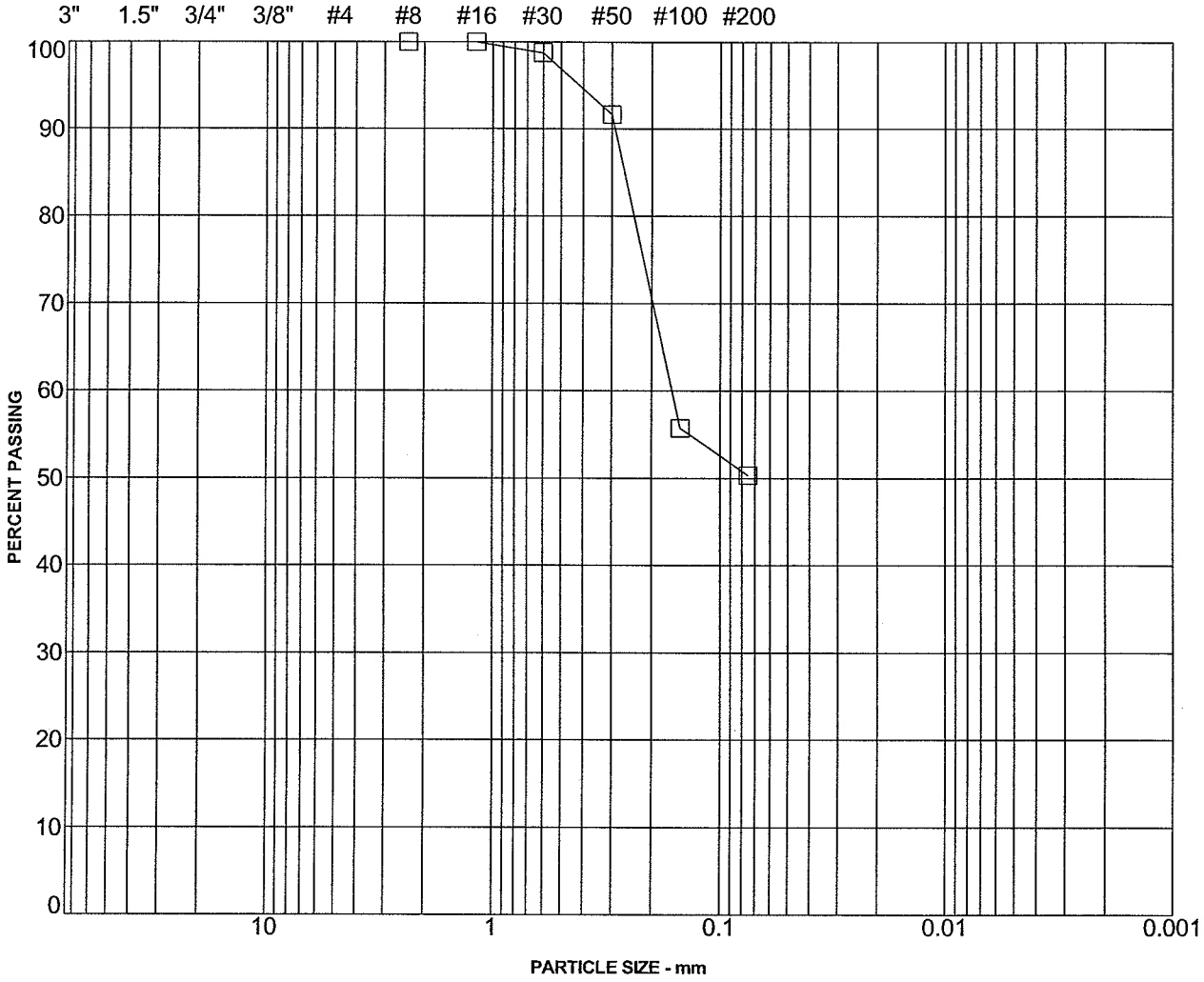
PLATE

B-2

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9/7/2010 9:30:09 AM

SIEVE ANALYSIS	HYDROMETER



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
☐	B- 7	10.0	Olive-Brown Sandy Silt

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

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PROJECT NO. 111946/ PWGEO

PARTICLE SIZE ANALYSIS*

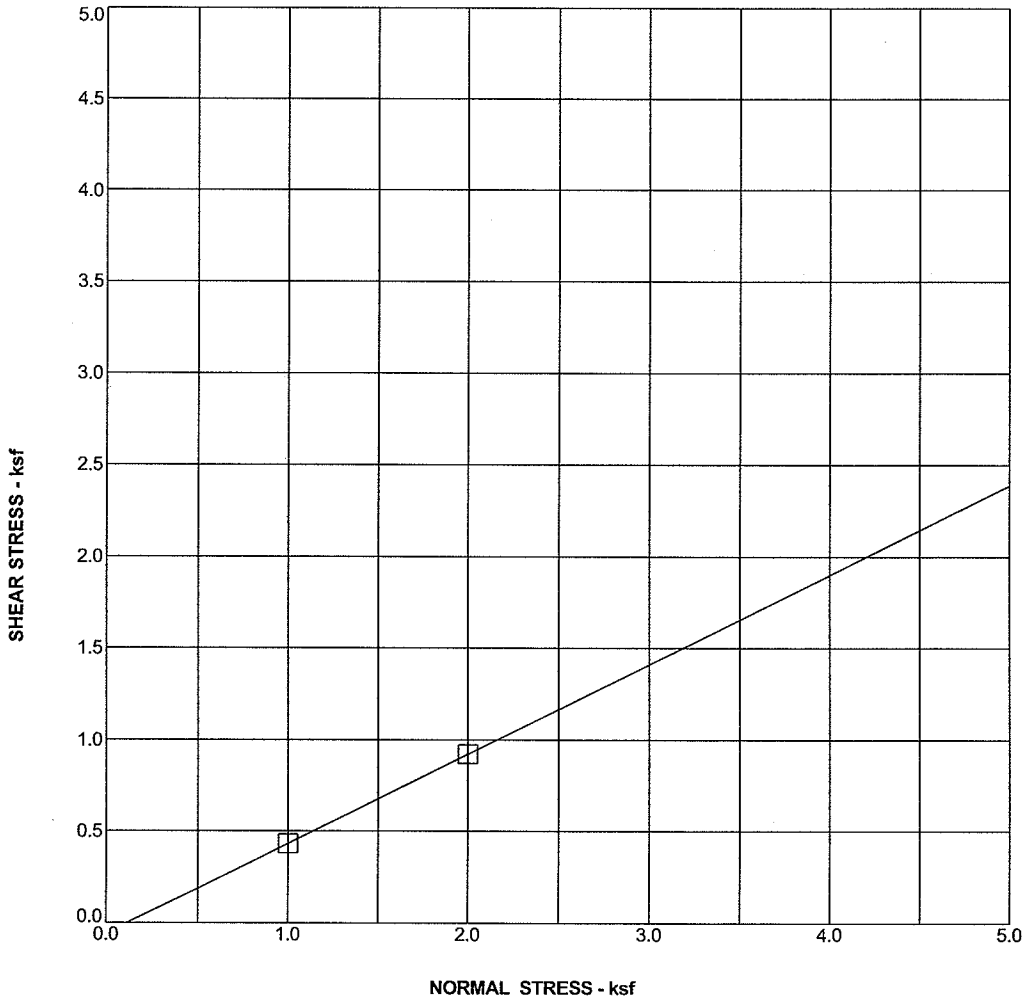
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-3

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9/7/2010 9:30:15 AM



BORING NO: B- 7

DEPTH: 1.5 ft

SAMPLE DESCRIPTION: Dark Brown Silty Sand

TEST TYPE: CD/WET/STAGED

RATE OF SHEAR: .004 in/min.

DRY DENSITY - pcf	84		
INITIAL WATER CONTENT - %	4		
FINAL WATER CONTENT - %	25		
NORMAL STRESS - psf	1000	2000	
MAXIMUM SHEAR - psf	432	921	

FRICTION ANGLE = 24 degrees

COHESION= 0.00 ksf

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 (MODIFIED FOR STAGED TEST)

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PROJECT NO. 111946/ PWGEO

DIRECT SHEAR*

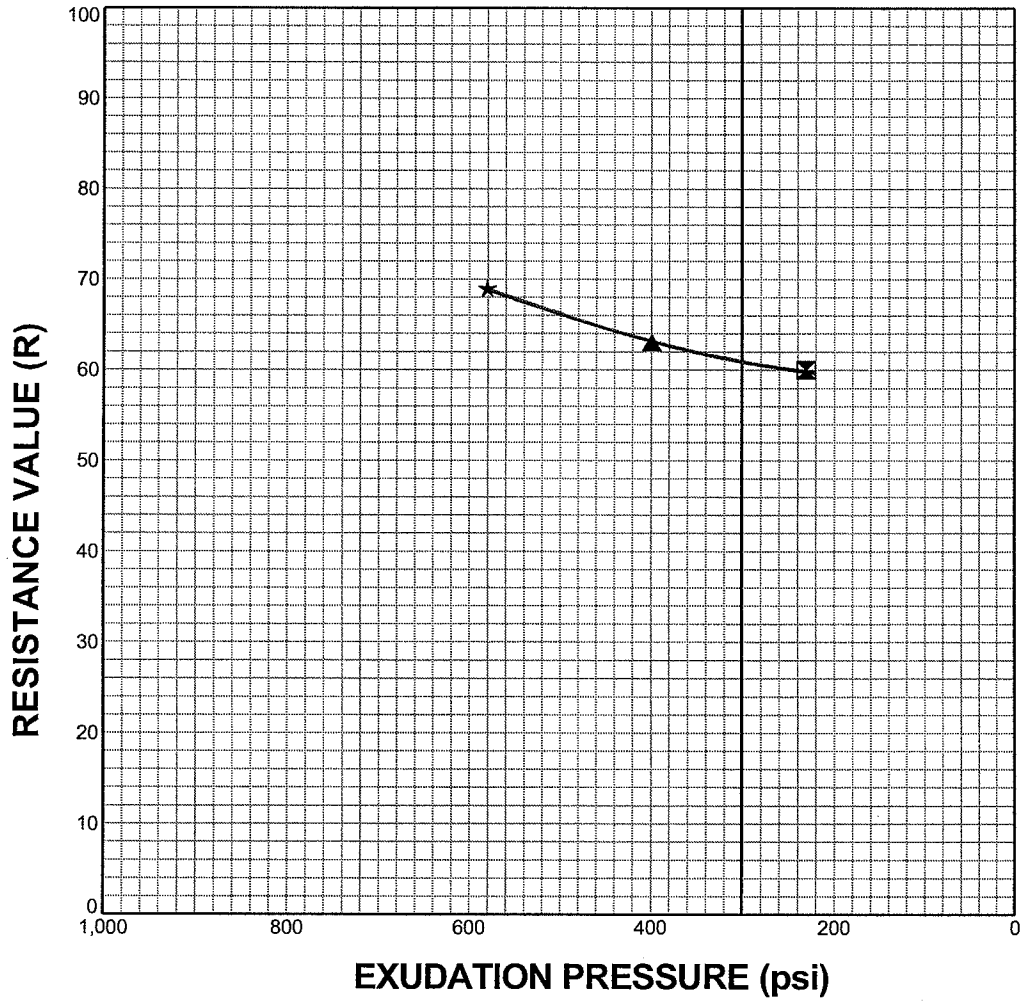
Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-4

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9/7/2010 9:32:02 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	13.3	10.8	9.1
DRY DENSITY (PCF)	110.2	113.9	116.9
EXUDATION PRESSURE (PSI)	230	399	580
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	60	63	69

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B- 8)	Light Brown Silty Sand	---	---	**61**

NOTE: Bulk Sample from 13 to 15 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

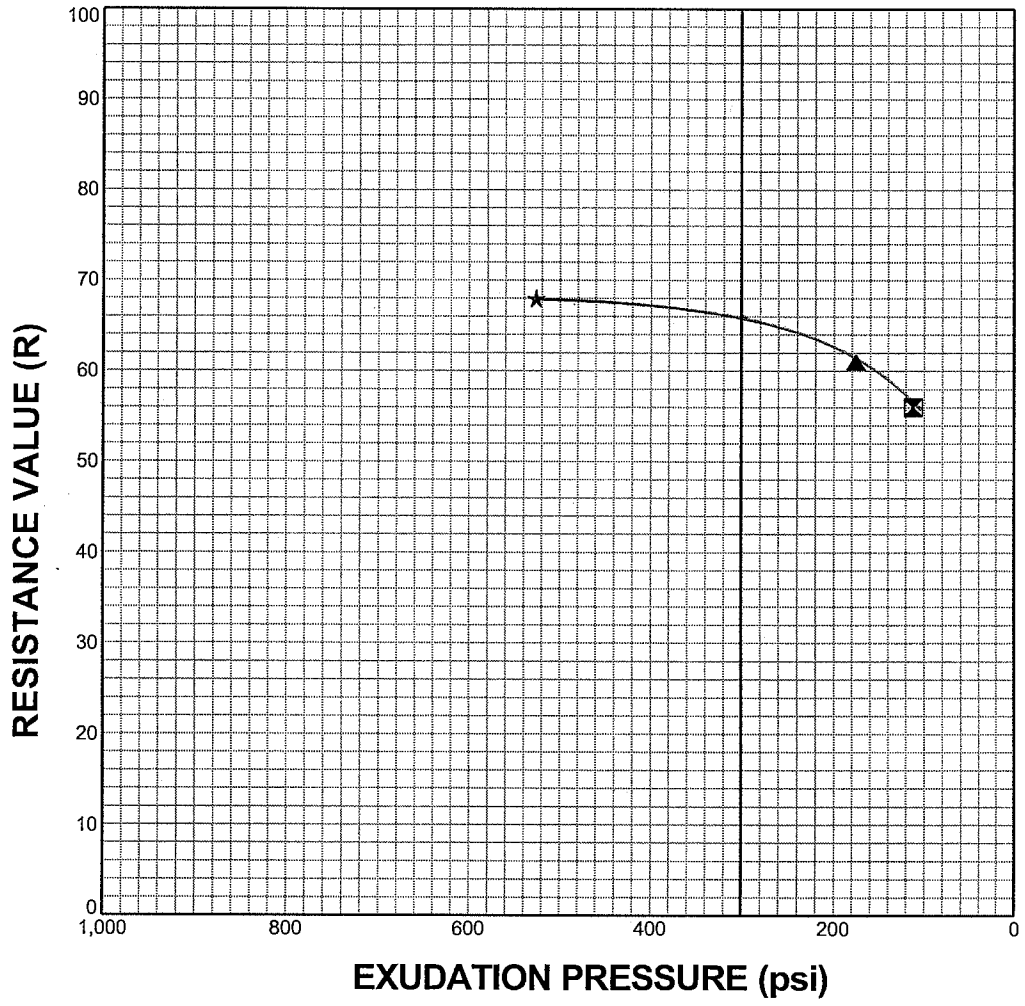
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-5

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9/7/2010 9:45:46 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	12.8	11.5	10.2
DRY DENSITY (PCF)	109.4	111.9	111.9
EXUDATION PRESSURE (PSI)	112	175	526
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	56	61	68

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-10)	Light Brown Silty Sand	---	---	**66**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

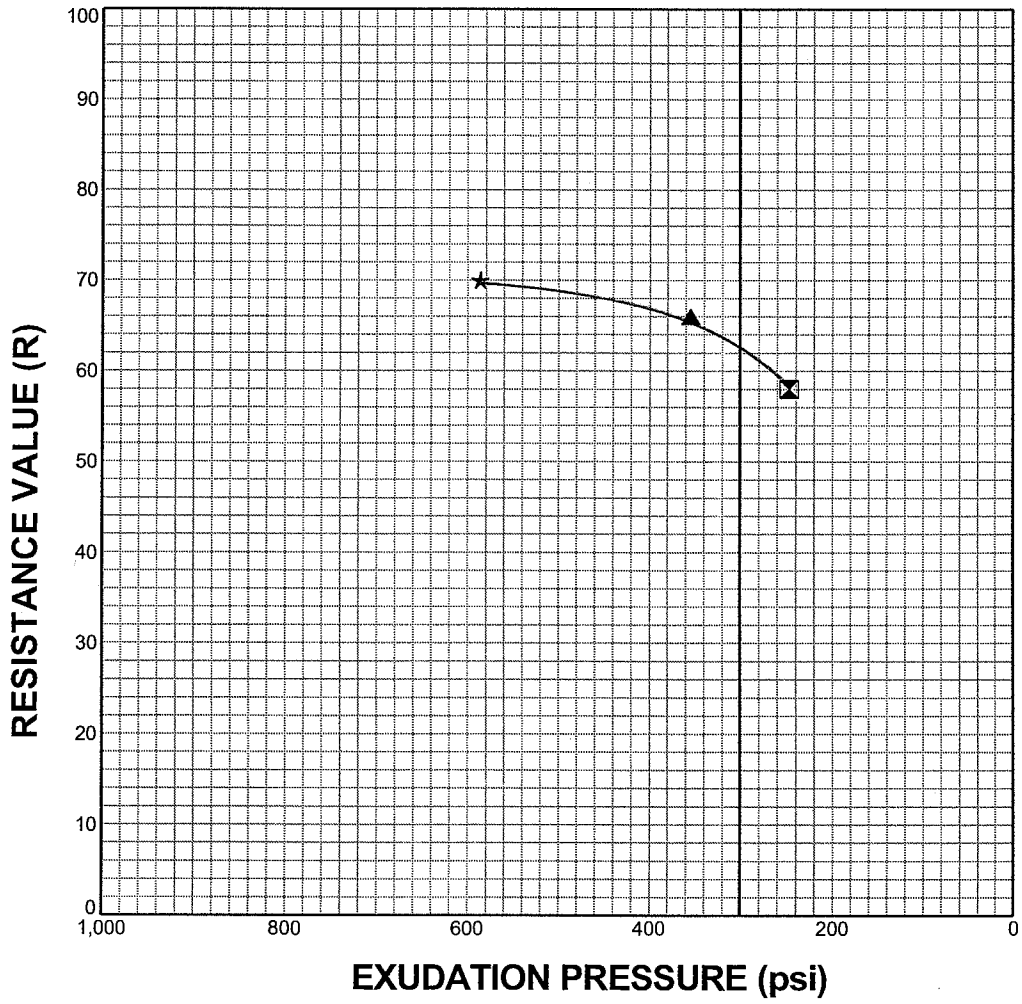
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-6

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9/7/2010 9:45:53 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	11.7	10.9	10.0
DRY DENSITY (PCF)	113.6	114.8	113.8
EXUDATION PRESSURE (PSI)	247	354	586
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	58	66	70

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-15)	Red-Brown Silty Sand	---	---	**62**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

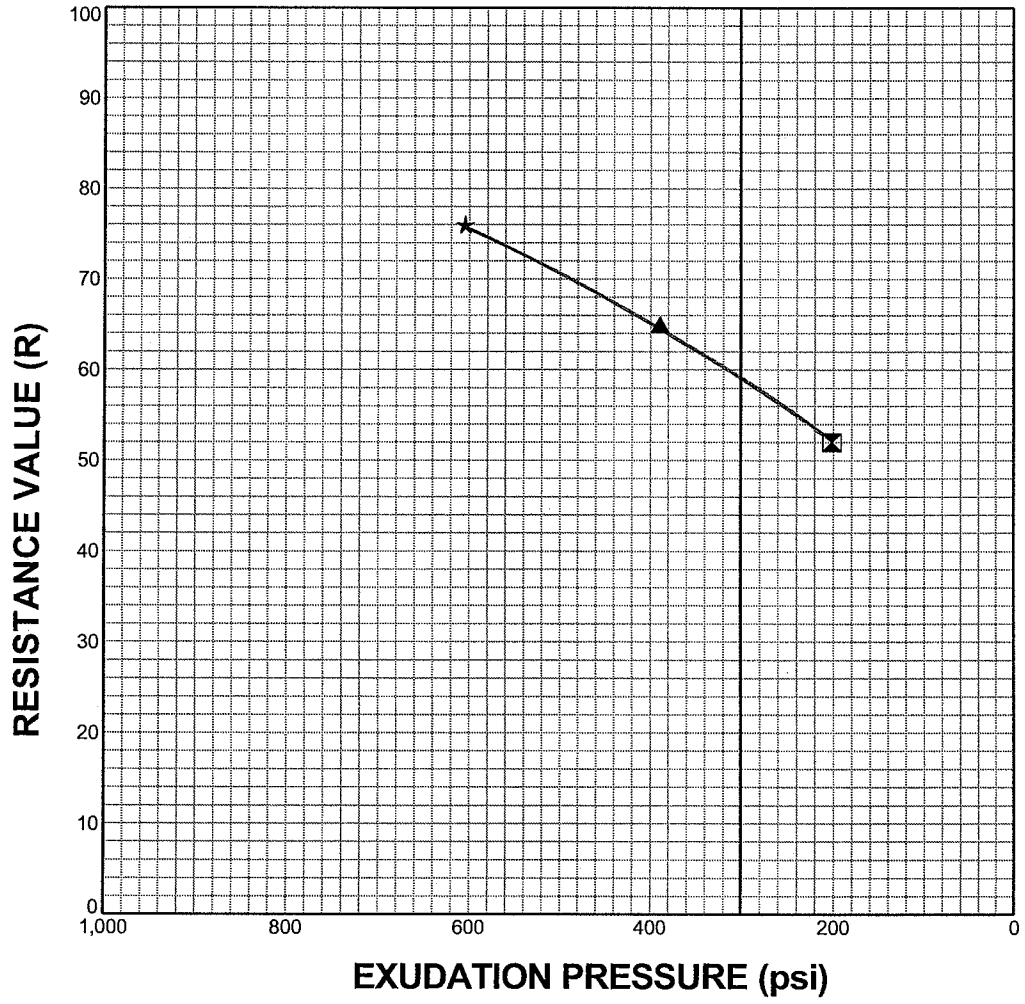
RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-7

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9/7/2010 9:45:58 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	10.2	9.4	8.5
DRY DENSITY (PCF)	123.4	125.4	125.2
EXUDATION PRESSURE (PSI)	201	389	604
EXPANSION PRESSURE (PSF)	0	0	0
RESISTANCE VALUE (R)	52	65	76

Date Received:

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(B-19)	Dark Brown Silty Sand	---	---	**59**

NOTE: Bulk Sample from 0 to 5 feet

ASTM D 2844, Cal Test 301

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PROJECT NO. 111946/ PWGEO

RESISTANCE VALUE TEST DATA

Central Coast California Veterans Cemetery
Monterey County, California

PLATE

B-8

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9/7/2010 9:45:59 AM

California State Certified Laboratory No. 2153

CERCO analytical

1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

24 August, 2010

Job No.1008046
Cust. No.11454

Mr. Robert Hasseler
Kleinfelder
40 Clark Street, Suite J
Salinas, CA 93901

Subject: Project No.: 111946/PWGEO
Project Name: Fora Veterans Cemetery (CCCVC)
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hasseler:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on August 05, 2010. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are classified as "negligibly corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are none detected. Because the chloride ion concentrations are less than 300 mg/kg, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations are none detected and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils range from 6.2 to 7.1 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 450 to 460-mV and are indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call JDH Corrosion Consultants, Inc. at (925) 927-6630.

We appreciate the opportunity of working with you on this project. If you have any questions, or if you required further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax: 925 462 2775
www.cercoanalytical.com

Client: Kleinfelder
Client's Project No.: 111946
Client's Project Name: Fora Veterans Cemetary (CCCVC)
Date Sampled: 07/27-28/10
Date Received: 5-Aug-10
Matrix: Soil
Authorization: Signed Chain of Custody and P.O.#R10516

Date of Report: 24-Aug-2010

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1008046-001	B-7, 7-2-2 @ 5.5'	460	6.2	-	70,000	-	N.D.	N.D.
1008046-002	B-1, 1-2-2 @ 5.5'	450	7.1	-	69,000	-	N.D.	N.D.
1008046-003	B-4, 4-2-2 @ 5.5'	450	6.7	-	41,000	-	N.D.	N.D.
1008046-004	B-9, B-9 @ 0-5'	460	6.9	-	23,000	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Detection Limit:	-	-	10	-	50	15	15
Date Analyzed:	23-Aug-2010	23-Aug-2010	-	20-Aug-2010	-	23-Aug-2010	23-Aug-2010

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits.**

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/24-25/2010
		REHS:	

HOLE #:	P-1		PRESATURATE DATE/TIME:	4:30 PM	8/24/2010
DIAMETER:	12 inches		PRESATURATE WATER DEPTH:	full	feet 4:30 pm 8/24
HOLE DEPTH:	1.00 feet	24-Aug	HOLE DEPTH (Next Day) /TIME:	1.00	feet 9:15 am 8/25
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/25/2010	9:22	9:32	0.00	2.75	10	2.750	3.6
2	8/25/2010	9:32	9:42	2.75	4.25	10	1.500	6.7
3	8/25/2010	9:42	9:52	4.38	5.88	10	1.500	6.7
4	8/25/2010	9:52	10:02	0.00	3.00	10	3.000	3.3
5	8/25/2010	10:02	10:12	3.00	5.88	10	2.875	3.5
6	8/25/2010	10:12	10:22	5.88	6.50	10	0.625	16.0
7	8/25/2010	10:22	10:32	0.00	2.50	10	2.500	4.0
8	8/25/2010	10:32	10:42	2.50	4.75	10	2.250	4.4

RATE: 4.4 min/in

HOLE #:	P-2		PRESATURATE DATE/TIME:	3:45 PM	8/24/2010
DIAMETER:	12 inches		PRESATURATE WATER DEPTH:	full	feet 3:45 pm 8/24
HOLE DEPTH:	1.00 feet	24-Aug	HOLE DEPTH (Next Day) /TIME:	1.00	feet 10:50 am 8/25
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/25/2010	10:55	11:05	0.00	2.75	10	2.750	3.6
2	8/25/2010	11:05	11:15	2.75	4.25	10	1.500	6.7
3	8/25/2010	11:15	11:25	0.00	2.13	10	2.125	4.7
4	8/25/2010	11:25	11:35	2.13	3.88	10	1.750	5.7
5	8/25/2010	11:35	11:45	3.88	5.25	10	1.375	7.3
6	8/25/2010	11:45	11:55	5.25	6.13	10	0.875	11.4
7	8/25/2010	11:55	12:05	0.00	2.88	10	2.875	3.5
8	8/25/2010	12:05	12:15	2.88	4.13	10	1.250	8.0

RATE: 8.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-3		PRESATURATE DATE/TIME:	3:30 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 3:30 pm 8/23
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 8:45 am 8/24
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	8:50	9:00	0.00	3.75	10	3.750	2.7
2	8/24/2010	9:00	9:10	3.75	5.25	10	1.500	6.7
3	8/24/2010	9:10	9:20	5.25	6.38	10	1.125	8.9
4	8/24/2010	9:20	9:30	6.38	7.13	10	0.750	13.3
5	8/24/2010	9:30	9:40	7.13	8.13	10	1.000	10.0
6	8/24/2010	9:40	9:50	8.13	8.88	10	0.750	13.3
7	8/24/2010	9:50	10:00	8.88	9.50	10	0.625	16.0
8	8/24/2010	10:00	10:10	9.50	10.00	10	0.500	20.0

RATE: 20.0 min/in

HOLE #:	P-4		PRESATURATE DATE/TIME:	1:40 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 3:30 pm 8/12
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 3:40 pm 8/13
SOIL TYPE:	Dark Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	3:45	3:55	11.75	24.50	10	12.750	0.8
2	8/13/2010	3:55	4:05	24.50	34.75	10	10.250	1.0
3	8/13/2010	4:05	4:15	34.75	39.25	10	4.500	2.2
4	8/13/2010	4:15	4:25	39.25	42.88	10	3.625	2.8
5	8/13/2010	4:25	4:35	42.88	45.38	10	2.500	4.0
6	8/13/2010	4:35	4:45	45.38	47.63	10	2.250	4.4

RATE: 4.4 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/25/2010
		REHS:	

HOLE #:	P-5		PRESATURATE DATE/TIME:	1:20 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 1:20 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.08	feet 2:25 pm 8/13
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	2:30	2:40	0.00	11.00	10	11.000	0.9
2	8/13/2010	2:40	2:50	11.00	20.00	10	9.000	1.1
3	8/13/2010	2:50	3:00	20.00	32.00	10	12.000	0.8
4	8/13/2010	3:00	3:10	32.00	38.00	10	6.000	1.7
5	8/13/2010	3:10	3:20	0.00	8.88	10	8.875	1.1
6	8/13/2010	3:20	3:30	8.88	15.75	10	6.875	1.5

RATE: 1.5 min/in

HOLE #:	P-6		PRESATURATE DATE/TIME:	4:15 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 4:15 pm 8/23
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 10:50 am 8/24
SOIL TYPE:	Light Brown SAND with SILT (SM-ML)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	10:25	10:35	0.00	4.50	10	4.500	2.2
2	8/24/2010	10:35	10:45	4.50	8.00	10	3.500	2.9
3	8/24/2010	10:45	10:55	8.00	10.50	10	2.500	4.0
4	8/24/2010	10:55	11:05	10.50	11.88	10	1.375	7.3
5	8/24/2010	11:05	11:15	11.88	12.38	10	0.500	20.0
6	8/24/2010	11:15	11:25	12.38	12.63	10	0.250	40.0
7	8/24/2010	11:25	11:35	12.63	12.88	10	0.250	40.0
8	8/24/2010	11:35	11:45	12.88	13.13	10	0.250	40.0

RATE: 40.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-7		PRESATURATE DATE/TIME:	1:00 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 1:00 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	1.17	feet 12:55 pm 8/13
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	1:00	1:10	14.00	12.13	10	1.875	5.3
2	8/13/2010	1:10	1:20	12.13	11.00	10	1.125	8.9
3	8/13/2010	1:20	1:30	11.00	9.75	10	1.250	8.0
4	8/13/2010	1:30	1:40	9.75	8.50	10	1.250	8.0
5	8/13/2010	1:40	1:50	8.50	7.38	10	1.125	8.9
6	8/13/2010	1:50	2:00	7.38	6.13	10	1.250	8.0

RATE: 8.0 min/in

HOLE #:	P-8		PRESATURATE DATE/TIME:	4:30 PM	8/23/2010
DIAMETER:	4 inches		PRESATURATE WATER DEPTH:	full	feet 4:30 pm 8/23
HOLE DEPTH	5.00 feet	28-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 12:05 pm 8/24
SOIL TYPE:	Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	12:10	12:20	0.00	4.75	10	4.750	2.1
2	8/24/2010	12:20	12:30	4.75	6.88	10	2.125	4.7
3	8/24/2010	12:30	12:40	6.88	8.50	10	1.625	6.2
4	8/24/2010	12:40	12:50	8.50	10.13	10	1.625	6.2
5	8/24/2010	12:50	1:00	10.13	11.50	10	1.375	7.3
6	8/24/2010	1:00	1:10	11.50	13.25	10	1.750	5.7
7	8/24/2010	12:58	13:08	13.25	14.38	10	1.125	8.9
8	8/24/2010	13:08	14:18	14.38	15.75	10	1.375	7.3

RATE: 7.3 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/24/2010
		REHS:	

HOLE #:	P-9		PRESATURATE DATE/TIME:	4:45 PM	8/23/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 4:45 pm 8/23
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	5.00	feet 1:20 pm 8/24
SOIL TYPE:	Poorly Graded SAND w/ SILT (SP-SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/24/2010	1:25	1:35	0.00	2.75	10	2.750	3.6
2	8/24/2010	1:35	1:45	2.75	4.25	10	1.500	6.7
3	8/24/2010	1:55	2:05	4.00	6.13	10	2.125	4.7
4	8/24/2010	2:05	2:15	6.13	8.88	10	2.750	3.6
5	8/24/2010	2:15	2:25	8.88	10.25	10	1.375	7.3
6	8/24/2010	2:25	2:35	10.25	13.13	10	2.875	3.5
7	8/24/2010	2:35	2:45	13.13	15.88	10	2.750	3.6
8	8/24/2010	2:45	2:55	15.88	17.63	10	1.750	5.7

RATE: 5.7 min/in

HOLE #:	P-10		PRESATURATE DATE/TIME:	2:00 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:00 pm 8/12
HOLE DEPTH:	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.00	feet 4:55 pm 8/13
SOIL TYPE:	Dark & Red Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	5:00	5:10	4.50	22.50	10	18.000	0.6
2	8/13/2010	5:10	5:20	22.50	28.00	10	5.500	1.8
3	8/13/2010	5:20	5:30	28.00	32.13	10	4.125	2.4
4	8/13/2010	5:30	5:40	32.13	35.50	10	3.375	3.0
5	8/13/2010	5:40	5:50	35.50	38.13	10	2.625	3.8
6	8/13/2010	5:50	6:00	38.13	40.63	10	2.500	4.0

RATE: 4.0 min/in

SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER/APPLICANT:	Fort Ord Reuse Authority (FORA)	PROJECT:	FORA Veterens Cemetery
SITE LOCATION:	Former Fort Ord, CA	PROJECT NUMBER:	111946
CONTACT/TELEPHONE:		DATE:	8/12/2010-8/13/2010
		REHS:	

HOLE #:	P-11		PRESATURATE DATE/TIME:	2:20 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:20 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	4.70	feet 6:15 pm 8/13
SOIL TYPE:	Gray Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	6:20	6:30	13.00	42.00	10	29.000	0.3
2	8/13/2010	6:30	6:40	42.00	50.50	10	8.500	1.2
3	8/13/2010	6:40	6:50	9.00	37.00	10	28.000	0.4
4	8/13/2010	6:50	7:00	37.00	47.00	10	10.000	1.0
5	8/13/2010	7:00	7:10	10.00	33.50	10	23.500	0.4
6	8/13/2010	7:10	7:20	33.50	46.00	10	12.500	0.8

RATE: 0.8 min/in

HOLE #:	P-12		PRESATURATE DATE/TIME:	2:40 PM	8/12/2010
DIAMETER:	8 inches		PRESATURATE WATER DEPTH:	full	feet 2:40 pm 8/12
HOLE DEPTH	5.00 feet	27-Jul	HOLE DEPTH (Next Day) /TIME:	2.83	feet 7:25 pm 8/13
SOIL TYPE:	Dark Brown SILTY SAND (SM)		WATER DEPTH (Next Day):	Dry	feet

READING	DATE	TIME START	TIME FINISH	WATER LEVEL (in) START	WATER LEVEL (in) FINISH	ELAPSED TIME MIN.	WATER FALL INCHES	PERCOLATION RATE MINUTES/INCH
1	8/13/2010	7:30	7:40	4.50	22.50	10	18.000	0.6
2	8/13/2010	7:40	7:50	22.50	28.00	10	5.500	1.8
3	8/13/2010	7:50	8:00	28.00	32.13	10	4.125	2.4
4	8/13/2010	8:00	8:10	32.13	35.50	10	3.375	3.0
5	8/13/2010	8:10	8:20	35.50	38.13	10	2.625	3.8
6	8/13/2010	8:20	8:30	38.13	40.63	10	2.500	4.0

RATE: 4.0 min/in

Exhibit 1
Summary of Compaction Recommendations

Area	Compaction Recommendation [1,2,3]
General Engineered Fill	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Imported Fill [4]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Trenches [5]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content.
Exterior Flatwork [6]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.
Parking and Access Driveways [6]	Compact to a minimum of 95 percent compaction at a moisture content above the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.

Notes:

1. All compaction requirements refer to relative compaction as a percentage of the laboratory standard described by ASTM D 1557.
2. All lifts to be compacted shall be a maximum of 8 inches loose thickness, unless otherwise recommended.
3. All compacted surfaces should be firm, stable, and unyielding under compaction equipment.
4. Includes building and/or equipment pads.
5. In landscaping areas, this percent compaction in trenches may be reduced to 85 percent.
6. Depths are below finished subgrade elevation.

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Attachment 9

"Letter of Map Revision Determination Document"

FIRM #06053C0195G, FEMA, Issued November 7, 2014

Federal Emergency Management Agency

Washington, D.C. 20472

November 7, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Louis R. Calcagno
Chairman, Monterey County Board of Supervisors
P. O. Box 1728
Salinas, CA 93902

IN REPLY REFER TO:
Case No.: 14-09-3525P
Community Name: Monterey County, CA
Community No.: 060195
Effective Date of
This Revision: **March 23, 2015**

Dear Mr. Calcagno:

The Flood Insurance Rate Map for your community has been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map

cc: The Honorable Ralph Rubio
Mayor, City of Seaside

Ms. Jennifer Bodensteiner, CFM
Hydrologist
Monterey County Water Resources Agency

Mr. Tim O'Halloran, P.E.
City Engineer/ Public Works Services Manager
City of Seaside

Mr. Darren Bonfantine, P.E., CFM
Wood Rodgers, Inc.

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Monterey County California (Unincorporated Areas)	NO PROJECT	HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 060195		
IDENTIFIER	Central Coast Veterans Cemetery	APPROXIMATE LATITUDE & LONGITUDE: 36.634, -121.795 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 06053C0195G DATE: April 2, 2009	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Unnamed Ponding Area - from approximately 2,540 feet southeast to approximately 220 feet east of the intersection of Parker Flats Cut Off Road and Normandy Road

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Unnamed Ponding Area	Zone A	Zone X (unshaded)	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

142877 PT202.BKR.14093525P.BG 102-D-A

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 060203 **Name:** City of Seaside, California

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 06053C0195G DATE: April 2, 2009	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jeffrey D. Lusk
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

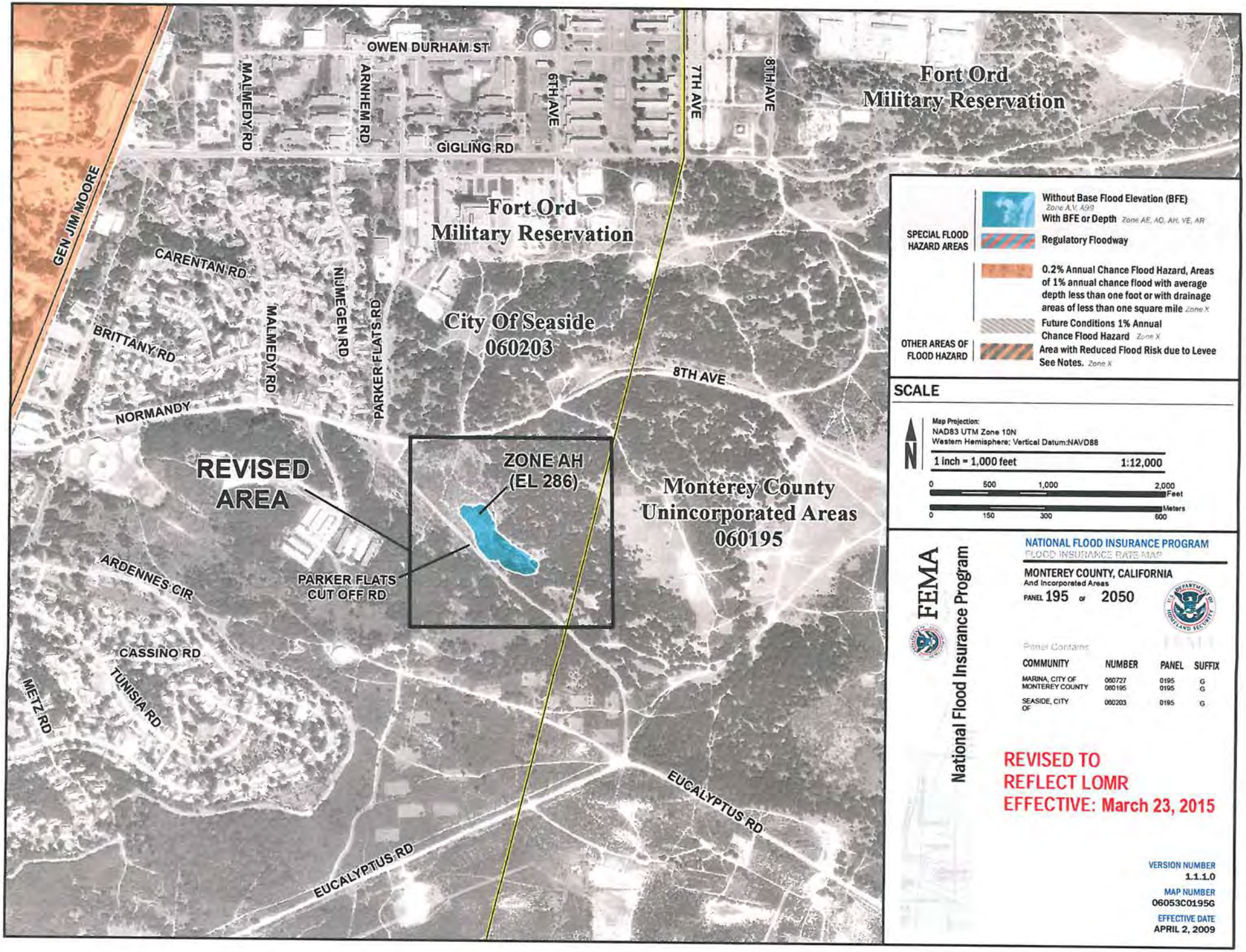
A notice of changes will be published in the Federal Register. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Monterey County Herald*
Dates: November 14, 2014 and November 21, 2014

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration


OWEN DURHAM ST
MALMEDY RD
ARNHEM RD
GIGLING RD
6TH AVE
7TH AVE
8TH AVE
Fort Ord
Military Reservation
GEN JIM MOORE
CARENTAN RD
NIJMEGEN RD
PARKER FLATS RD
Fort Ord
Military Reservation
City Of Seaside
060203
BRITTANY RD
MALMEDY RD
8TH AVE
NORMANDY
REVISED
AREA
ZONE AH
(EL 286)
Monterey County
Unincorporated Areas
060195
ARDENNES CIR
PARKER FLATS
CUT OFF RD
CASSINO RD
TUNISIA RD
METZ RD
EUCALYPTUS RD
EUCALYPTUS RD
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
Zone A,V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
OTHER AREAS OF FLOOD HAZARD
Area with Reduced Flood Risk due to Levee See Notes. Zone X
SCALE
N
Map Projection:
NAD83 UTM Zone 10N
Western Hemisphere; Vertical Datum:NAVD88
1 inch = 1,000 feet
1:12,000
0 500 1,000 2,000 Feet
0 150 300 600 Meters
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
MONTEREY COUNTY, CALIFORNIA
And Incorporated Areas
PANEL 195 OF 2050
Panel Contains
COMMUNITY NUMBER PANEL SUFFIX
MARINA, CITY OF 060727 0195 G
MONTEREY COUNTY 060195 0195 G
SEASIDE, CITY OF 060203 0195 G
REVISED TO
REFLECT LOMR
EFFECTIVE: March 23, 2015
VERSION NUMBER
1.1.1.0
MAP NUMBER
06053C0195G
EFFECTIVE DATE
APRIL 2, 2009

Attachment 10

"Drainage Report for California Central Coast Veterans Cemetery – Phase 1"

July 2, 2014, Wood Rodgers, Inc

DRAINAGE REPORT
for

California Central Coast Veterans Cemetery – Phase 1
City of Seaside, California

July 2, 2014



Prepared for:

DGS
GENERAL SERVICES

Prepared by:

Wood Rodgers, Inc.
3301 C Street, Bldg. 100-B
Sacramento, CA 95816
916.341-7760

WOOD RODG
DEVELOPING INNOVATIVE DESIGN

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1.2 Project Description..... 1
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2.2.3 Analysis – Parker Flats Road Infiltration Chamber. 5
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A – Proposed Hydrology Study Exhibit

B – Storm Drain Pipe Hydraulic Calculation Table

C – Infiltration Basin Sizing and StormTech Cut Sheet

SECTION 1 INTRODUCTION

1.1 Purpose

The purpose of this report is to document the proposed drainage design for improvements related to the development of the California Central Coast Veterans Cemetery Project – Phase 1 (Project). The report covers both onsite improvements as well as offsite improvements along Parker Flats Road. Water quality treatment of stormwater runoff for the site is addressed in a separate report.

1.2 Project Description

The Project covers approximately 16 acres, located within the larger 84.4-acre cemetery site *(See Figure 1-Location Map).* The onsite property is in the process of being transferred from the Fort Ord Redevelopment Agency (FORA) to the State of California. The State of California Department of Veterans Affairs will own and operate the cemetery. The offsite (roadway) parcels are also owned by FORA, and are anticipated to be transferred to the City of Seaside in 2014.

The Project will include the following on-site improvements:

- 5,000 columbarium
- An administration and maintenance complex
- Ceremonial entrance
- A cortege assembly area
- Committal service shelter
- A flag/assembly area
- Memorial walkway/donations area
- Supporting roads and infrastructure

(See Appendix A- Proposed Hydrology Study Exhibit showing the proposed site layout.)

1.3 Existing Site

The Proposed Project is located at the intersection of Parker Flats Road and Parker Flats Cutoff, on a portion of a parcel designated as Assessor Parcel Number (APN) 031-151-048-000. Access to the Project site is provided by Parker Flats Road, located on the northern boundary. The Project area consists of a 16-acre site identified as Phase 1 of the proposed CCC Veterans Cemetery, located within the northwestern corner of the planned 84.4-acre site.

The Site is undeveloped and is populated with trees and scrub, and located in a coastal region amidst sandy hills with varied terrain. The Site ranges from elevation 416 feet NAVD88 on the east boundary to the lowest elevation of 283 feet NAVD88 in a topographic depression located along the west boundary.

The Site is isolated from rainfall runoff from most of the adjacent hillside watersheds due to the topography. Rainfall runoff from each adjacent hillside watershed is prevented from leaving the Site due to adjacent deep depressions that lie 4 to 30 feet below the nearest release point.

The Site contains one deep depression that will be further excavated for grading balance. The proposed borrow basin will act as the sites' drainage retention.

1.3.1 Existing Site - Soils

The soils in the Seaside area consist primarily of sandy soils with high infiltration rates. The soil types found in the area are Type A soils Oceanic Loamy and Baywood Sands, and Type B soil Arnold-Santo. Hydrologic Soils Group Type A soils are characterized as sandy soils with high infiltration rates and low runoff potential. Hydrologic Soils Group Type B soils are characterized as loamy soils with moderately high infiltration rates and moderately low runoff potential.

1.3.2 Existing Site – Land Use

The existing land use of the Site and surrounding watersheds is open space with sparse county roads throughout. The open space is wooded with low trees and bushes. The imperviousness of the existing land use is estimated to be 1%.

CITY OF MARINA
MONTEREY COUNTY

CITY OF SAND CITY
MONTEREY COUNTY

CITY OF SEASIDE
MONTEREY COUNTY

CITY OF MONTEREY
MONTEREY COUNTY

G17

1

218

Project Site

Fort Ord National Monument

California

NORTH

0 1,500 3,000 6,000

Feet

Prepared By: AM

Checked By: DB

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
180 Grand Avenue, Ste 400 Tel: 510.208.2400
Oakland, CA 94612 Fax: 510.208.2401

Project Boundary
City Boundary
Interstate/Highway
Major Road

LOCATION MAP
CALIFORNIA CENTRAL COAST VETERANS CEMETERY
MONTEREY COUNTY, CA

FIGURE 1

Date: MARCH, 2014

Job Number: 8482

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SECTION 2 METHODOLOGY

2.1 Drainage Design

Drainage improvements were laid out based on the site and grading plan that was developed to meet the Project's program requirements. For the onsite work, a combination of overland flow, storm drain pipes, and ditches convey stormwater runoff to the low lying area to the south that will serve as a retention basin. The offsite frontage improvements along Parker Flats Road drain to an infiltration basin that is contained within the right of way.

2.2 Analysis

The offsite improvements were analyzed for both 25-year and 100-year storm events, per City of Seaside requirements. The onsite drainage improvements were analyzed for a 25-year event only.

Wood Rodgers has prepared a separate report "Hydrologic and Hydraulic Study Report for California Central Coast Veterans Cemetery" dated March 2014 that analyzed the existing 100-year water surface in the existing low-lying area that serves the immediate region and determined the existing 100-year water surface elevation to be at 286.1.

The rational method was used to estimate runoff for the sizing of the piping systems. Impervious areas were assigned a runoff coefficient of 0.9, and pervious areas a coefficient of 0.1. *Caltrans Highway Design Manual Figure 816.6* was used to estimate overland flow times of concentration. Pipe velocity was assumed at 5 feet per second. The off-site system analysis used a Tc of 10 minutes, and the on-site system a Tc of 15 minutes. As the travel time within the piping is very short, the same Tc was conservatively used for all nodes (in their corresponding systems) to simplify the analysis. Rainfall intensities were found using the *Monterey County Standard Detail 25 – Rainfall Intensities Chart.* The 2-year, 1 hour intensity for this location is 0.5 inches.

2.2.1 Analysis – Tributary areas

The overall tributary area for the Project is bounded by the ridgelines leading from Flag Hill, and the centerlines of Parker Flats Road and Parker Flats Cutoff. The overall tributary area was broken into 5 tributary sub-areas to capture the offsite improvements as well as main junction points for the onsite drain system. *(See Appendix A- Proposed Hydrology Study Exhibit.)*

The existing shed on the north side of Parker Flats Road is retained in an existing pond on the north side of the road and is assumed to not overtop the road. Any future development will need to continue to fully retain all run-off as the project system is not being sized to accommodate any flows from north of the road.

2.2.2 Analysis – Pipe Capacity.

The sizing of the piping systems was calculated using Manning's formula with a friction coefficient of 0.015, a value that accounts for minor losses. Pipes were sized to not surcharge and to maintain a minimum velocity of 2 fps at full flow. *(See Appendix B- Storm Drain Pipe Hydraulic Calculation Table for all piping calculations)* The findings demonstarte that all pipes are flowing less than 100% full and thus sized sufficiently to contain the project run-off.

2.2.3 Analysis – Parker Flats Road Infiltration Chamber.

The offsite flows are routed into a DI that directly connects to an infiltration chamber. Calculations for sizing and a cut sheet for the specified unit are included in Appendix C. *(See Appendix C- Infiltration Basin Sizing and Stormtech Cut Sheet)*

SECTION 3 Conclusion

The analysis in this report demonstrates that the offsite and onsite drainage pipes being installed for this project have sufficient capacity to convey onsite design flows to the existing onsite regional low area, and convey offsite design flows to a new infiltration chamber with Parker Flats Road.

APPENDIX 'A'

Proposed Hydrology Study Exhibit

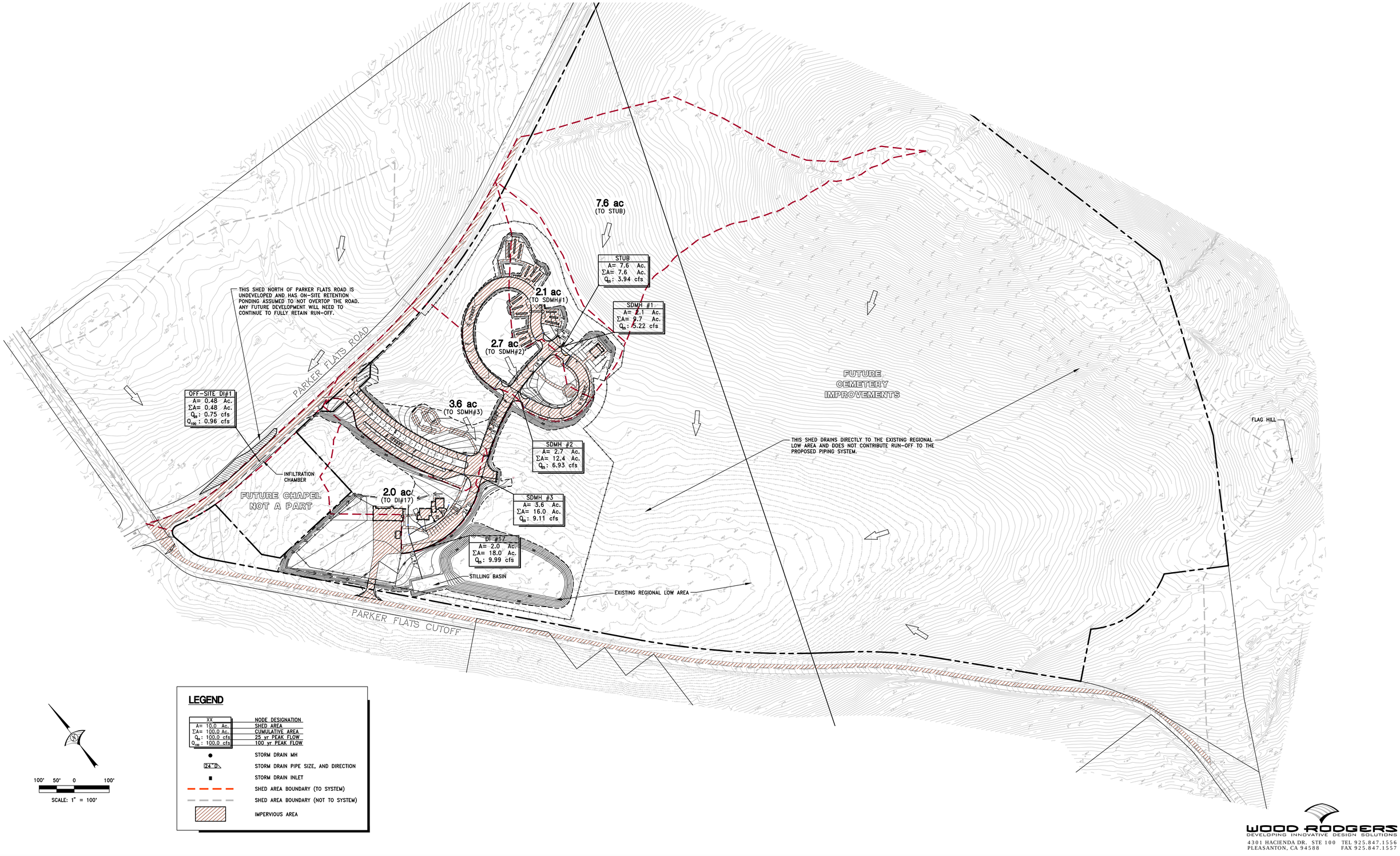
PROPOSED HYDROLOGY STUDY EXHIBIT

CALIFORNIA CENTRAL COAST VETERANS CEMETERY

STATE OF CALIFORNIA DEPARTMENT OF GENERAL SERVICES

CITY OF SEASIDE / COUNTY OF MONTEREY, CALIFORNIA

JULY, 2014



LEGEND

XX	NODE DESIGNATION
A= 10.0 Ac.	SHED AREA
ΣA= 100.0 Ac.	CUMULATIVE AREA
Q10: 100.0 cfs	25 yr PEAK FLOW
Q100: 100.0 cfs	100 yr PEAK FLOW
●	STORM DRAIN MH
24" D	STORM DRAIN PIPE SIZE, AND DIRECTION
■	STORM DRAIN INLET
- - - -	SHED AREA BOUNDARY (TO SYSTEM)
- - - -	SHED AREA BOUNDARY (NOT TO SYSTEM)
▨	IMPERVIOUS AREA

100' 50' 0 100'

SCALE: 1" = 100'

WOOD RODGERS
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4301 HACIENDA DR. STE 100 TEL 925.847.1556
PLEASANTON, CA 94588 FAX 925.847.1557

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APPENDIX 'B'

Storm Drain Pipe Hydraulic Calculation Table

Project No. 8482

Engineer: Ron Johnson
Date: July 2, 2014

CALIFORNIA CENTRAL COAST VETERAN'S CEMETARY
STORM DRAIN PIPE HYDRAULIC CALCULATION TABLE

	Run-off Calculation											Pipe Sizing					Findings	
			Run-off Coefficient					Intensity		Run-off							Q_d / Q_{full}	
	Area	Area Sum	Pervious Area (C=0.1)	Pervious Area Sum (C=0.1)	Impervious Area (C=0.9)	Impervious Area Sum (C=0.9)	Total Composite C	25-year Intensity I25 = 7.75 * 0.865 / (Tc)^1/2	100-year Intensity I100 = 7.75 * 1.11 / (Tc)^1/2	Q_{25}	Q_{100}	D	L	S_{actual}	V_{full}	Q_{full}	25-year	100-year
Node	(ac)	(ac)	(ac)	(ac)	(ac)	(ac)		(in/hr)	(in/hr)	(cfs)		(in)	(ft)	-	(fps)	(cfs)	%	%
ON-SITE STORM DRAIN SYSTEM																		
STUB	7.60	7.60	5.70	5.70	1.90	1.90	0.30	1.73	N/A	3.94	N/A	18	22	0.005	3.64	6.44	61	N/A
SDMH 1	2.10	9.70	1.44	7.14	0.66	2.56	0.31	1.73	N/A	5.22	N/A	18	453	0.029	8.77	15.50	34	N/A
SDMH2	2.70	12.40	1.80	8.94	0.90	3.46	0.32	1.73	N/A	6.93	N/A	18	209	0.048	11.29	19.95	35	N/A
SDMH 3	3.60	16.00	2.48	11.42	1.12	4.58	0.33	1.73	N/A	9.11	N/A	24	304	0.0047	4.28	13.44	68	N/A
DI 17	2.00	18.00	1.61	13.03	0.39	4.97	0.32	1.73	N/A	9.99	N/A	24	56	0.011	6.55	20.56	49	N/A
OFF-SITE STORM DRAIN SYSTEM																		
OFF-SITE DI 1	0.48	0.48	0.00	0.00	0.48	0.48	0.90	1.73	2.22	0.75	0.96	N/A	N/A					

Notes:

1 **Head loss was calculated using Manning's equation. The Manning's roughness coefficient used: 0.015**
2 **Based on the Caltrans method of calculating Tc for overland flow to the first node "STUB", a Tc of 15 mins was calculated. As the travel time within the piping is very short, the same Tc was conservatively used for all on-site nodes to simplify the analysis.**
3 **A Tc of 10 minutes was used for the off-site system. As the time within the piping is very short, the same Tc was conservatively used for both off-site nodes to simplify the analysis.**
4 **Off-Site DI 1 connects directly to an infiltration chamber.**

APPENDIX 'C'

Infiltration Basin Sizing and StormTech Cut Sheet

Hydrology Report
Parker Flats Road
Stormwater Storage Requirement Calculation
Facility: **10-Jun-14**
Modified Rational Method **by: DR**

User Input:			Notes / Comments
A (impervious)	0.48	Acres	From Wood Rodgers Drainage Report 5/9/14
A (pervious)	0.00	Acres	
C (impervious)	0.9	--	
C (pervious)	0.20	--	
Ā	525	sq. ft.	Infiltration area of percolation facility
Percolation Rate (p)	12.00	in / hr	Maximum Allowable, rate to be verified at time of construction. Percolatoin test 13.6 in/hr †
Design Storm	100	Years	Works only for storm of 2,10,25,50 or 100 years, otherwise enter storm intensity here*:
2-Year Intensity	0.45	in/hr	From Monterey County Standard Detail 25, "Rainfall Intensities Chart"

i=	0.999	100	year storm intensity
I=	7.742	/SQRT(t)	I=7.75i/SQRT(t)

Runoff:

R(imp)=C*i*A(imp)*t*60= 200.68 x SQRT(t)
R(perv)=C*iA(perv)*t*60= 0.00 x SQRT(t)
R(net)=R(imp)+R(perv)= 200.68 x SQRT(t)

Infiltration:

I = (Ā * p / 60) * t =
I = 8.75 x t

Chamber Storage:

Storage = R - I = 200.68 x SQRT(t) - 8.75 *t

d(ps)/dt=0 therefore t= 131.5 Minutes = 2.19 Hours Basin drains in less than 48 hours? **True**

Required Retention Volume

PS(t)=Pmax=	1151	CF
	0.03	AF

SC-740	2.19	STORAGE AS EQUIVALENT DEPTH IN PERCOLATION FACILITY (FT)*
	0.66	STORAGE AS EQUIVALENT DEPTH OVER SITE (INCHES)
	45%	STORAGE AS A PERCENT OF CALC'D PRECIPITATION

Proposed Retention Dimensions

Type of Chamber	SC-740
Area of Chamber	525
Number of Chambers	1
Width	6.25
Length	84

* Target value per Stormtech Attachement 1
† Kleinfelder-Geotechnical Report and Percolation Testing - Parker Flats Road 9/17/10, delta 10/7/10

StormTech Subsurface Stormwater Management

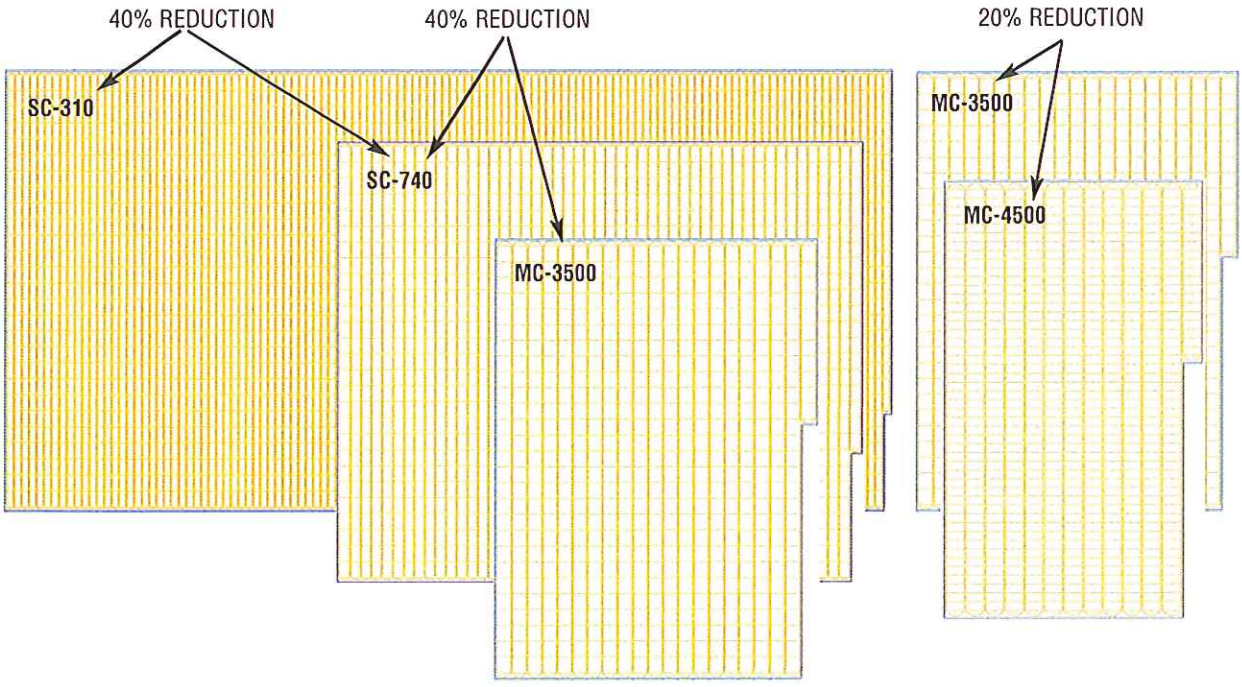


PRODUCT SPECIFICATIONS	SC-310	SC-740	DC-780	MC-3500	MC-4500
Height, in. (mm)	16 (406)	30 (762)	30 (762)	45 (1143)	60 (1524)
Width, in. (mm)	34 (864)	51 (1295)	51 (1295)	77 (1956)	100 (2540)
Length, in. (mm)	90.7 (2300)	90.7 (2300)	90.7 (2300)	90 (2286)	52 (1321)
Installed Length, in. (mm)	85.4 (2170)	85.4 (2170)	85.4 (2170)	86.0 (2184)	48.3 (1227)
Bare Chamber Storage, cf (cm)	14.7 (0.42)	45.9 (1.30)	46.2 (1.30)	109.9 (3.11)	106.5 (3.01)
Stone above, in. (mm)	6 (152)	6 (152)	6 (152)	12 (305)	12 (305)
Stone below, in. (mm)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)
Row Spacing, in. (mm)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)
Minimum Installed Storage, cf (cm)	**31.0 (0.88)**	**74.9 (2.12)**	**78.4 (2.22)**	**178.9 (5.06)**	**162.6 (4.60)**
Storage Per Unit Area, cf/sf (cm/sm)	1.31 (0.39)	2.21 (0.67)	2.32 (0.70)	3.48 (1.06)	4.45 (1.35)

NOTE: Spec sheets for our RC-310 and RC-750, recycled chambers, are available upon request.



Example: Footprint Comparison – 100,000 CF Project



Attachment 11

Basin Staged Storage

Proposed Basin (Phase 1-2)

Infiltration basin staged storage

Notes	Elev	Area, sf	Area, ac	Delta Vol, ac-ft	Cumulative Vol, ac-ft
Invert	270.0	17294	0.40	0.00	0.00
	271.0	19700	0.45	0.42	0.42
	272.0	22200	0.51	0.48	0.91
	273.0	24800	0.57	0.54	1.45
	274.0	27502	0.63	0.60	2.05
	275.0	30303	0.70	0.66	2.71
	276.0	33337	0.77	0.73	3.44
	277.0	36506	0.84	0.80	4.24
	278.0	39669	0.91	0.87	5.12
	279.0	42924	0.99	0.95	6.06
	280.0	46294	1.06	1.02	7.09
	281.0	49778	1.14	1.10	8.19
	282.0	53539	1.23	1.19	9.38
1ft freeboard	283.0	57579	1.32	1.28	10.65
Top	284.0	61961	1.42	1.37	12.02

Attachment 12

"Geotechnical Investigation: California Central Coast Veterans Cemetery, Phase 2"

December 10, 2018, SCST, LLC

GEOTECHNICAL INVESTIGATION

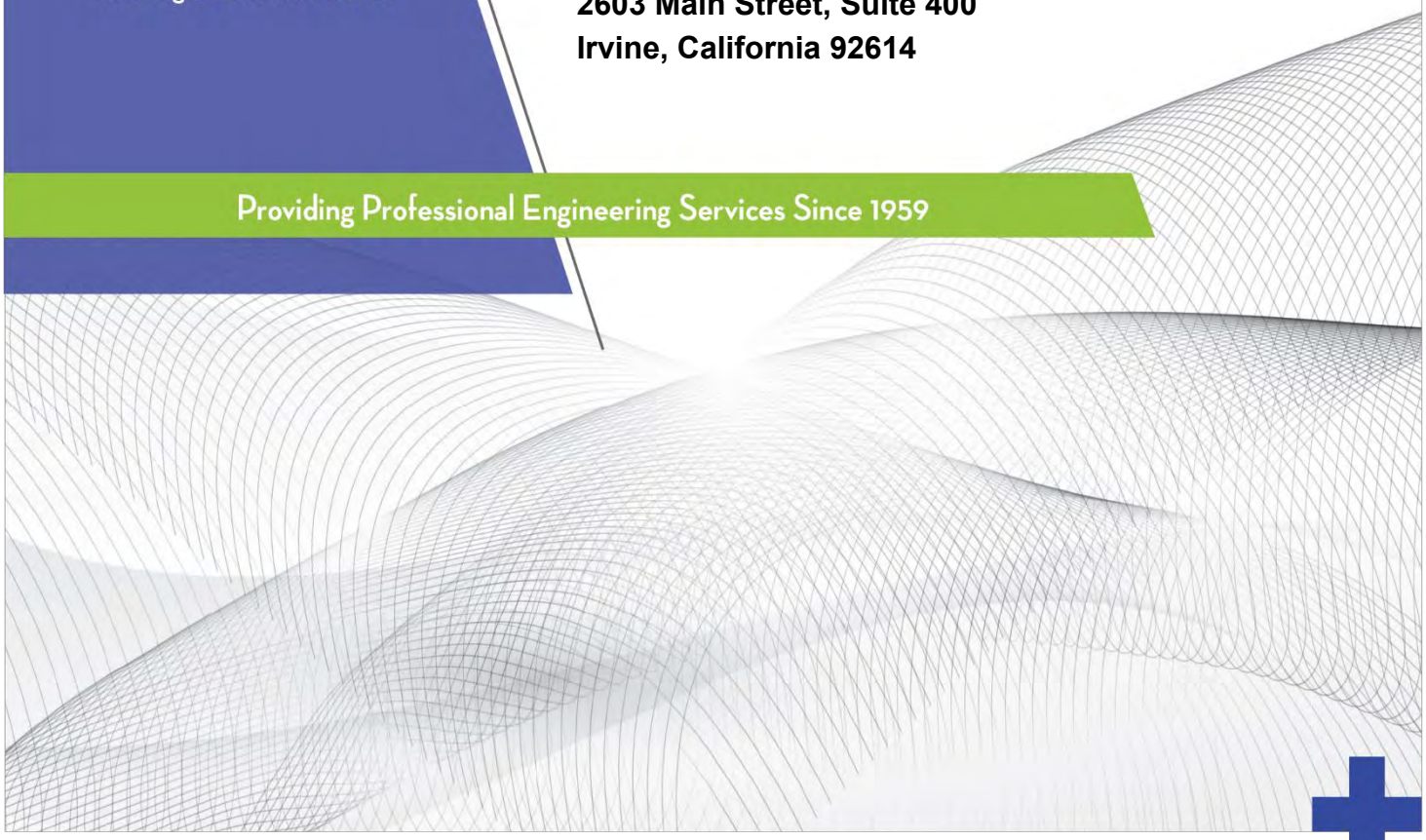
CALIFORNIA CENTRAL COAST VETERANS CEMETERY, PHASE 2

Parker Flats Cut Off Road
Seaside, California

Prepared By:
SCST, LLC
6280 Riverdale Street
San Diego, California 92120

Prepared For:
Mr. Carl Taylor, PE, LEED AP
Huitt-Zollars, Inc.
2603 Main Street, Suite 400
Irvine, California 92614

Providing Professional Engineering Services Since 1959



GEOTECHNICAL INVESTIGATION

December 10, 2018

SCST No. 180402P4
Report No. 1

Mr. Carl Taylor, PE, LEED AP
Vice President
Huitt-Zollars, Inc.
2603 Main Street, Suite 400
Irvine, California 92614

Subject: GEOTECHNICAL INVESTIGATION
CALIFORNIA CENTRAL COAST VETERANS CEMETERY, PHASE 2
PARKER FLATS CUT OFF ROAD
SEASIDE, CALIFORNIA

Dear Mr. Taylor:

SCST, LLC (SCST) is pleased to present our report describing the geotechnical investigation performed for the California Central Coast Veterans Cemetery, Phase 2 project. We conducted the geotechnical investigation in general conformance with the scope of work presented in our proposal dated June 22, 2018. Based on the results of our investigation, we consider the planned development feasible from a geotechnical standpoint, provided the recommendations of this report are followed. If you have any questions, please call us at (619) 280-4321.

Respectfully submitted,
SCST, LLC

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Appendix I ..... Field Investigation
Appendix II ..... Laboratory Testing
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EXECUTIVE SUMMARY

This report presents the results of the geotechnical investigation SCST, LLC (SCST) performed for the California Central Coast Veterans Cemetery (CCCVC), Phase 2 project. We understand the project will consist of design and construction of a new cemetery on 4.29 acres of land. The phase 2 development will consist of 2,000 in-ground crypts, 1,700 in-ground cremains plots, approximately 400 linear feet of new roadways, and rehabilitation of the existing infiltration basin. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project.

SCST explored the subsurface conditions by drilling ten borings and three percolation test borings to depths between about 8½ and 11½ feet below the existing ground surface using a breakdown tripod rig auger and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations. Additionally, SCST obtained and reviewed previously prepared geotechnical reports for the proposed cemetery (Kleinfelder, 2010 and 2014).

The materials encountered in the borings performed by SCST consists of poorly graded sand with silt and silty sands. These materials are generally consistent with the soils encountered during the previous investigations performed by Kleinfelder. Groundwater was not encountered in the borings. SCST also performed three borehole percolation tests around the existing infiltration basin.

The main geotechnical considerations affecting the proposed construction are the presence of near-surface loose sands. To reduce the potential for settlement, hardscapes, retaining walls, and any other settlement sensitive improvements should be underlain by at least 2 feet of compacted fill materials with an expansion index of 20 or less. The recommendations presented herein may need to be updated once final plans are developed.

1. INTRODUCTION

This report presents the results of the geotechnical investigation SCST, LLC (SCST) performed for the California Central Coast Veterans Cemetery (CCCVC), Phase 2 project. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. Figure 1 presents the site location.

2. SCOPE OF WORK

2.1 FIELD INVESTIGATION

SCST explored the subsurface conditions by drilling ten borings and three percolation test borings to depths between about 8½ and 11½ feet below the existing ground surface using a tripod rig auger and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations.

Our scope of services also included Unexploded Ordinance (UXO) training and an escort by a certified technician by Kemron Environmental during our field investigation. A private utility locator (Safe2Core) was contracted to provide utility clearance for each exploratory boring location in addition to the marking and notification of the site for Underground Services Alert.

2.2 LABORATORY TESTING

Selected samples were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of in situ moisture and density, particle-size distribution, direct shear, R-value, expansion index, and corrosivity. The results of the laboratory tests and brief explanations of the test procedures are presented in Appendix II.

2.3 BOREHOLE PERCOLATION TESTING

We performed borehole percolation testing at three locations (P-1, P-2, and P-3) in general conformance with the Native Soil Assessment for Small Infiltration-Based Stormwater Control Measures Manual (Central Coast Low Impact Development Initiative, 2013). The results of the testing are presented in Appendix III.

2.4 ANALYSIS AND REPORT PREPARATION

The results of the field and laboratory tests were evaluated to develop conclusions and recommendations regarding:

- Subsurface conditions beneath the site
- Potential geologic hazards
- Criteria for seismic design in accordance with the 2016 California Building Code (CBC)
- Site preparation and grading
- Estimated foundation settlements
- Support for flatwork and concrete slabs-on-grade
- Crypt subdrains
- Retaining walls
- Pavement sections
- Soil corrosivity
- Infiltration test results on existing flood basin

3. SITE DESCRIPTION

The CCCVC is located on the previous site of Ford Ord in the city of Seaside, Monterey County, California. It is bound by Normandy Road (previously Parker Flats Road) to the north, Parker Flats Road (previously Parker Flats Cut-Off) to the west, and undeveloped land consisting of dense vegetation, trees, and brush to the east and south. A site vicinity map shows the approximate location of the site on Figure 1.

4. PROPOSED DEVELOPMENT

We understand the project will consist of design and construction of a new cemetery on 4.29 acres of land. Specifically, phase 2 development of the CCCVC will consist of 2,000 in-ground crypts, 1,700 in-ground cremains plots, approximately 400 linear feet of new roadways, and rehabilitation of the existing infiltration basin. Phase 2 consists of three sections that are located on the northwest portion of the CCCVC site. The in-ground cremains plots will be located east of the existing memorial walk at Section 1 of Phase 2. This area will be used to place cremated remains approximately 3 feet below the ground surface. The in-ground crypt plots will be developed on Sections 2 and 3 of Phase 2, south of the existing street. An additional 395 feet of street will be added to access these burial plots and allow for vehicle turnarounds. These sections

will house pre-cast concrete crypts in plots measuring 3 feet by 8 feet as well as some oversize crypts in plots measuring 4 feet by 9 feet.

5. SUBSURFACE SOIL CONDITIONS

The site is located along the central coast of California and is underlain by Quaternary-age sand deposits. A description of the subsurface material encountered is presented below. Figure 3 presents the regional geology in the vicinity of the site.

Sand Deposits (Qs): The dune and drift sand deposits encountered in the borings consists primarily of fine-grained sands with silt to silty sands to the maximum depths explored. The materials were loose in the upper two feet and becoming medium dense to dense with increasing depth.

Groundwater: Groundwater was not encountered in the borings. Historic high groundwater levels at a nearby monitoring well (Monterey Peninsula Water Management District Well #FO-08) indicates the groundwater level is on the order of 400 feet below existing ground surface at the site. The permanent groundwater table is expected to be below a depth that will influence the planned construction. However, groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater rise or seepage is difficult to predict, such conditions are typically mitigated if and when they occur.

6. GEOLOGIC HAZARDS

6.1 FAULTING AND SURFACE RUPTURE

Figure 3 shows the locations of known faults in the region. The closest known active fault is the Rinconada Fault and Monterey Bay Fault located about 3.4 miles (5.5 kilometers) to the northeast and 5.1 miles (8.2 kilometers) to the southwest of the site, respectively. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active faults are known to underlie or project toward the site. Therefore, the probability of fault rupture is low.

6.2 CBC SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is ground shaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and maximum considered earthquake (MCE_R) spectral response acceleration parameters in accordance with the 2016 CBC are presented below:

Site Coordinates: Latitude 36.63591°
Longitude -121.79555°

Site Class: D

Site Coefficients, F_a = 1.000
F_v = 1.500

Mapped Spectral Response Acceleration at Short Period, S_s = 1.478g

Mapped Spectral Response Acceleration at 1-Second Period, S_1 = 0.529g

Design Spectral Acceleration at Short Period, S_{DS} = 0.985g

Design Spectral Acceleration at 1-Second Period, S_{D1} = 0.529g

Site Peak Ground Acceleration, PGA_M = 0.558g

6.3 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, resulting in large total and differential ground surface settlements and possible lateral spreading during an earthquake. Due to the lack of shallow groundwater and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is low.

6.4 LANDSLIDES AND SLOPE STABILITY

Evidence of landslides or slope instabilities was not observed during our investigation. The potential for landslides or slope instabilities to occur at the site is considered low.

6.5 FLOODING, TSUNAMIS, AND SEICHES

The site is not located within a flood zone. The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009). Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water. Therefore, the potential for flooding, tsunamis, or seiches to affect the site is considered low.

6.6 SUBSIDENCE

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered low.

6.7 HYDRO-CONSOLIDATION

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are aeolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater causing the

material to consolidate. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

7. CONCLUSIONS

Based on the results of our investigation, we consider the proposed construction feasible from a geotechnical standpoint, provided the recommendations of this report are followed. The main geotechnical considerations affecting the proposed construction are the presence of near-surface loose sands. Remedial grading will need to be performed to reduce the potential for distress to the proposed improvements. Remedial grading recommendations are provided in the following sections of this report. The recommendations presented herein may need to be updated once final plans are developed.

8. RECOMMENDATIONS

8.1 SITE PREPARATION AND GRADING

8.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation, and debris. Subsurface improvements that are to be abandoned should be removed, and the resulting excavations should be backfilled and compacted in accordance with the recommendations of this report. Pipeline abandonment can consist of capping or rerouting at the project perimeter and removal within the project perimeter. If appropriate, abandoned pipelines can be filled with grout or slurry as recommended by and observed by the geotechnical consultant.

8.1.2 Remedial Grading – Above Ground Improvements

The on-site soils should be excavated to a depth of at least 2 feet below the planned hardscapes, retaining wall footings, and any other settlement sensitive improvements. Localized deeper excavations may be necessary due to loose or otherwise unsuitable materials encountered during grading. Horizontally, the excavations should extend at least 2 feet outside the planned improvements, retaining wall footings, or up to existing improvements, whichever is less. An SCST representative should observe conditions exposed in the bottom of excavations to determine if any additional excavation is required.

8.1.3 Remedial Grading – In Ground Crypts

We anticipate that the construction of the proposed in-ground crypts will involve deeper excavations. Localized deeper excavations may be necessary due to loose or otherwise unsuitable materials encountered during grading. Horizontally, the excavations should

extend at least 2 feet outside the planned improvements or up to any existing improvements, whichever is less. The excavations will require temporary excavations or shoring. The pre-cast concrete crypts in plots should be placed on top of a 6-inch layer of drainage fill consisting of 1-inch crushed rock. An SCST representative should observe conditions exposed in the bottom of excavations to determine if any additional excavation is required.

8.1.4 Expansive Soil

The on-site soil sample tested has an expansion index of very low. To reduce the potential for expansive heave, retaining wall footings and hardscape areas should be underlain by at least 2 feet of material with an expansion index of 20 or less. Horizontally, the low expansion potential material should extend at least 2 feet outside the planned hardscape areas, retaining walls, or up to existing improvements, whichever is less. Based on our laboratory tests results, the on-site soils will meet this expansion index criteria.

8.1.5 Compacted Fill

The exposed bottom of all excavations should be scarified to a depth of 12 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. Fills should be moisture conditioned to near optimum moisture content and compacted to at least 90% relative compaction. Fill should be placed in horizontal lifts at a thickness appropriate for the equipment spreading, mixing, and compacting the material, but generally should not exceed 8 inches in loose thickness. The maximum dry density and optimum moisture content for evaluating relative compaction should be determined in accordance with ASTM D 1557. Utility trench backfill beneath structures, pavements, and hardscape should be compacted to at least 90% relative compaction. The top 12 inches of subgrade beneath pavements should be compacted to at least 95%.

8.1.6 Imported Soil

Imported soil should consist of predominately granular soil, have an expansion index of less than 20, and be free of organic matter and rocks greater than 6 inches. Imported soil should be observed and, if appropriate, tested by SCST prior to transport to the site.

8.1.7 Excavation Characteristics

It is anticipated that excavations can be achieved with conventional earthwork equipment in good working order.

8.1.8 Oversized Material

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, used as landscape material, or disposed of off-site.

8.1.9 Temporary Excavations

Temporary excavations 3 feet deep or less can be made vertically. Deeper temporary excavations in fill should be laid back no steeper than 1:1 (horizontal:vertical). The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing, or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. SCST should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (horizontal:vertical) downward from the outside bottom edge of existing structures or improvements will require shoring. Soldier piles and lagging, internally braced shoring or trench boxes could be used. If trench boxes are used, the soil immediately adjacent to the trench box is not directly supported. Ground surface deformations immediately adjacent to the pit or trench could be greater where trench boxes are used compared to other methods of shoring.

As an alternative to shoring/underpinning, maximum 10-foot-wide slots can be excavated and immediately backfilled adjacent to existing improvements. Care should be taken to not undermine existing improvements. Slot excavations should be filled prior to performing adjacent excavations.

8.1.10 Temporary Shoring

For design of cantilevered shoring with level backfill, an active earth pressure equal to a fluid weighing 35 pounds per cubic foot (pcf) can be used. An additional 20 pcf should be added for shoring with 2:1 sloping ground. The surcharge loads on shoring from traffic and construction equipment working adjacent to the excavation can be modeled by assuming

an additional 2 feet of soil behind the shoring. For design of soldier piles, an allowable passive pressure of 350 pounds per square foot (psf) per foot of embedment over two times the pile diameter up to a maximum of 5,000 psf can be used. Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be required throughout. The soldier piles should be designed for the full anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure can be limited to a maximum value of 400 psf.

8.1.11 Temporary Dewatering

Groundwater seepage may occur locally and should be anticipated in excavations. Temporary dewatering can be accomplished by sloping the excavation bottom to a sump and pumping from the sump. A layer of gravel about 6 inches thick placed in the bottom of the excavation will facilitate groundwater flow and can be used as a working platform.

8.1.12 Slopes

All permanent slopes should be constructed no steeper than 2:1 (horizontal:vertical). Faces of fill slopes should be compacted either by rolling with a sheepsfoot roller or other suitable equipment or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (horizontal:vertical). In our opinion, slopes constructed no steeper than 2:1 (horizontal:vertical) will possess an adequate factor of safety. An engineering geologist should observe all cut slopes during grading to ascertain that no unforeseen adverse geologic conditions are encountered that require revised recommendations. All slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

8.1.13 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should

excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

8.1.14 In-Ground Crypts Drainage

A drainage system is recommended to be provided beneath the in-ground crypts. The drainage system should consist of a 4-inch perforated subdrain pipe (SDR 35 or equivalent) with the perforations faced downward placed at the end of the lowest end crypt field. The crypt field should be graded to allow positive drainage to the system. The subdrain pipe should be enveloped with 3 cubic feet per linear feet of ¾" crushed rock wrapped with a filter fabric (Mirafi 140N or equivalent). The pipe should be designed to have a minimum 1% fall to a suitable outlet.

8.1.15 Grading Plan Review

SCST should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented and that no revised recommendations are needed due to changes in the development scheme.

8.2 CONVENTIONAL RETAINING WALLS

8.2.1 Foundations

Retaining walls can be supported on shallow spread and/or continuous footings with bottoms levels entirely on compacted fill. Footings should extend at least 18 inches below lowest adjacent finished grade and should be at least 24 inches wide. An allowable bearing capacity of 2,500 psf can be used. This bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 5,000 psf. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 7 feet exists between the lower outside footing edge and the face of the slope.

8.2.2 Resistance to Lateral Loads

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. Passive pressure can be computed using an allowable lateral pressure of 350 psf per foot of depth below the ground surface for level ground conditions. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.2.3 Lateral Earth Pressures

The active earth pressure for the design of unrestrained retaining walls with level backfill can be taken as equivalent to the pressure of a fluid weighing 35 pcf. The at-rest earth pressure for the design of restrained retaining walls with level backfills can be taken as equivalent to the pressure of a fluid weighing 55 pcf. These values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain clay soils. An additional 20 pcf should be added to these values for walls with a 2:1 (horizontal:vertical) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If any other surcharge loads are anticipated, SCST should be contacted for the necessary increase in soil pressure.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a backdrain to reduce the accumulation of hydrostatic pressures. The backdrain can consist of a 2-foot-wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided, or a perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide damp proofing specifications and details. Figure 4 presents typical conventional retaining wall backdrain details.

8.2.4 Seismic Earth Pressure

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid weighing 20 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, static active earth pressure. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

8.2.5 Backfill

Wall backfill should consist of granular, free-draining material having a sand equivalent of 20 or more. The backfill zone is defined by a 1:1 plane projected upward from the heel of the wall. Expansive or clayey soil should not be used. Additionally, backfill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in dimension. Backfill should be compacted to at least 90% relative compaction. Backfill should not be placed until walls have achieved adequate structural strength.

Compaction of wall backfill will be necessary to minimize settlement of the backfill and overlying settlement sensitive improvements. However, some settlement should still be anticipated. Provisions should be made for some settlement of concrete slabs and pavements supported on backfill. Additionally, any utilities supported on backfill should be designed to tolerate differential settlement.

8.2.6 Settlement Characteristics

Total foundation settlements are estimated to be less than 1 inch. Differential settlements across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

8.2.7 Foundation Excavation Observations

A representative from SCST should observe the foundation excavations prior to forming or placing reinforcing steel.

8.3 EXTERIOR SLABS-ON-GRADE

Exterior slabs on grade should be underlain by at least 2 feet of material with an expansion index of 20 or less. Exterior slabs should be at least 5 inches thick and reinforced with at least No. 3 bars at 18 inches on center each way for normal loading conditions. However, if heavier loads are anticipated, the slab should be designed using a modulus of subgrade reaction (kV1) value of 180 pounds per cubic inch.

Slabs should be provided with weakened plane joints placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be considered in the concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

8.4 PIPELINES

8.4.1 Thrust Blocks

For level ground conditions, a passive earth pressure of 300 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level if encountered.

8.4.2 Modulus of Soil Reaction

A modulus of soil reaction (E') of 2,000 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

8.4.3 Pipe Bedding

Pipe bedding, as specified in the "Greenbook" Standard Specifications for Public Works Construction, can be used. Bedding material should consist of clean sand having a sand equivalent not less than 30 and should extend to at least 12 inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The on-site materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

8.4.4 Cutoff Walls

Where pipeline inclinations exceed 15 percent, cutoff walls are recommended in trench excavations. Additionally, we do not recommend that open graded rock be used for pipe bedding or backfill because of the potential for piping erosion. The recommended bedding is clean sand having a sand equivalent not less than 30 or 2-sack sand/cement slurry. If sand/cement slurry is used for pipe bedding to at least 1 foot over the top of the pipe, cutoff walls are not considered necessary. The need for cutoff walls should be further evaluated by the project civil engineer designing the pipeline.

8.5 PAVEMENT SECTION RECOMMENDATIONS

The pavement support characteristics of the soils encountered during our investigation are considered favorable. An R-value of 67 was determined for the existing subgrade soils. Based on an R-value of 67, the following preliminary pavement structural sections are provided for the assumed Traffic Indexes.

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Portland Cement Concrete Pavement (inches)
Parking Stalls	5.0	3 AC / 4 AB	6 PCC / 4 AB
Drive Lanes	6.0	3 AC / 4 AB	6 PCC / 6 AB
Fire Lanes	7.5	5 AC / 4 AB	7½ PCC / 6 AB

AC – Asphalt Concrete
AB – Aggregate Base
PCC – Portland Cement Concrete

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. All soft or yielding areas should be stabilized or removed and replaced with compacted fill or aggregate base. Aggregate base and asphalt concrete should conform to the Caltrans Standard Specifications or the "Greenbook" and should be compacted to at least 95% relative compaction. Aggregate base should have an R-value of not less than 78. All materials and methods of construction should conform to good engineering practices and the minimum local standards.

8.6 SOIL CORROSIVITY

Representative samples of the on-site soil were tested to evaluate corrosion potential. The test results are presented in Appendix II. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength, and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations, as required.

8.7 INFILTRATION TESTING

The basin is currently filled with water and appears to have a very low infiltration rate due to the accumulation of silt at the bottom. We probed the bottom of the basin and collected samples to determine the depth of the silt. Based on our field observations, the very fine-grained silt was observed to be approximately 2 to 3 inches in thickness underlain by low permeability fine sand with silt to a depth of approximately 2 feet below the silt layer. To achieve the design rate, minimum 2½ feet of material at the bottom of the basin should be removed to expose the native coarse-grained soils. However, it should be noted that our observations were based on samples obtained at the edges of the basin and that the required removal depths may vary towards the middle portion of the basin.

We performed three borehole percolation tests at the approximate locations shown in Figure 2 to assess the infiltration rate of the native soils below the existing flood basin. Tests were conducted in accordance with the guidelines presented in the *Native Soil Assessment for*

Small Infiltration Based Stormwater Control Measures, Central Coast Low Impact Development Initiative (2013). The holes were drilled to a depth that corresponded to the basin bottom within the native soil strata. Each percolation test hole was logged by our field geologist, and the logs are included in Appendix I. The annulus between each perforated pipe and sidewall was filled with fine gravel. A hose equipped with a water meter was used to measure the volume during the presoak period. Appendix III presents the field data and test results. The table below presents the tested infiltration rates.

Infiltration Rate Test Results

Test Location	Test Depth (feet)	Material Type at Test Depth	Infiltration Rate (inch/hour)
P-1	10	Silty Sand	5.3
P-2	10	Silty Sand	0.6*
P-3	10	Silty Sand	7.4

*** Note: Observed silt intrusion in test hole during the percolation test.**

We observed very fine silt infiltrating the test hole at P-2 during testing. At each instance where the test hole was empty, fine silt layers had accumulated at the bottom of the test hole prior to refilling. Due to this intrusion of silt, it is our opinion that the test results for P-2 (0.6 inches per hour) are inconclusive and should be discarded.

The remaining measured test rates of 5.3 and 7.4 inches per hour are representative of the native soil types encountered in the test holes. The previous study by Kleinfelder (2010) indicates the measured infiltration rates near the basin (Parker Flats Cutoff Road and State Cemetery) ranged from 7.5 to 13.6 inches per hour.

The measured rates do not include a factor of safety, and long-term sustainable infiltration rates will be affected by several factors including the degree of saturation of the adjacent ground and the infiltration of fine-grained soils into the basin. Therefore, to account for these factors, the application of these rates should consider the use of an appropriate factor of safety. The development of the factor of safety should be based upon the more conservative rate obtained during testing and include consideration of the impacts of deteriorated performance, life safety issues and should anticipate that the measured test rates will be reduced over time.

9. GEOTECHNICAL ENGINEERING DURING CONSTRUCTION

The geotechnical engineer should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of the geotechnical engineer during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

10. CLOSURE

SCST should be advised of any changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the test pit locations and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

11. REFERENCES

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California Building Standards Commission, (2016), 2016 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Effective January 1, 2017.

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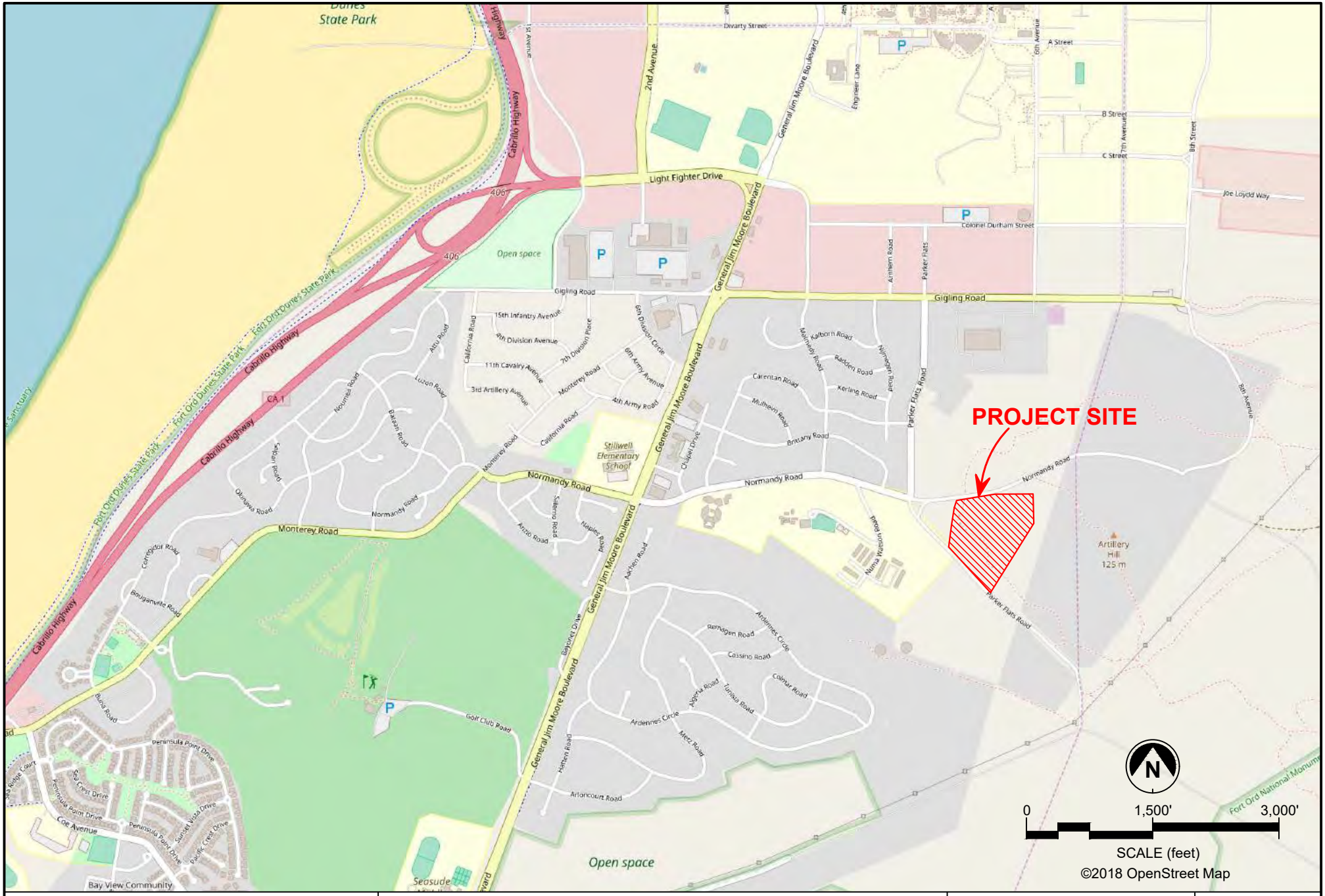
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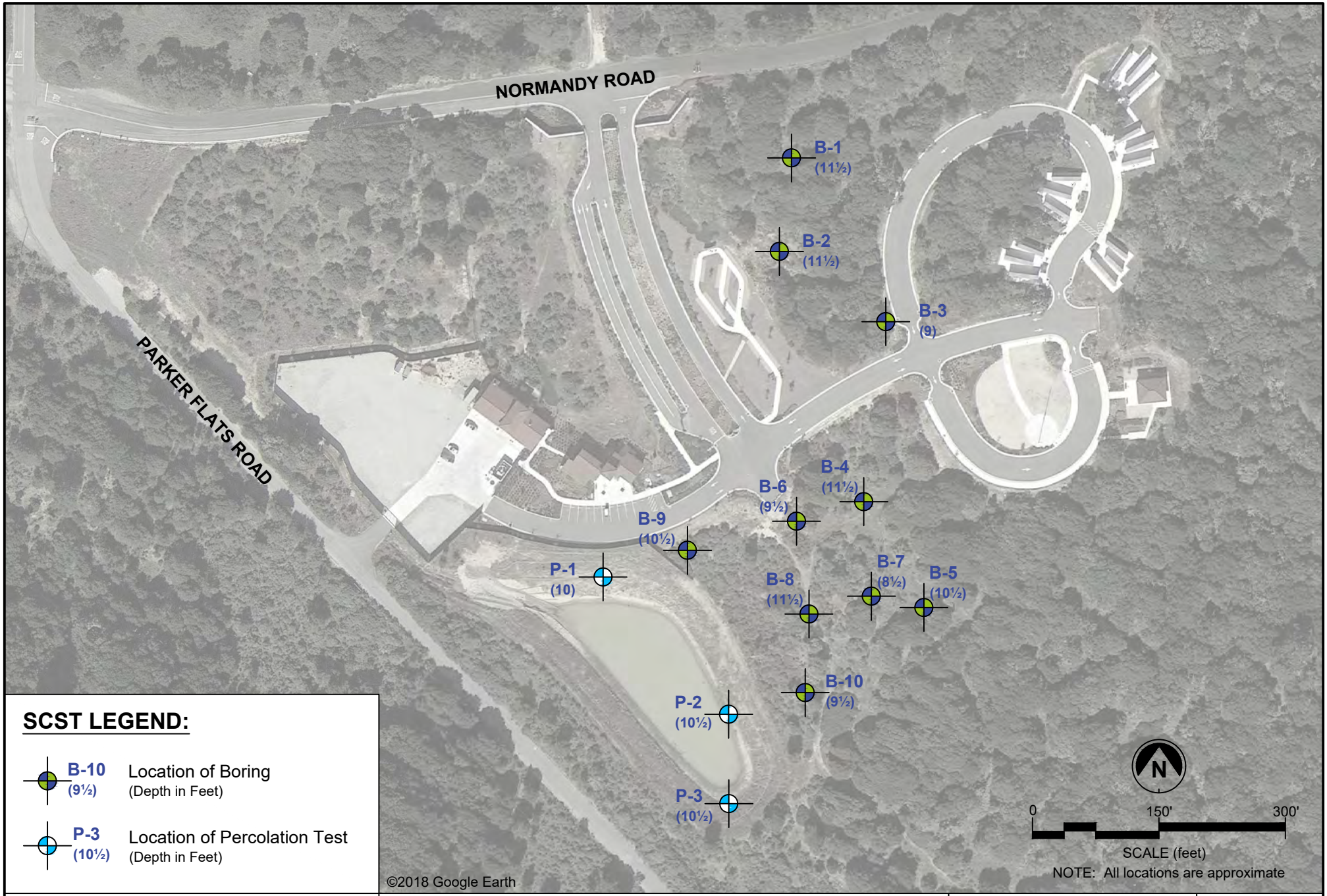
SCST, LLC

SITE VICINITY MAP

CCCVC Veterans Cemetery
Seaside, California

Date: December, 2018
By: PFL/DTC
Job No.: 180402P4-1

Figure: 1



SCST LEGEND:

- B-10 (9½) — Location of Boring (Depth in Feet)
- P-3 (10½) — Location of Percolation Test (Depth in Feet)

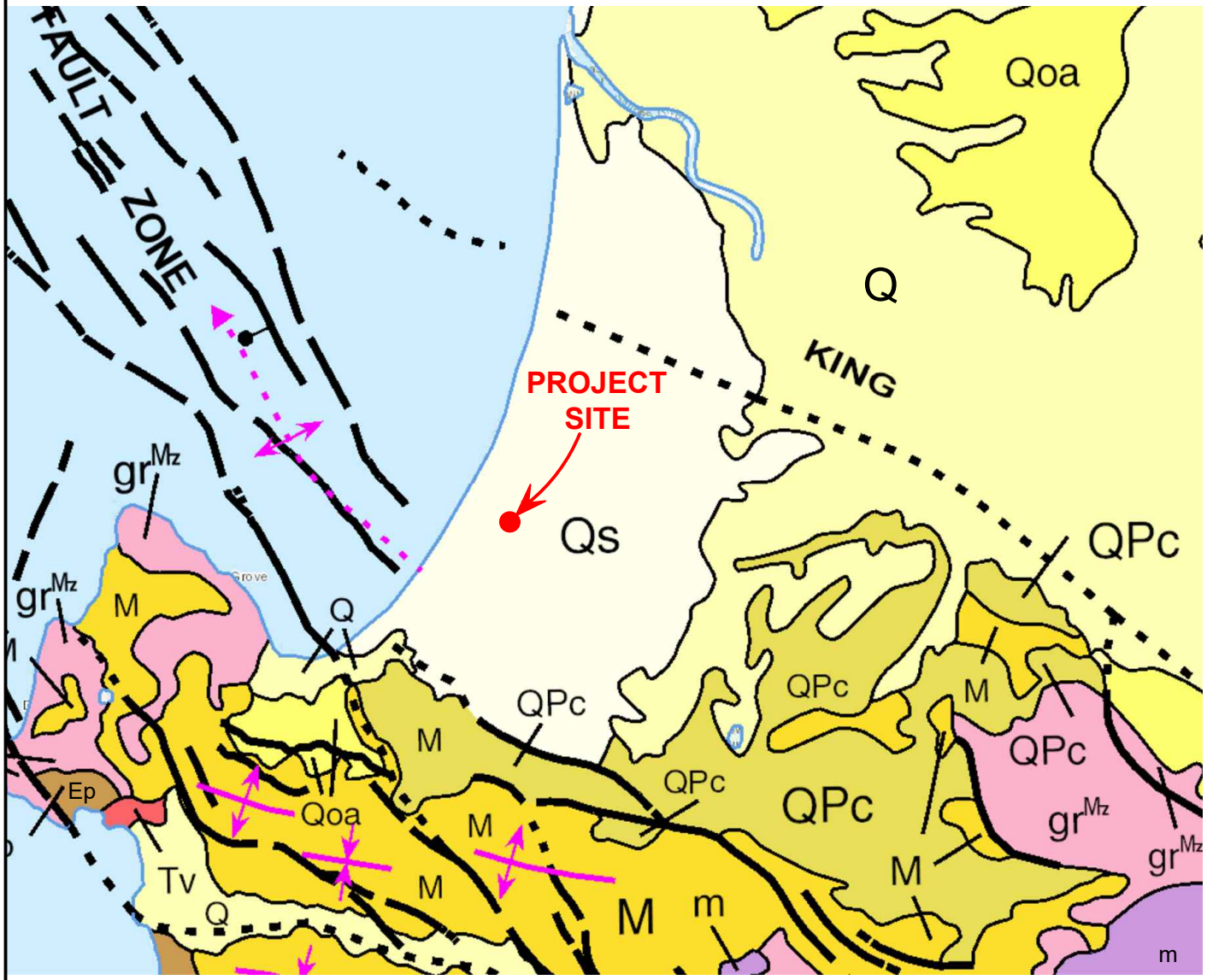
SCST, LLC

SUBSURFACE EXPLORATION MAP

CCCVC Veterans Cemetery
Seaside, California

Date: December, 2018
By: PFL/DTC
Job No.: 180402P4-1

Figure: 2



EXPLANATION:

Qs	Quaternary sand deposits
QPc	Pilo-Pleistocene and Pliocene loosely consolidated deposits
Q	Quaternary alluvium and marine deposits
Qoa	Older alluvial flood plain deposits
Tv	Tertiary volcanic flow rocks
M	Miocene marine rocks
Ep	Paleocene marine rocks
m	Pre-Cenozoic metasedimentary and metavolcanic rocks undivided
gr^{Mz}	Mesozoic granitic rocks

Anticline Fold - Solid where well defined; short dash where inferred

Syncline Fold - Solid where well defined; short dash where inferred

70 U D

Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

N

0 15,000' 30,000'

SCALE (feet)

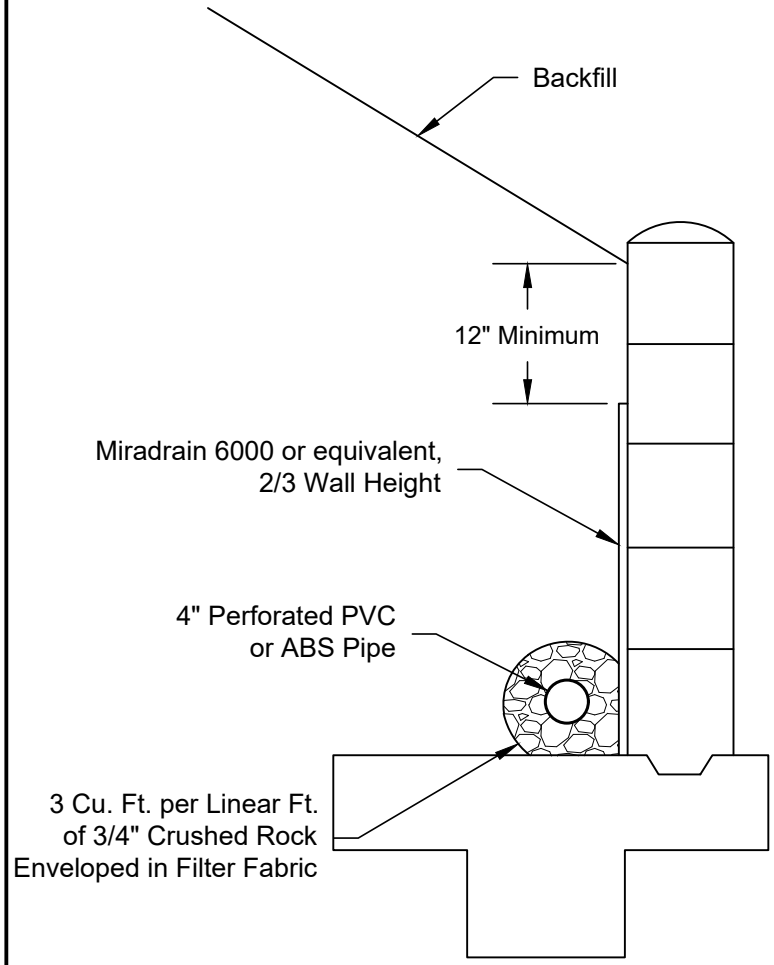
Reference:
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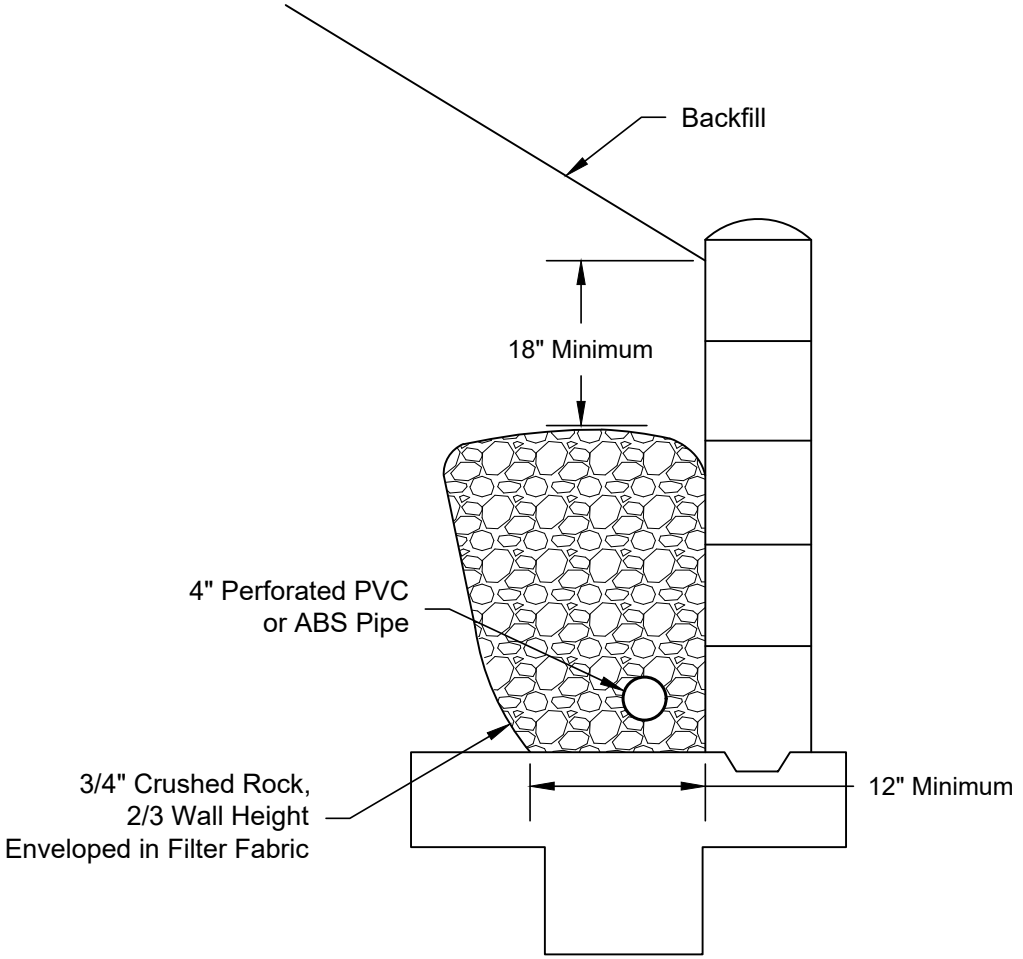
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REGIONAL GEOLOGY MAP
CCCVC Veterans Cemetery
Seaside, California

Date: November, 2018
By: PFL/DTC
Job No.: 180402P4-1

Figure: 3





NOT TO SCALE

NOTES:

1) Dampproof or waterproof back of wall following architect's specifications.
2) 4" minimum perforated pipe, SDR35 or equivalent, holes down, 1% fall to outlet. Provide solid outlet pipe at suitable locations.
3) Drain installation and outlet connection should be observed by the geotechnical consultant.

SCST, LLC	**TYPICAL RETAINING WALL BACKDRAIN DETAILS** CCCVC Veterans Cemetery Seaside, California	Date: December, 2018 By: PFL/DTC Job No.: 180402P4-1	Figure: 4

APPENDIX I
FIELD INVESTIGATION

Our field investigation consisted of a visual reconnaissance of the site and drilling ten borings and three percolation test borings to depths between about 8½ and11½ feet below the existing ground surface using a tripod drill rig and a hand auger. An SCST geologist logged the borings and collected samples of the materials encountered in the borings for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations. Figure 2 presents the approximate locations of the borings and percolation tests. The field investigation was performed under the observation of an SCST geologist who also logged the borings and obtained samples of the materials encountered in the borings.

The soils are classified in accordance with the Unified Soil Classification System as illustrated on Figure I-1. Logs of the borings are presented on Figures I-2 through I-14.

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION		GROUP SYMBOL	TYPICAL NAMES
I. COARSE GRAINED, more than 50% of material is larger than No. 200 sieve size.			
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
	GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
		SP	Poorly graded sands, gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand and silty mixtures.
		SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED, more than 50% of material is smaller than No. 200 sieve size.			
	SILTS AND CLAYS (Liquid Limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays or low plasticity.
	SILTS AND CLAYS (Liquid Limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
III. HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.

SAMPLE SYMBOLS

- ☒ - Bulk Sample
- CAL - Modified California Sampler
- CK - Undisturbed Chunk sample
- MS - Maximum Size of Particle
- ST - Shelby Tube
- SPT - Standard Penetration Test sampler

GROUNDWATER SYMBOLS

- ▽ - Water level at time of excavation or as indicated
- ≈ - Water seepage at time of excavation or as indicated

LABORATORY TEST SYMBOLS

- AL - Atterberg Limits
- CON - Consolidation
- COR - Corrosivity Tests (Resistivity, pH, Chloride, Sulfate)
- DS - Direct Shear
- EI - Expansion Index
- MAX - Maximum Density
- RV - R-Value
- SA - Sieve Analysis

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-1

LOG OF BORING B-1

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 310 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, moist, fine grained.							
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		20	17	2.7	96.3	DS
3									
4									
5									
6		Light yellowish brown.	CAL		23	20	1.0	102.6	
7									
8									
9									
10									
11		Light brown, dense.	CAL		56	48	5.2	105.0	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-2

LOG OF BORING B-2

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 297 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs)**: POORLY GRADED SAND with SILT, loose, light yellowish brown, moist, fine grained.		X					SA EI COR
2									
3	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		15	13	1.8	98.6	
4									
5									
6			CAL		15	13	4.8	97.6	
7									
8									
9									
10									
11			CAL		28	24	6.3	101.4	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-3

LOG OF BORING B-3

Date Drilled: 11/5/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 297 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, brown, dry, fine grained.		X					
2				X					
3		Medium dense, light brown, moist.	CAL	X	25	21	2.1	95.8	
4				X					
5		Dense.		X					
6			CAL		48	41	2.1	101.0	
7									
8		Very dense.							
9			CAL		50/6		4.1	106.1	
10		**BORING TERMINATED AT 9 FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-4

LOG OF BORING B-4

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 283 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.		X					
2				X					
3	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL	X	19	16	3.5	101.2	
4				X					
5				X					
6			CAL		33	28	7.2	110.9	
7									
8									
9									
10		Dense, fine to medium grained.							
11			CAL		49	42	4.8	108.3	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-5

LOG OF BORING B-5

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 292 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									SA
3		Medium dense, moist.	CAL		26	22	2.4	102.2	EI
4									COR
5	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
6			CAL		16	14	3.2	95.9	
7									
8									
9		Dense.							
10			CAL		42	36	8.9	117.3	
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-6

LOG OF BORING B-6

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 280 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.		X					
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.		X					SA
3			CAL	X	26	22	2.4	100.3	RV
4				X					
5				X					
6			CAL		35	30	2.5	105.1	
7									
8		Very dense.							
9			CAL		59	50	7.2	109.9	
10		**BORING TERMINATED AT 9½ FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-7

LOG OF BORING B-7

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 283 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		20	17	2.1	97.0	SA RV
3									
4									
5		Very dense.	CAL		65	55	3.0	107.8	
6									
7		Dense.							
8			CAL		51	43	5.3	110.6	
9		**BORING TERMINATED AT 8½ FEET**							
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-8

LOG OF BORING B-8

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 279 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2	SM	SILTY SAND, loose, light brown, moist, fine grained.							
3									
4									
5		Medium dense.							
6			CAL		20	17	10.1	110.3	DS
7									
8									
9									
10									
11			CAL		20	17	11.8	114.1	
12		**BORING TERMINATED AT 11½ FEET**							
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-9

LOG OF BORING B-9

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 280 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									
3		Dense, grey brown.	CAL		40	34	3.6	101.4	SA EI COR
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.	CAL		21	18	3.3	97.8	
7									
8									
9									
10		Dense.	CAL		51	43	9.1	99.4	
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-10

LOG OF BORING B-10

Date Drilled: 11/6/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): Approx 277 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SP	**SAND DEPOSITS (Qs):** POORLY GRADED SAND with SILT, loose, light yellowish brown, dry, fine grained.							
2									
3	SM	SILTY SAND, medium dense, light yellowish brown, moist, fine grained.							
4			CAL		21	18	3.3	102.9	
5		Light brown.							
6			CAL		33	28	6.5	107.2	
7									
8									
9			CAL		34	29	11.8	117.9	
10		**BORING TERMINATED AT 9½ FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-11

LOG OF BORING P-1

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, light yellowish brown, dry to moist, fine grained.		X					SA
2									
3		Light brown.							
4									
5									
6									
7									
8									
9									
10		**BORING TERMINATED AT 10 FEET**							
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-12

LOG OF BORING P-2

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs)**: SILTY SAND, loose, light yellowish brown, dry, fine grained.		X					SA
2	SP	POORLY GRADED SAND with SILT, loose, dark brown, moist, fine grained.							
3									
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
7									
8									
9									
10									
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-13

LOG OF BORING P-3

Date Drilled: 11/7/2018 | Logged by: ACL
Equipment: Tripod | Reviewed by: IC
Elevation (ft): | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**SAND DEPOSITS (Qs):** SILTY SAND, loose, light yellowish brown, dry, fine grained.							
2	SP	POORLY GRADED SAND with SILT, loose, dark brown, moist, fine grained.							
3									
4									
5									
6	SM	SILTY SAND, medium dense, light brown, moist, fine grained.							
7									
8									
9									
10									
11		**BORING TERMINATED AT 10½ FEET**							
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, Inc.

CCCVC Veterans Cemetery
Seaside, California

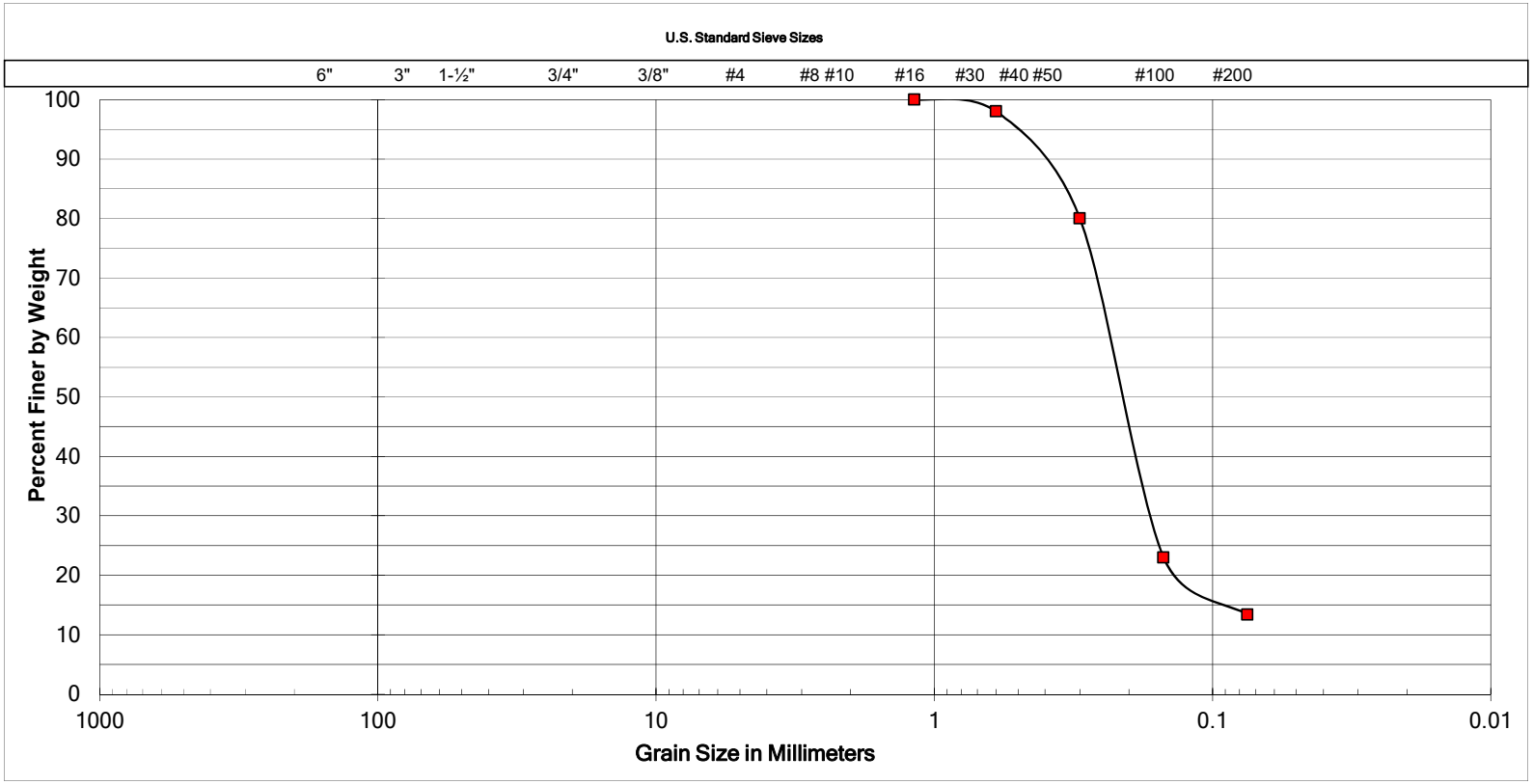
By:	EMW	Date:	December, 2018
Job Number:	180402P4-1	Figure:	I-14

APPENDIX II
LABORATORY TESTING

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **PARTICLE-SIZE DISTRIBUTION:** The particle-size distribution was determined on selected soil samples in accordance with ASTM D422.
- **DIRECT SHEAR:** The direct shear was determined on selected soil samples in accordance with ASTM D3080.
- **R-VALUE:** R-value tests were performed on selected soil samples in accordance with California Test Method 301.
- **EXPANSION INDEX:** The expansion index was determined on selected soil samples in accordance with ASTM D4829.
- **CORROSIVITY**: Corrosivity tests were performed on selected soil samples. The pH and minimum resistivity were determined in accordance with California Test 643. The total chloride ion content was determined in accordance with California Test 422. The soluble sulfate content was determined in accordance with California Test 417.

Soil samples not tested are now stored in our laboratory for future reference and analysis, if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-2 at 0 to 5 feet
SAMPLE NUMBER
34809

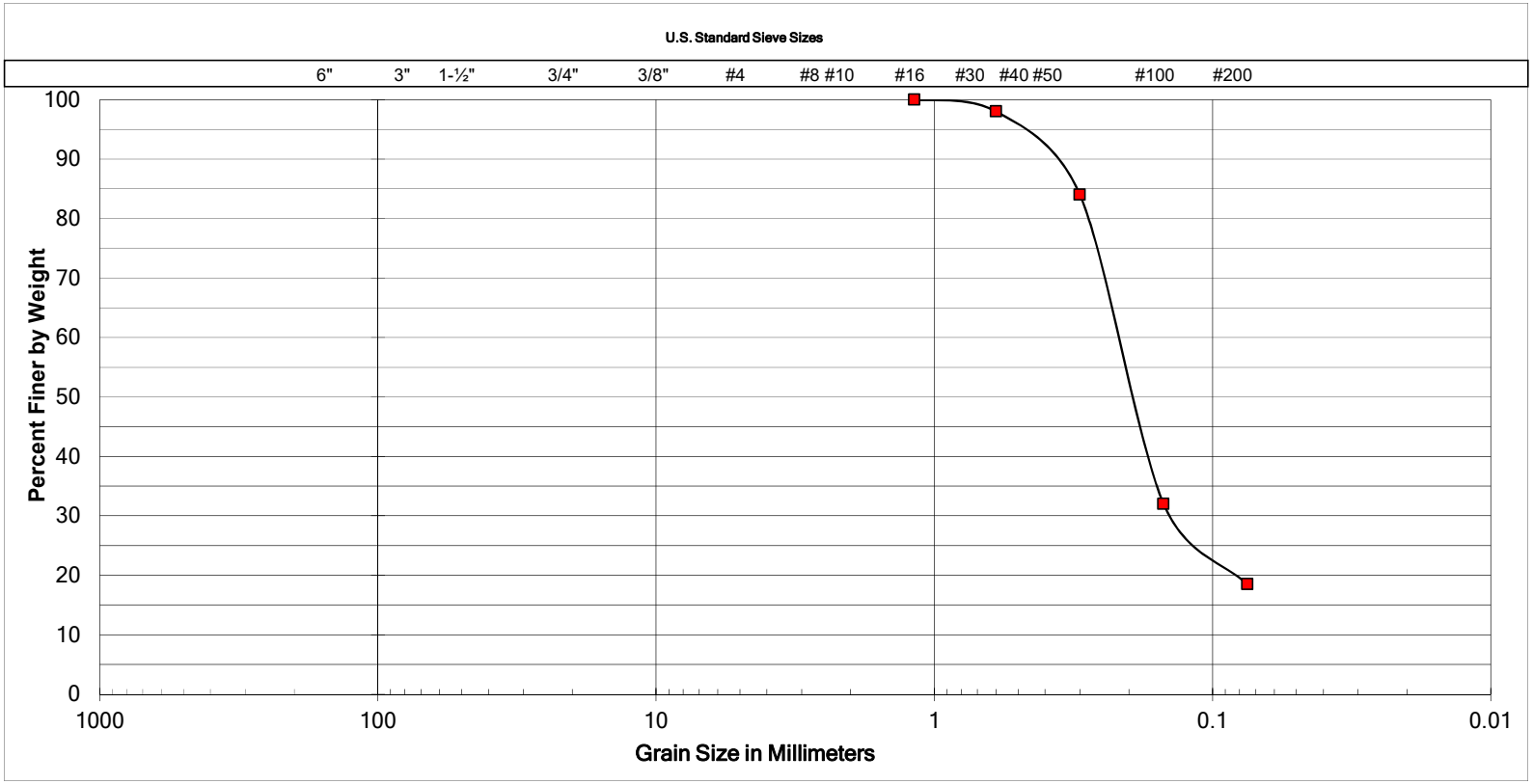
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-5 at 0 to 5 feet
SAMPLE NUMBER
34819

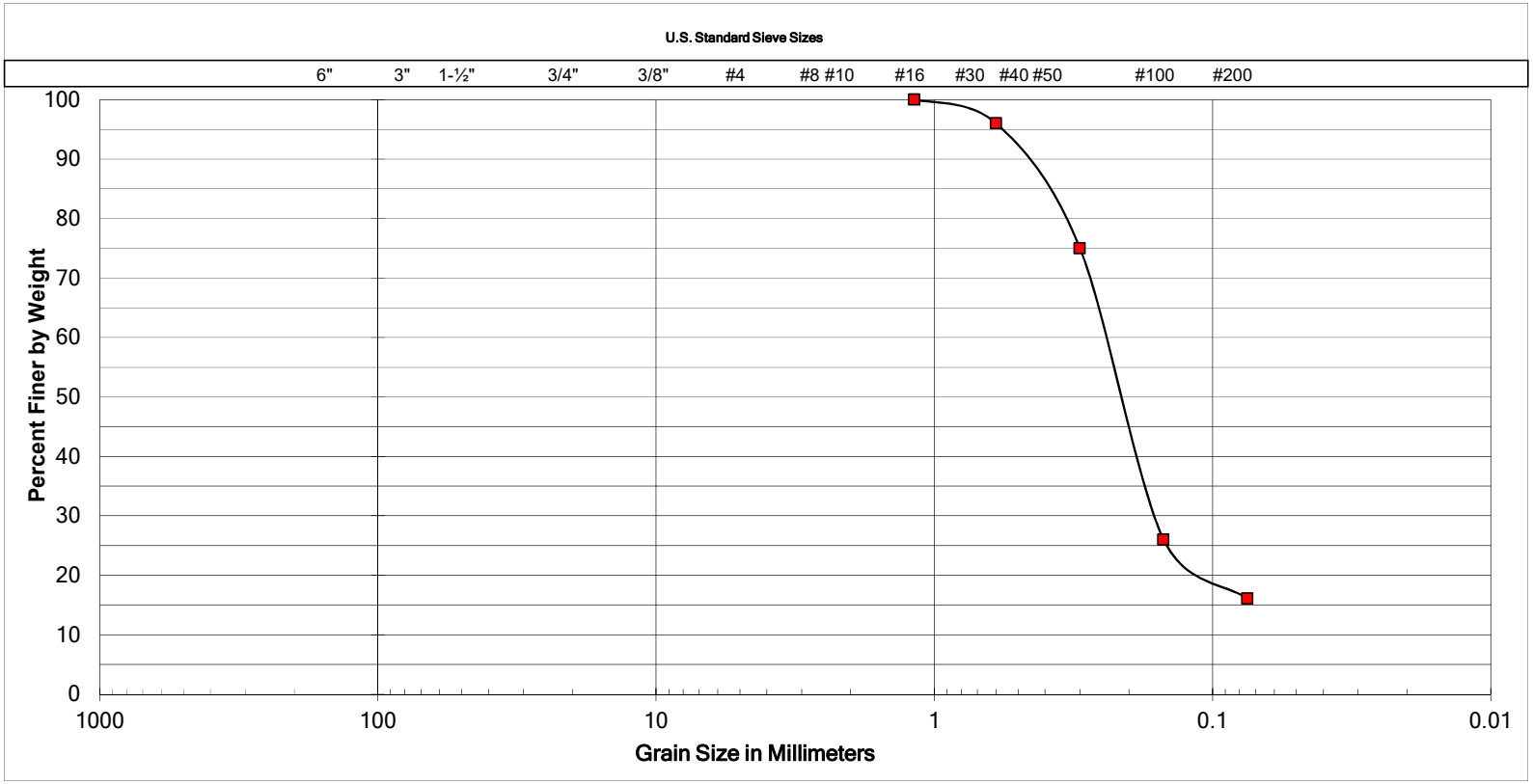
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-6 at 0 to 5 feet
SAMPLE NUMBER
34823

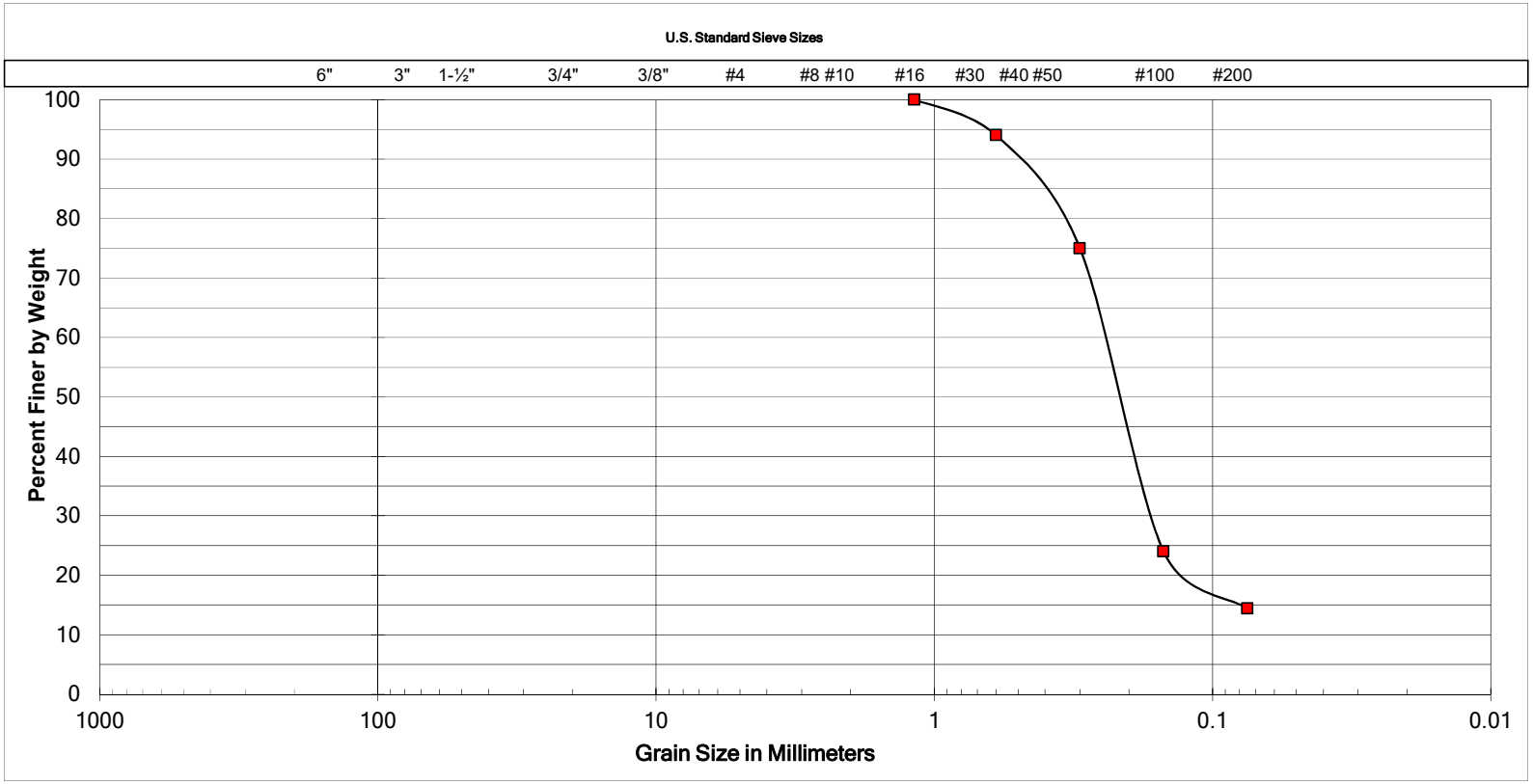
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-3



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-7 at 0 to 5 feet
SAMPLE NUMBER
34827

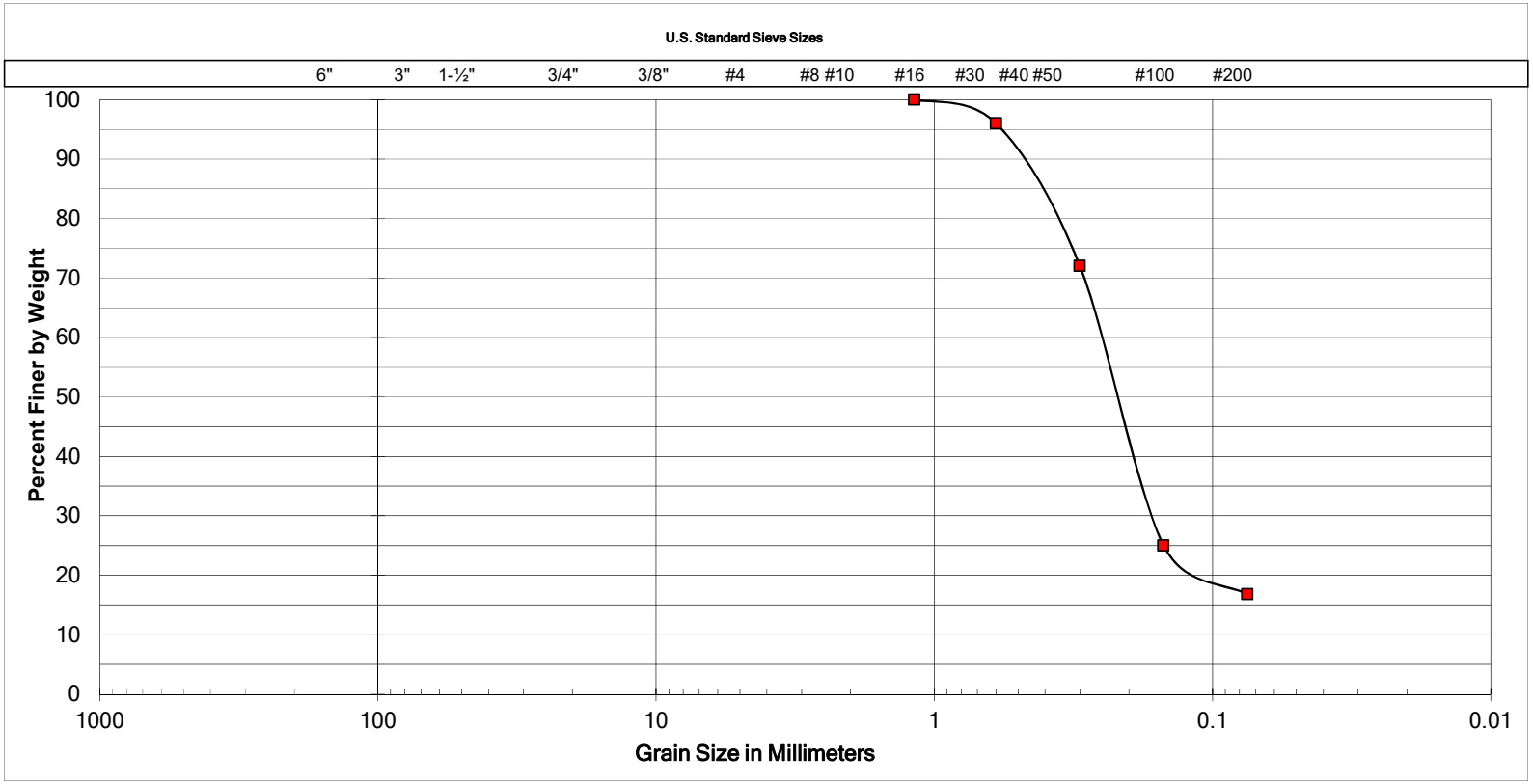
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-4



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-9 at 0 to 5 feet
SAMPLE NUMBER
34833

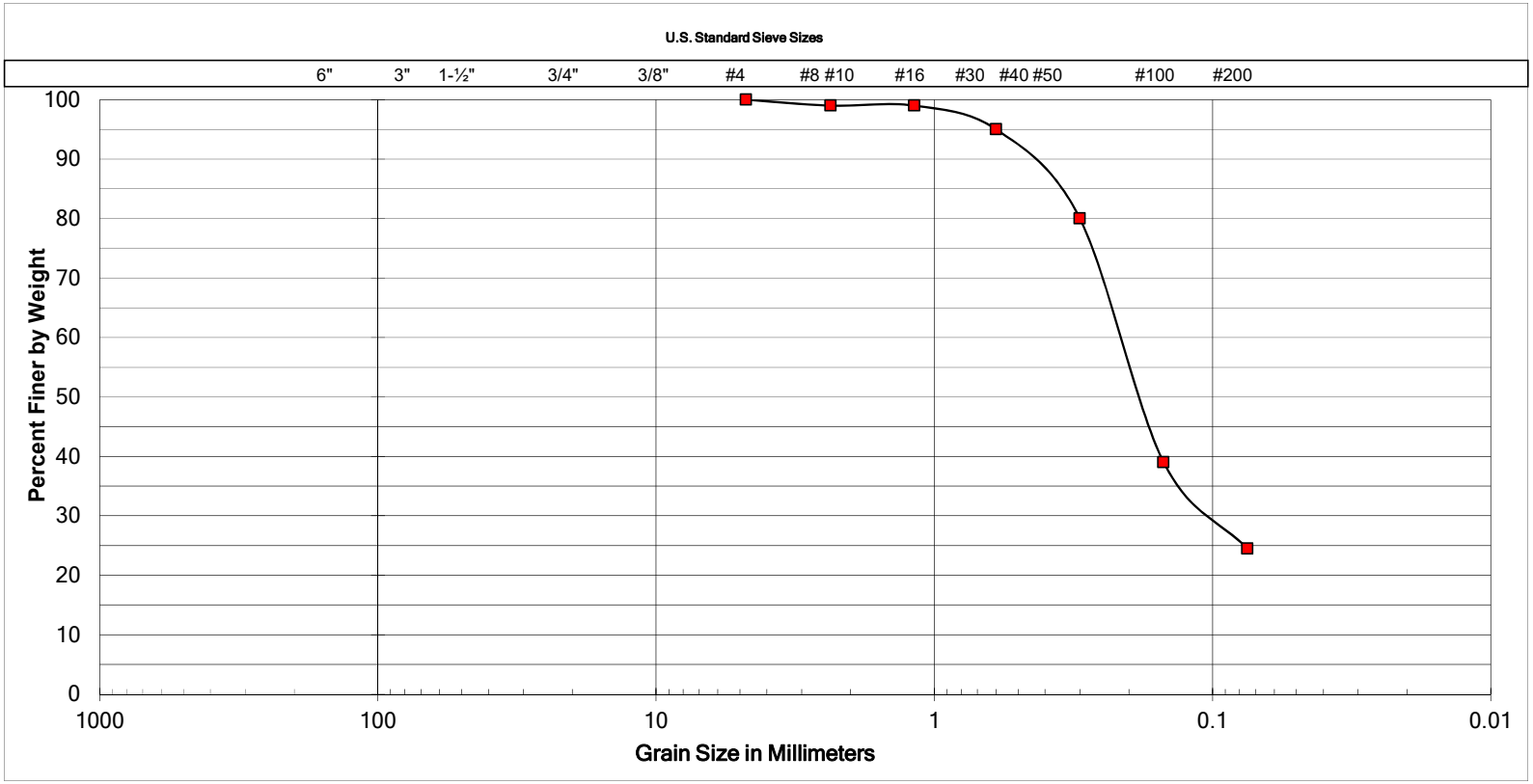
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-5



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
P-1 at 0 to 1.5 feet
SAMPLE NUMBER
34840

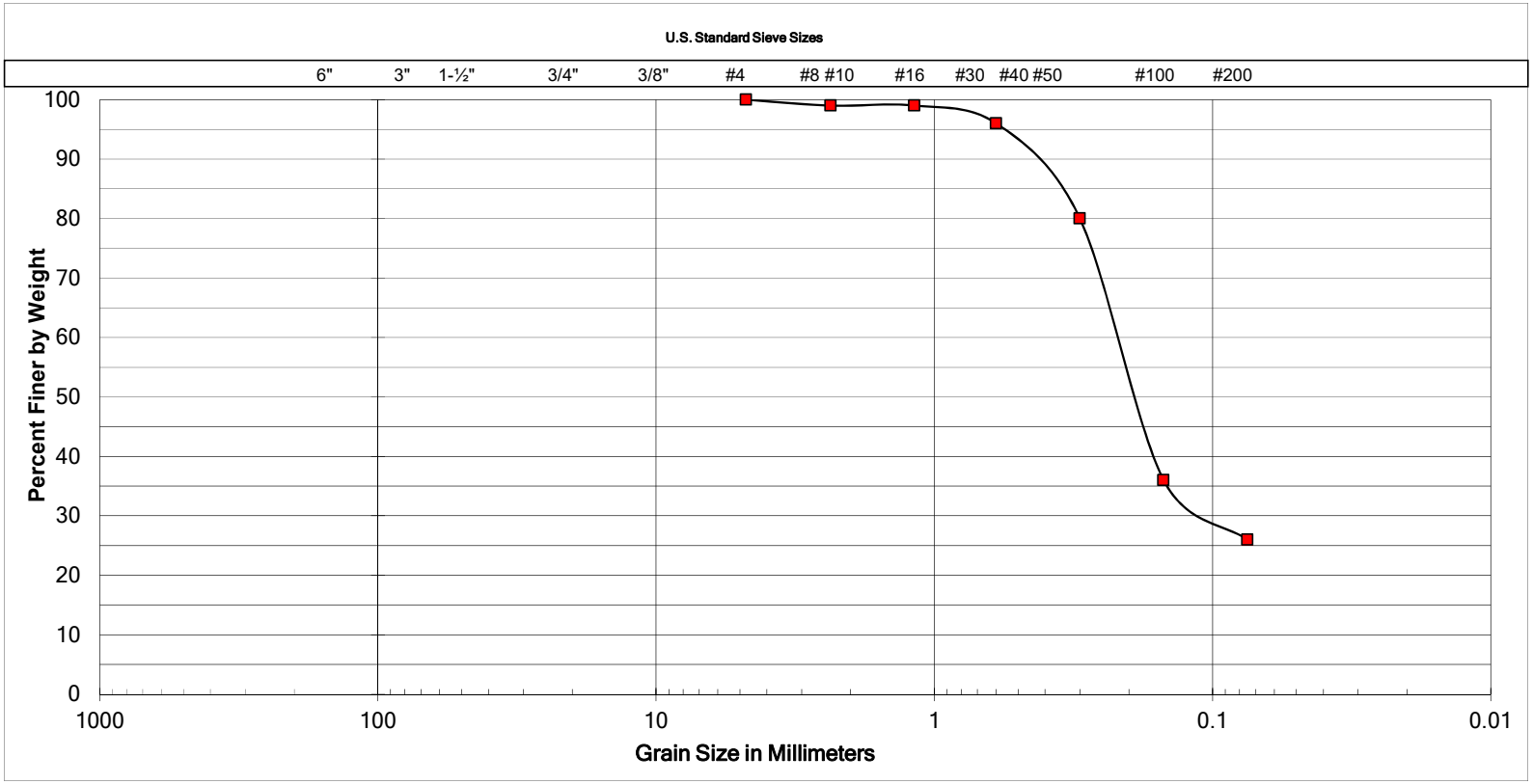
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	ACL	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-6



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
P-2 at 0 to 2 feet
SAMPLE NUMBER
34841

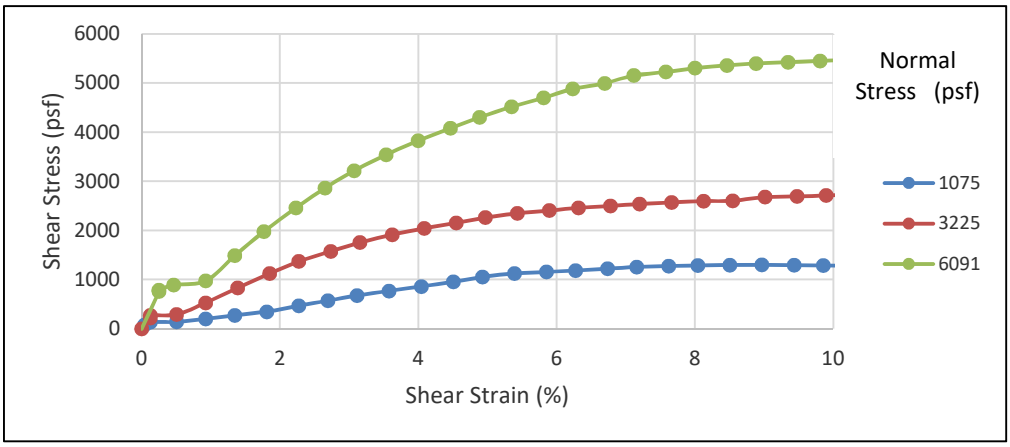
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

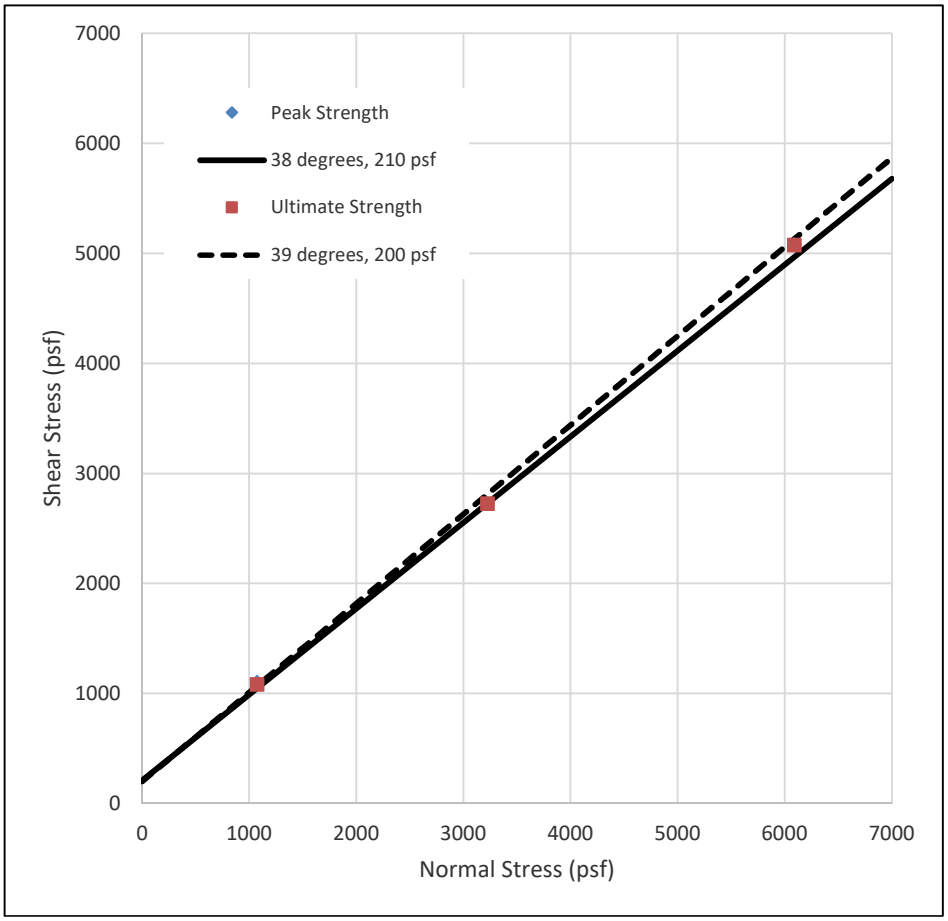
ATTERBERG LIMITS	
LIQUID LIMIT	---
PLASTIC LIMIT	---
PLASTICITY INDEX	---

SCST, LLC

CCCVC Veterans Cemetery
Seaside, California

By:	CT	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-7





SAMPLE ID: B-1 at 3 to 3.5 feet

Silty Sand

NOTES: Insitu
Strain Rate: 0.003 in/min
Sample was consolidated and drained

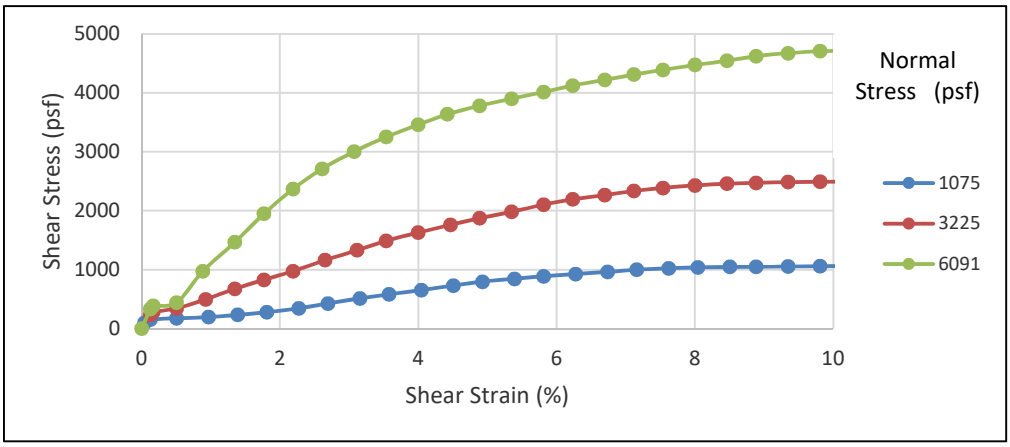
	Peak	Ultimate
Φ	38 °	39 °
c	210 psf	200 psf

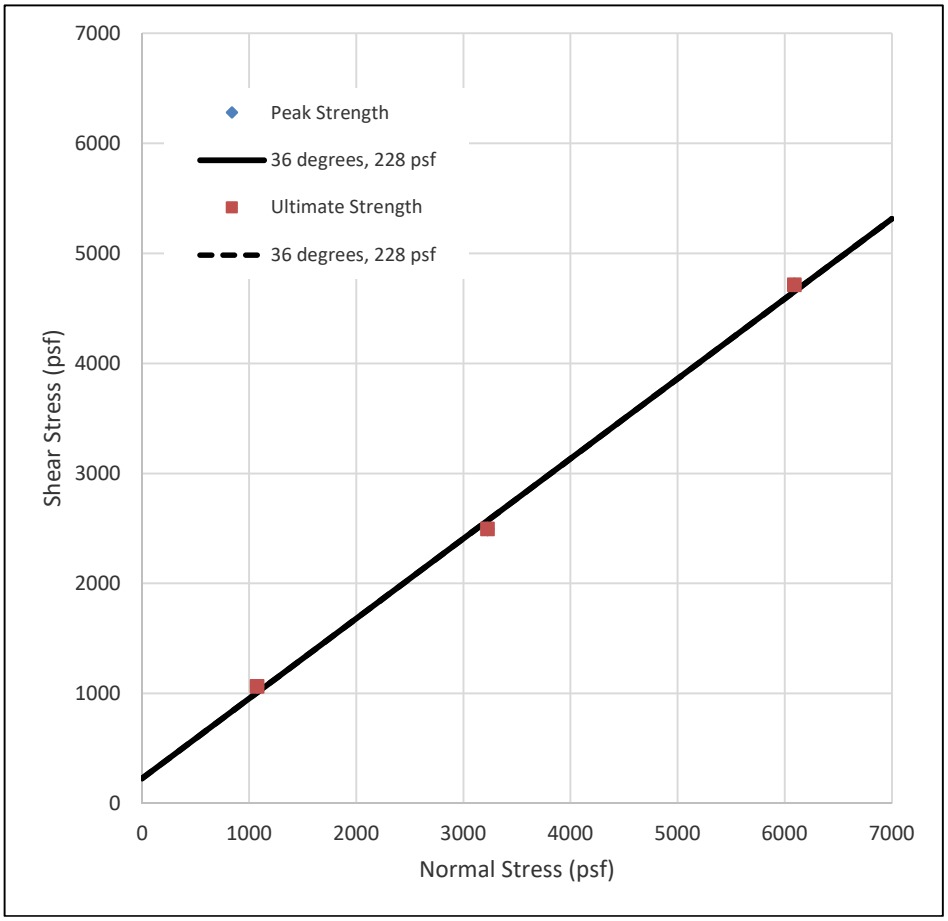
	Initial	Final
γ_d	96.3 pcf	96.3 pcf
w_c	2.7 %	25.0 %
Saturation	10 %	91 %

SCST Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	DB	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-8





SAMPLE ID: B-8 at 6 to 6.5 feet

Silty Sand

NOTES: Insitu
Strain Rate: 0.003 in/min
Sample was consolidated and drained

	Peak	Ultimate
Φ	36 °	36 °
c	228 psf	228 psf

	Initial	Final
γ_d	110.3 pcf	110.3 pcf
w_c	10.1 %	15.4 %
Saturation	55 %	84 %

SCST Inc.

CCCVC Veterans Cemetery
Seaside, California

By:	DB	Date:	December, 2018
Job Number:	180402P4-1	Figure:	II-9

EXPANSION INDEX

ASTM D4829

SAMPLE	DESCRIPTION	EI
B-2 at 0 to 5 feet	SILTY SAND	0
B-5 at 0 to 5 feet	SILTY SAND	1
B-9 at 0 to 5 feet	SILTY SAND	0

Classification of Expansive Soil [1]

EXPANSIVE INDEX	POTENTIAL EXPANSION
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

1. ASTM - D4829

R-VALUE

CALIFORNIA TEST 301

SAMPLE	DESCRIPTION	R-VALUE
B-6 at 0 to 5 feet	SILTY SAND	78
B-7 at 0 to 5 feet	SILTY SAND	67

RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

pH & Resistivity (Cal 643, ASTM G51)

Soluble Chlorides (Cal 422)

Soluble Sulfate (Cal 417)

SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-2 at 0 to 5 feet	19,000	6.91	0.005	0.003
B-5 at 0 to 5 feet	15,400	7.16	0.003	0.003
B-9 at 0 to 5 feet	10,700	6.61	0.005	0.005

Sulphate Exposure Classes [2]

CLASS	SEVERITY	WATER-SOLUBLE SULFATE (SO_4) IN SOIL, PERCENT BY MASS
S0	Not applicable	$SO_4 < 0.10$
S1	Moderate	$0.10 \le SO_4 < 0.20$
S2	Severe	$0.20 \le SO_4 \le 2.00$
S3	Very Severe	$SO_4 > 2.00$

2. ACI 318, Table 19.3.1.1

APPENDIX III
INFILTRATION TESTING RESULTS

We performed borehole percolation testing at three locations (P-1 through P-3). Figures III-1 through III-3 present the results of the testing.

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-1**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	10.0	Water Used (gallons):	5.2
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	14:05 14:10	0:05	3.50	0.00	42.00	0.1	Dry
2	14:16 14:18	0:02	2.50	0.78	20.64	0.1	Refilled
3	14:18 14:20	0:02	0.78	0.59	2.28	0.9	
4	14:20 14:22	0:02	0.59	0.50	1.08	1.9	
5	14:22 14:24	0:02	0.50	0.00	6.00	Dry	Dry
6	14:25 14:27	0:02	3.50	0.55	35.40	0.1	Refilled
7	14:27 14:29	0:02	0.55	0.50	0.60	3.3	
8	14:29 14:31	0:02	0.50	0.00	6.00	0.3	Dry
9	14:32 14:33	0:01	3.50	0.49	36.12	0.0	Refilled
10	14:33 14:34	0:01	0.49	0.00	5.88	Dry	Dry
11	14:38 14:39	0:01	2.50	0.62	22.56	0.0	Refilled
12	14:39 14:40	0:01	0.62	0.59	0.36	2.8	
13	14:40 14:41	0:01	0.59	0.56	0.36	2.8	
14	14:41 14:42	0:01	0.56	0.54	0.24	4.2	
15	14:42 14:43	0:01	0.54	0.50	0.48	2.1	
16	14:43 14:44	0:01	0.50	0.00	6.00	Dry	Dry
				Observed Percolation Rate:		2.1 min/in 28.8 in/hr	
				Gravel Correction Factor:		1.82	
				Corrected Percolation Rate:		4 min/in 15.8 in/hr	
				***Tested Infiltation Rate, I_t:**		**5.3 in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.5

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 1

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 6.6

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-2**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	9.0	Water Used (gallons):	7.35
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	11:07 11:17	0:10	2.15	0.45	20.40	0.5	
2	11:17 11:22	0:05	0.45	0.29	1.92	Dry	Dry, 1.5" of silt at bottom
3	11:26 11:31	0:05	2.09	1.13	11.52	0.4	Refilled
4	11:31 11:36	0:05	1.13	0.70	5.16	1.0	
5	11:36 11:42	0:06	0.70	0.44	3.12	Dry	Dry, 2" of silt at bottom
6	11:51 11:53	0:02	2.15	1.94	2.52	0.8	Refilled
7	11:53 11:55	0:02	1.94	1.80	1.68	1.2	
8	11:55 11:57	0:02	1.80	1.66	1.68	1.2	
9	11:57 11:59	0:02	1.66	1.55	1.32	1.5	
10	11:59 12:01	0:02	1.55	1.44	1.32	1.5	
11	12:01 12:03	0:02	1.44	1.32	1.44	1.4	
12	12:03 12:05	0:02	1.32	1.25	0.84	2.4	
13	12:05 12:07	0:02	1.25	1.16	1.08	1.9	
14	12:07 12:12	0:05	1.16	1.10	0.72	6.9	
15	12:12 12:17	0:05	1.10	1.06	0.48	10.4	
16	12:17 12:22	0:05	1.06	1.02	0.48	10.4	
17	12:22 12:27	0:05	1.02	0.95	0.84	Dry	Dry, 8" of silt at bottom
				Observed Percolation Rate:		10 min/in 5.8 in/hr	
				Gravel Correction Factor:		1.82	
				Corrected Percolation Rate:		19 min/in 3.2 in/hr	
				***Tested Infiltation Rate, I_t:**		**0.6 in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.5

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 5

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 13.0

SCST, Inc.	CCCVC, Veterans Cemetery Project Seaside, California		
	By: EMW	Date:	December, 2018
	Job No: 180402P4-1	Figure:	III-2

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	CCCVC Veterans Cemetery Project	Test Number:	**P-3**
Job Number:	180402P4	Tested By:	ACL
Date Drilled:	11/7/2018	Date Tested:	11/8/2018
Drilling Method:	6" SSA	Const Head (Presoak):	30 Minutes
Drilled Depth (feet):	10.0	Water Used (gallons):	5.55
Test Hole Diameter (inches):	6	Gravel Pack:	Yes
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)	Observation Notes
1	16:15 16:16	0:01	3.21	0.40	33.72	0.0	
2	16:16 16:17	0:01	0.40	0.35	0.60	1.7	
3	16:17 16:18	0:01	0.35	0.27	0.96	1.0	
4	16:18 16:19	0:01	0.27	0.00	3.24	Dry	Dry
5	16:20 16:21	0:01	3.21	0.42	33.48	0.0	Refill
6	16:21 16:22	0:01	0.42	0.36	0.72	1.4	
7	16:22 16:23	0:01	0.36	0.31	0.60	1.7	
8	16:23 16:24	0:01	0.31	0.27	0.48	2.1	
9	16:24 16:25	0:01	0.27	0.00	3.24	Dry	Dry
10	16:26 16:27	0:01	3.21	0.32	34.68	0.0	Refill
11	16:27 16:28	0:01	0.32	0.25	0.84	1.2	
12	16:28 16:29	0:01	0.27	0.00	3.24	Dry	Dry
				Observed Percolation Rate:		1.2 min/in 50.4 in/hr	
				Gravel Correction Factor:		1.82	
				Corrected Percolation Rate:		2 min/in 27.7 in/hr	
				***Tested Infiltation Rate, I_t:**		**7.4 in/hr**	

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.8

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 1

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 8.7

Attachment 13
Calibration references

"2018 - Salinas Valley Hydrologic Subareas, 4th Quarter Water Conditions"
January 2, 2019, Monterey County Water Resources Agency

"Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006"
2012, U.S. Department of the Interior, U.S. Geological Survey

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1-2-2019

2018 - Salinas Valley Hydrologic Subareas, 4th Quarter Water Conditions

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Report on Salinas Valley water conditions for the fourth quarter of Water Year 2017-2018.

CHANGES TO PRESENTATION OF GROUNDWATER LEVEL TRENDS:
Beginning with the first quarter Water Year 2017-2018 (WY18) report, we introduced changes to the presentation of groundwater level data. The aim of these changes is to enhance understanding of the nature of Salinas Valley groundwater level data and its relationship to basin health and management, to better communicate this information to stakeholders, and to more efficiently maintain the Agency's groundwater level monitoring network.

The changes are graphically incorporated into attachments E through J. As in past Quarterly Reports, attachments E through J summarize water level trends for the current and previous water years (WY18 and WY17, respectively). However, instead of "depth to water," water levels are now presented as "water surface elevation," relative to mean sea level. Unlike depth to water, water surface elevation is independent of well elevation, making replacement of study wells a less costly and more objective process. Water surface elevation also ties Salinas Valley groundwater level data directly to a universally recognized datum, facilitating comparative analysis and scientific collaboration.

A second change is the replacement of the "normal" conditions water level trend curve, as represented by a single selected water year (WY85), with the more objective "long-term average" water level curve, a data set based on averaged monthly water levels for the most recent 30-years for each subarea. In this way, each month's data will now be compared to an objective measure of central tendency based on data that encompass a more representative range of climatic and operational conditions in the Salinas Valley.

Finally, for comparison to water levels in dry conditions, WY15 replaces WY91. With this change, current groundwater level data will now be compared to data from a recent extended drought within a time of contemporary operational constraints. Using WY15 also minimizes uncertainty associated with the gradual loss and replacement of study wells since WY91.

SUMMARY/DISCUSSION:
This report covers the fourth quarter of Water Year 2017-2018 (WY18), July through September 2018. It provides a brief overview of water conditions in the Salinas Valley (Attachment A) with discussion of precipitation, reservoir storage, and groundwater level trends. Data for each of these components are included as graphs and tables in Attachments B through J.

Precipitation – Preliminary National Weather Service rainfall data indicates that the fourth quarter of WY18 brought no rainfall to Salinas and King City. Totals for normal rainfall for the fourth quarter are 0.20 at the Salinas Airport, and 0.17 inches in King City.

Attachment B contains graphs for both stations showing monthly and cumulative precipitation data for the current and a "normal" water year, based on long-term monthly precipitation averages. Attachment B also includes tables showing values for precipitation totals as well as percent of "normal" precipitation.

Reservoirs - The following table compares fourth quarter storage at Nacimiento and San Antonio reservoirs for the past two years. Storage in Nacimiento Reservoir is 130,275 acre-feet lower than in September 2017, and storage in San Antonio Reservoir is 69,038 acre-feet lower.

Reservoir	**September 30, 2018 (WY18) Storage in acre-feet**	**September 30, 2017 (WY17) Storage in acre-feet**	**Difference in acre-feet**
Nacimiento	50,763	181,038	-130,275
San Antonio	42,312	111,350	-69,038

Graphs showing daily reservoir storage for the last five water years along with 30-year average daily storage for comparison are included as Attachments C and D.

Groundwater Levels – More than 90 wells are measured monthly throughout the Salinas Valley to monitor seasonal groundwater level fluctuations. Data from approximately 50 of these wells are used in the preparation of this report. The measurements are categorized by hydrologic subarea, averaged, and graphed to compare current water levels (WY18) with selected past conditions. Graphs for individual subareas, showing the current year's water level conditions, last year's conditions (WY17) and dry conditions (WY15) are found in Attachments E through I. For comparison to long term conditions, a curve showing monthly water levels averaged over the most recent 30 years (WY1987-WY2017) is included on each graph. Attachment J is a summary of water level changes for all subareas.

By the end of the fourth quarter of WY18, groundwater levels began recovering in all subareas except the Upper Valley. Over the last month of the quarter, average groundwater levels rose by four feet in the Pressure 180-Foot Aquifer, by three feet in the Pressure 400-Foot Aquifer, by seven feet in the East Side Subarea, by one foot in the Forebay Subarea, while decreasing by less than one foot in the Upper Valley Subarea.

Compared to September 2017, average groundwater levels in September 2018 increased by less than one foot in the Pressure 180-Foot Aquifer, by one foot in the East Side Subarea, by two feet in the Forebay Subarea, and by one feet Upper Valley Subarea. Groundwater levels decreased by less than one foot in the Pressure 400-Foot Aquifer.

When compared to 30 year average groundwater conditions, September 2018 water levels were four feet higher in the Pressure 400-Foot Aquifer, less than one foot lower in the Pressure 180-Foot Aquifer and Forebay Subarea, six feet lower in the East Side Subarea, one foot lower in the Upper Valley Subarea.

Average groundwater levels at end of the fourth quarter of WY18 were higher in all subareas than in WY15 (dry conditions).

OTHER AGENCY INVOLVEMENT:

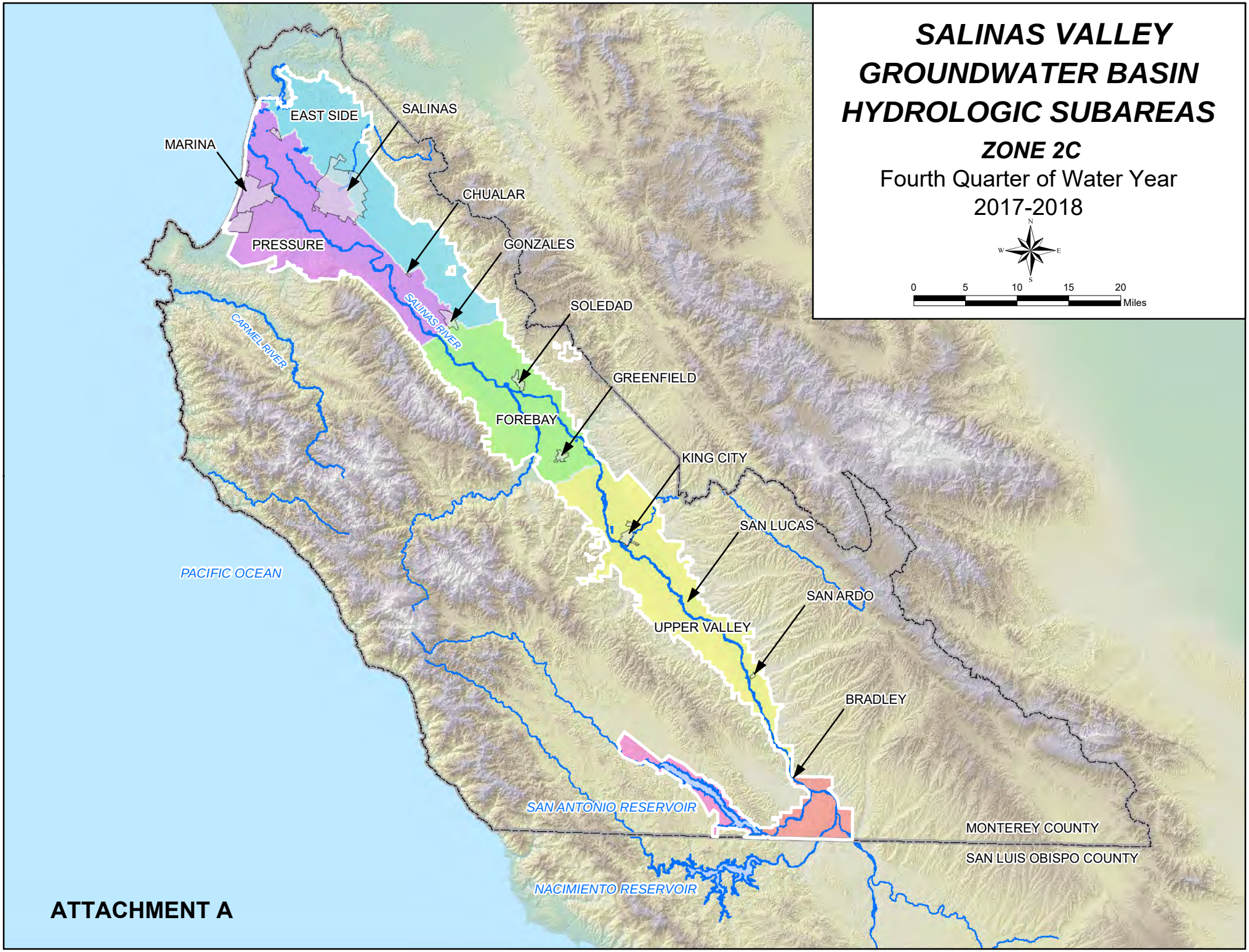
None

FINANCING:
Funds 111 and 116

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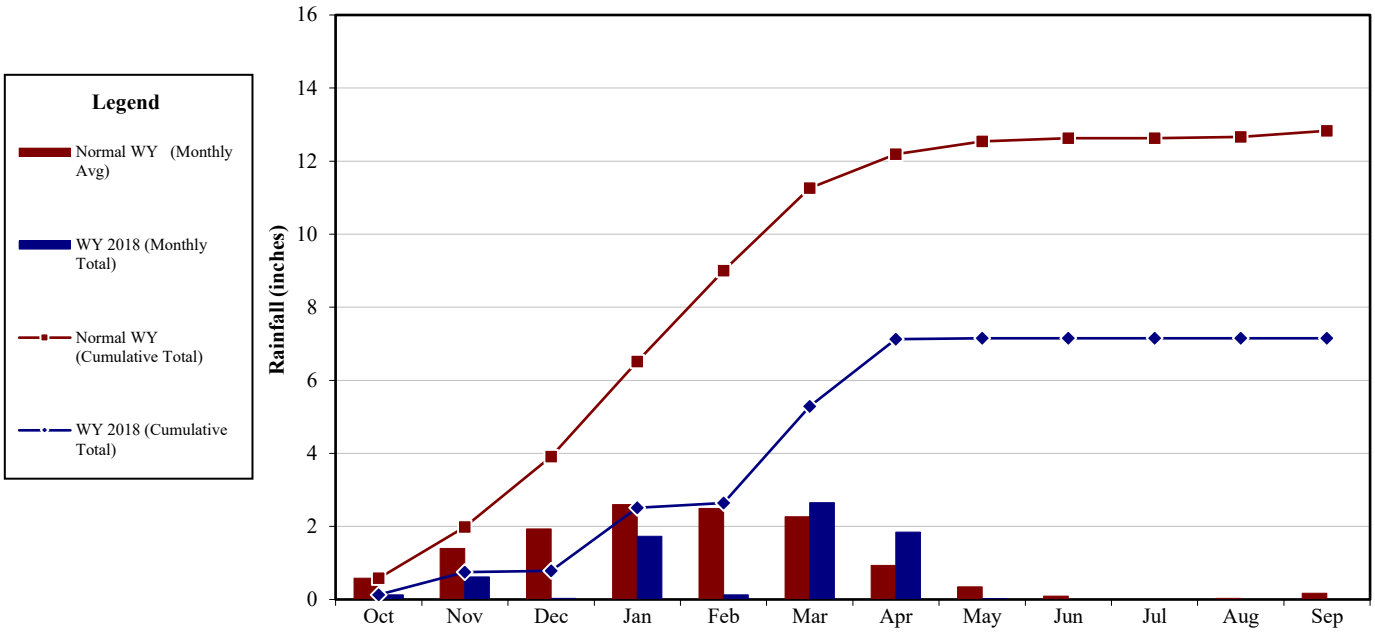
Attachments:

1. Attachment A, Salinas Valley Hydrologic Subareas Map
2. Attachment B, Salinas and King City Precipitation Graphs
3. Attachment C, Nacimiento Reservoir Graph
4. Attachment D, San Antonio Reservoir Graph
5. Attachment E, Groundwater Trends Pressure 180-Foot Aquifer
6. Attachment F, Groundwater Trends Pressure 400-Foot Aquifer
7. Attachment G, Groundwater Trends East Side Subarea
8. Attachment H, Groundwater Trends Forebay Subarea
9. Attachment I, Groundwater Trends Upper Valley Subarea
10. Attachment J, Groundwater Trends Summary



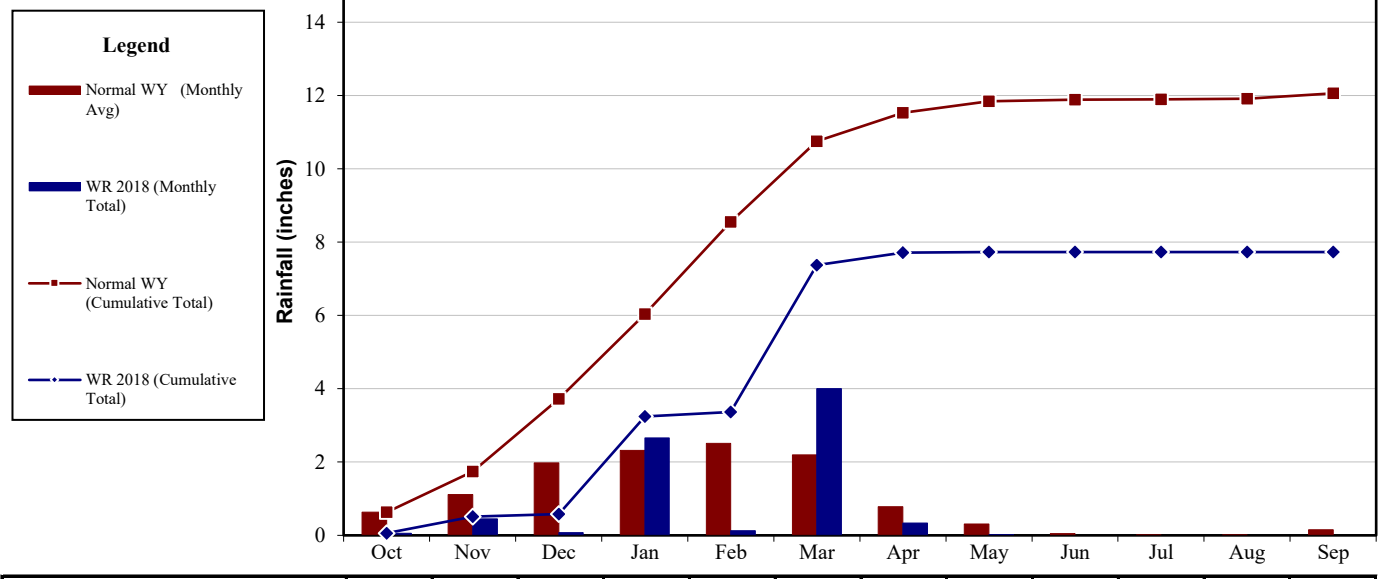
ATTACHMENT A

SALINAS AIRPORT RAINFALL
WATER YEAR 2018



Monthly Rainfall (WY 2018)	0.13	0.62	0.03	1.73	0.13	2.65	1.84	0.02	0.00	0.00	0.00	0.00
Monthly Rainfall (Normal WY*)	0.58	1.40	1.93	2.60	2.49	2.26	0.93	0.35	0.09	0.00	0.03	0.17
Percent of Normal for Month	22%	44%	2%	67%	5%	117%	198%	6%	0%	0%	0%	0%
Cumulative Rainfall (WY 2018)	0.13	0.75	0.78	2.51	2.64	5.29	7.13	7.15	7.15	7.15	7.15	7.15
Cumulative Rainfall (Normal WY*)	0.58	1.98	3.91	6.51	9.00	11.26	12.19	12.54	12.63	12.63	12.66	12.83
Percent of Cumulative Normal	22%	38%	20%	39%	29%	47%	58%	57%	57%	57%	56%	56%

KING CITY RAINFALL
WATER YEAR 2018

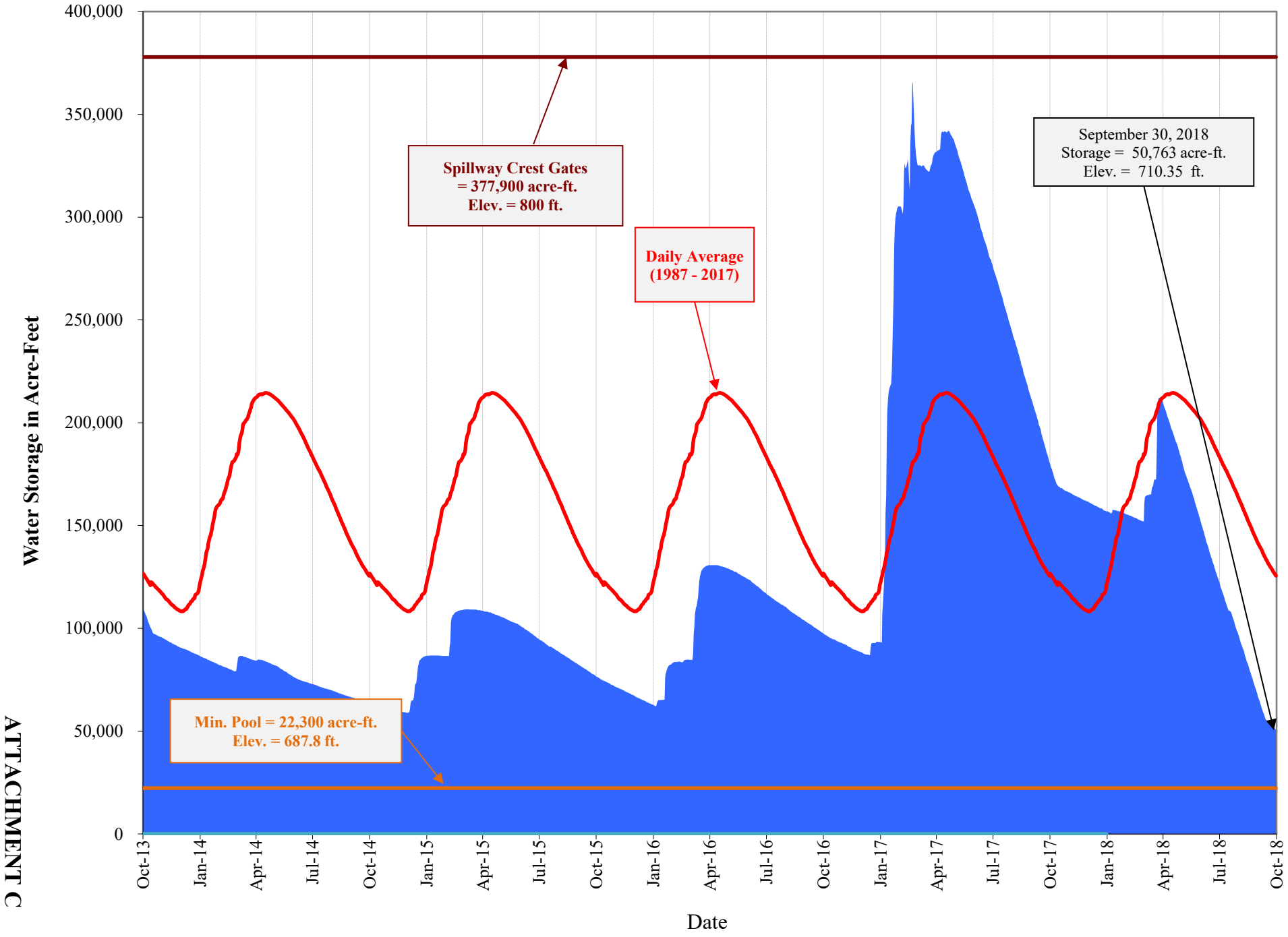


Monthly Rainfall (WR 2018)	0.06	0.45	0.07	2.66	0.13	4.00	0.34	0.02	0.00	0.00	0.00	0.00
Monthly Rainfall (Normal WY*)	0.63	1.11	1.98	2.32	2.51	2.20	0.78	0.31	0.05	0.01	0.01	0.15
Percent of Normal for Month	10%	41%	4%	115%	5%	182%	44%	6%	0%	0%	0%	0%
Cumulative Rainfall (WR 2018)	0.06	0.51	0.58	3.24	3.37	7.37	7.71	7.73	7.73	7.73	7.73	7.73
Cumulative Rainfall (Normal WY*)	0.63	1.74	3.72	6.04	8.55	10.75	11.53	11.84	11.89	11.90	11.91	12.06
Percent of Cumulative Normal	10%	29%	16%	54%	39%	69%	67%	65%	65%	65%	65%	64%

*Average precipitation over the most recent 30-year period ending in a decade (1981-2010)

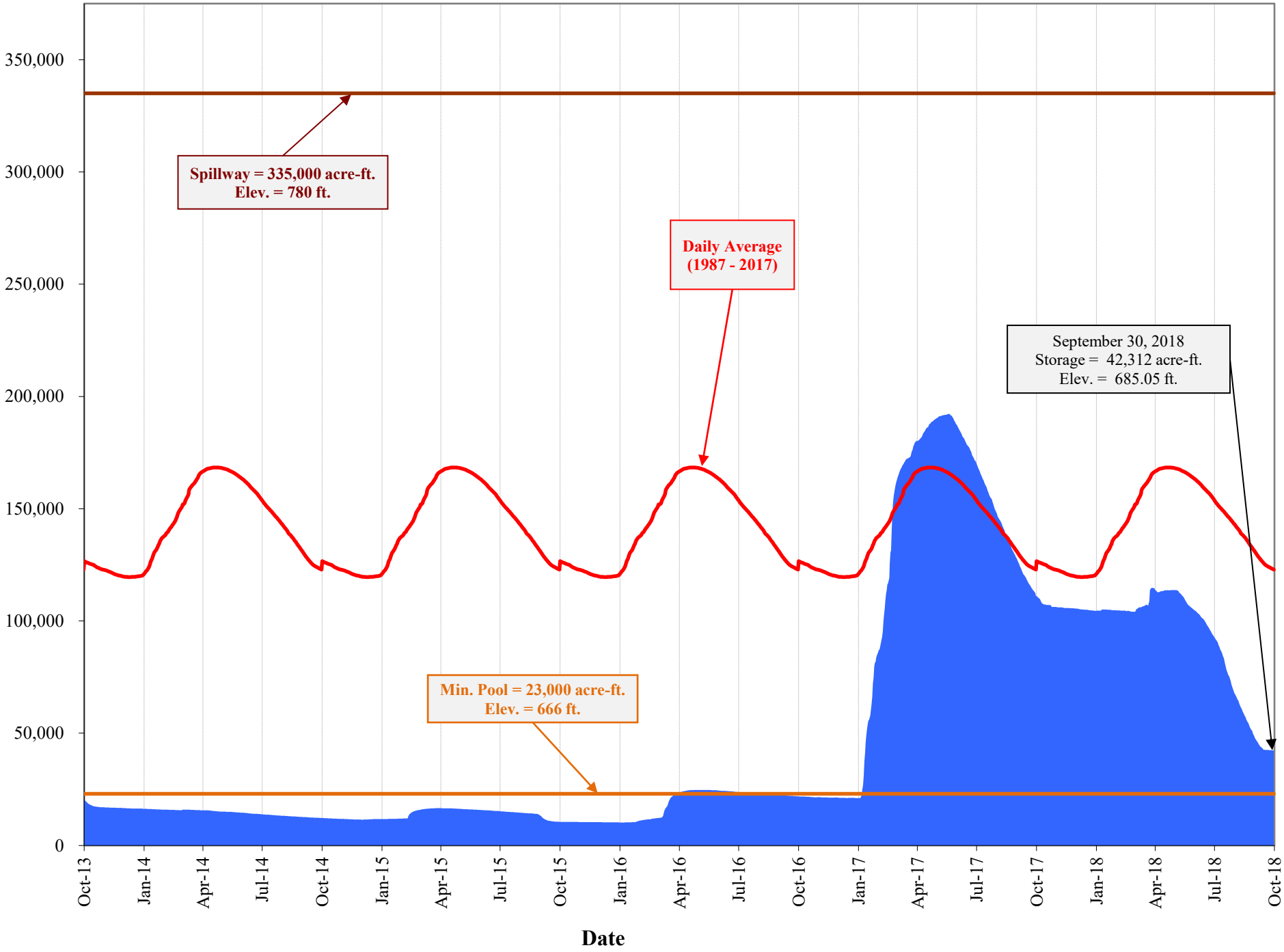
ATTACHMENT B

NACIMIENTO RESERVOIR
DAILY STORAGE



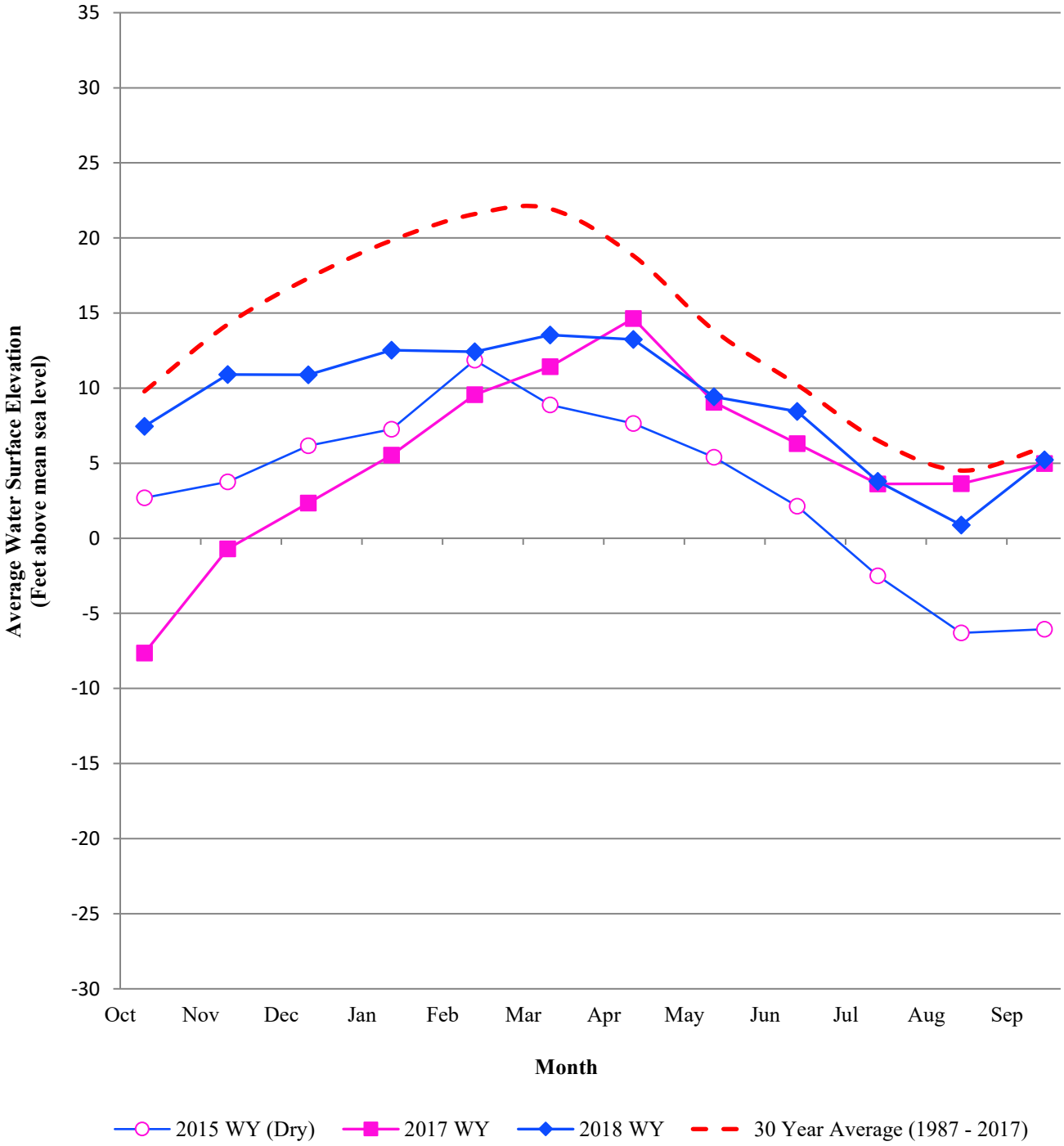
ATTACHMENT C

SAN ANTONIO RESERVOIR
DAILY STORAGE



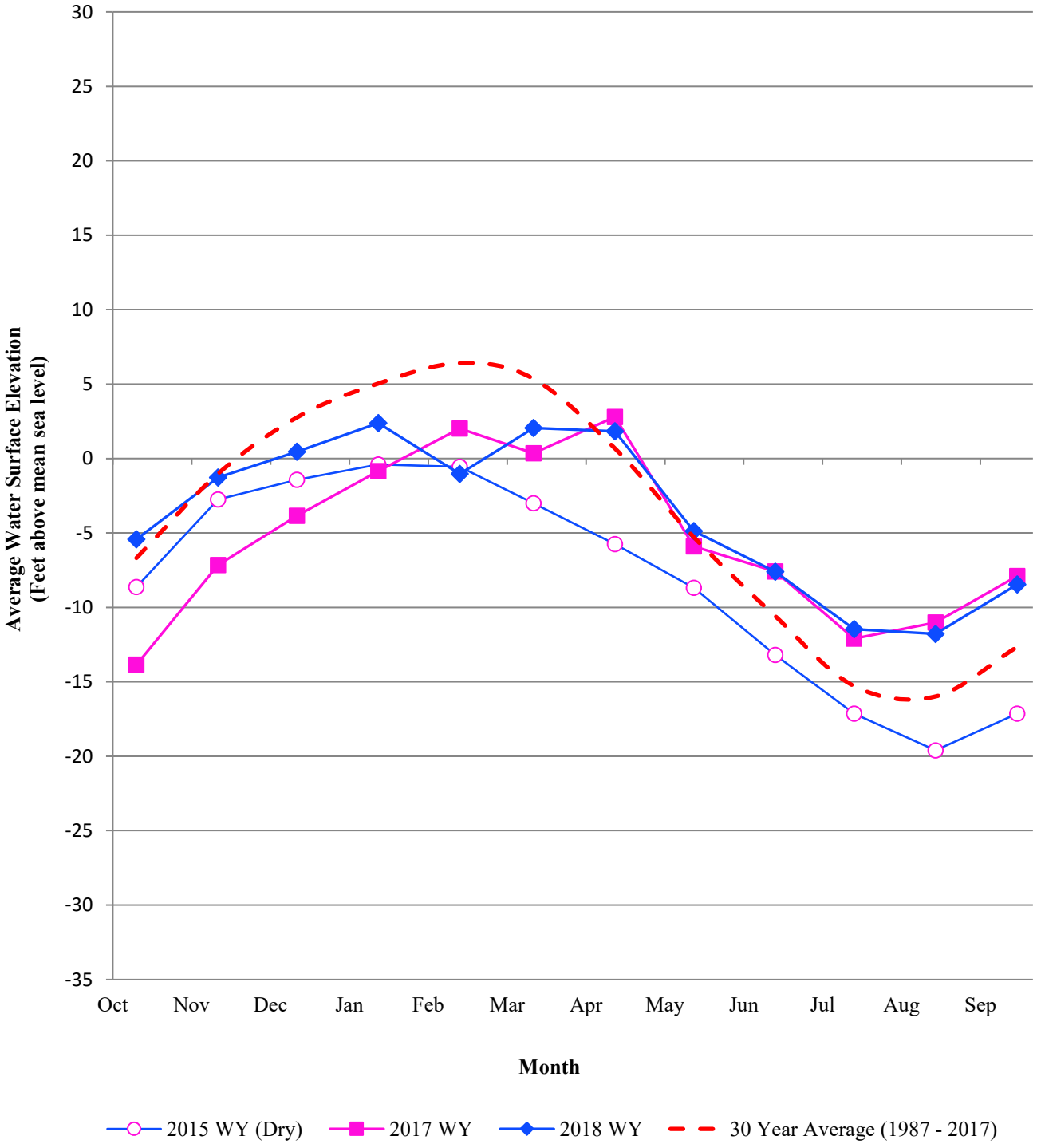
ATTACHMENT D

GROUNDWATER TRENDS
PRESSURE 180-FOOT AQUIFER
5 Wells



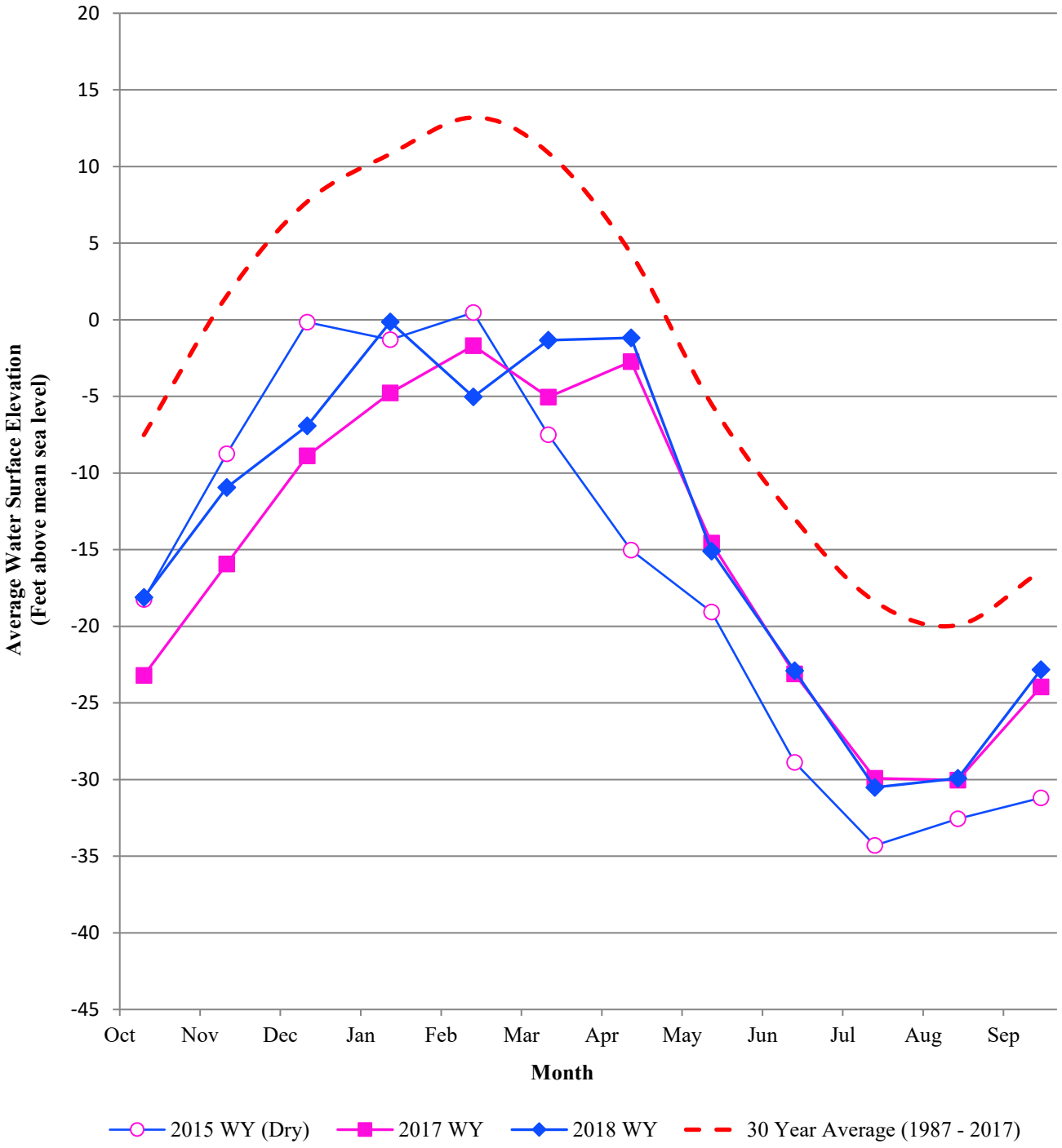
ATTACHMENT E

GROUNDWATER TRENDS
PRESSURE 400-FOOT AQUIFER
11 Wells



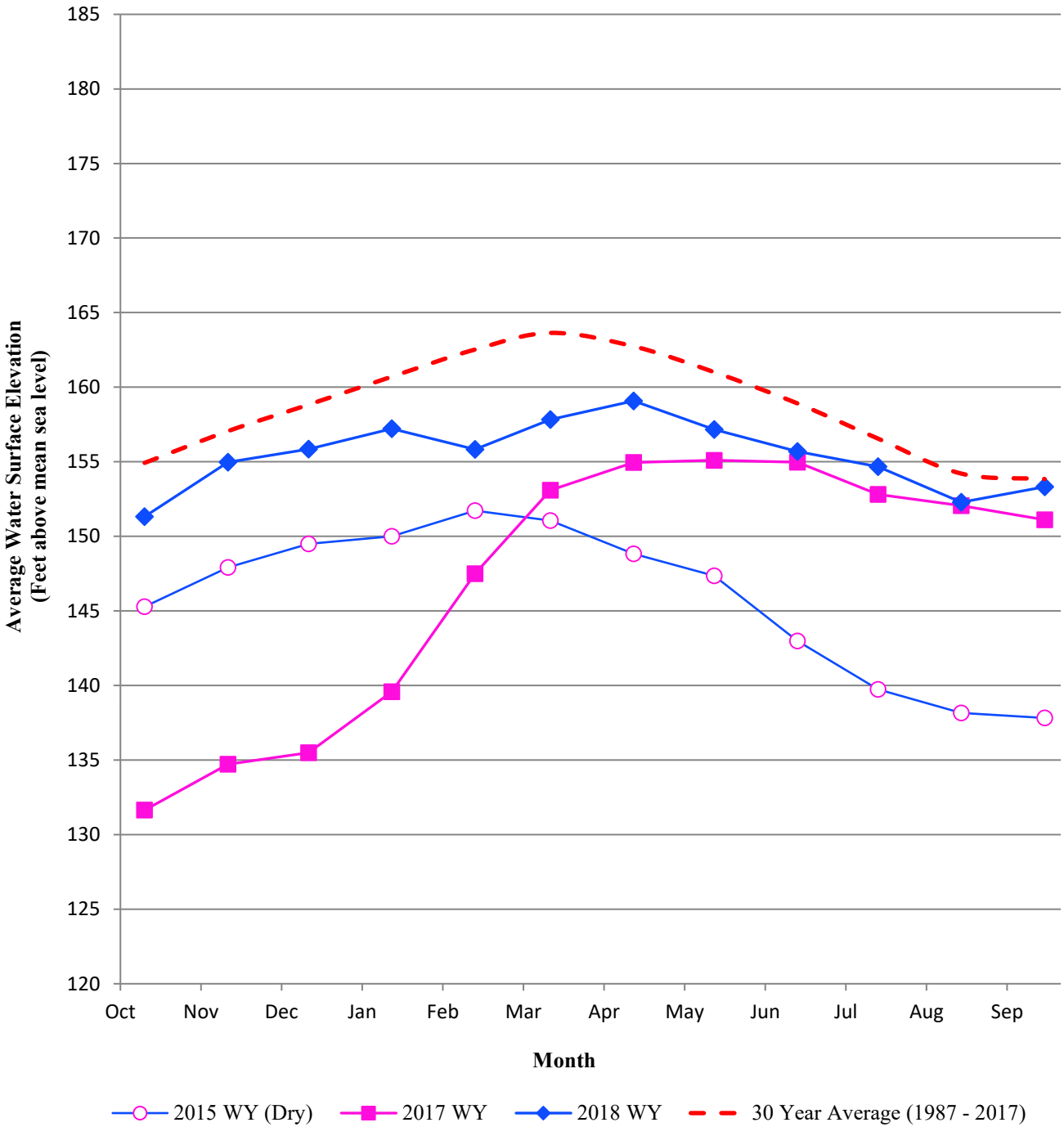
ATTACHMENT F

GROUNDWATER TRENDS
EAST SIDE SUBAREA
11 Wells



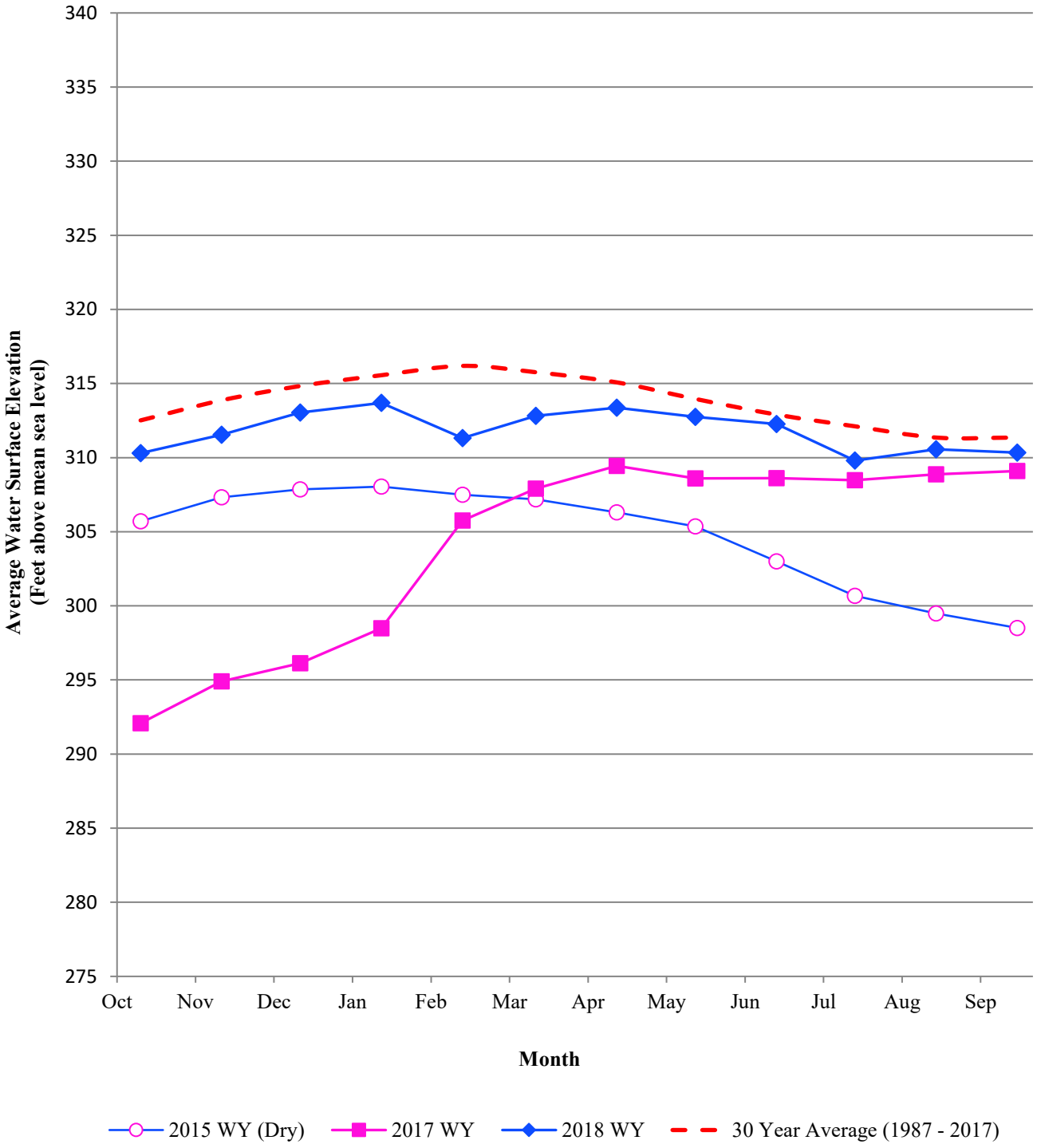
ATTACHMENT G

GROUNDWATER TRENDS
FOREBAY SUBEREA
10 Wells



ATTACHMENT H

GROUNDWATER TRENDS
UPPER VALLEY SUBAREA
9 Wells



ATTACHMENT I

Groundwater Trends Summary
September 2018

Area	September 2018 Groundwater Elevation (ft msl)	1 Year Change	Difference from 30 year Average Elevation	1 Month Change
Pressure 180-Foot Aquifer	**5 '**	**Up < 1 '**	**Down < 1 '**	**Up 4 '**
Pressure 400-Foot Aquifer	**-9 '**	**Down < 1 '**	**Up 4 '**	**Up 3 '**
East Side Subarea	**-23 '**	**Up 1 '**	**Down 6 '**	**Up 7 '**
Forebay Subarea	**153 '**	**Up 2 '**	**Down < 1 '**	**Up 1 '**
Upper Valley Subarea	**310 '**	**Up 1 '**	**Down 1 '**	**Down < 1 '**

ATTACHMENT J

USGS
science for a changing world

Prepared in cooperation with the Federal Emergency Management Agency

Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006



Scientific Investigations Report 2012–5113

U.S. Department of the Interior
U.S. Geological Survey

Cover. Flooding on the Russian River near Hopland, California, on December 31, 2005. Photo taken on Highway 101 south of Hopland looking north. Photograph by Ken Markham, USGS (retired).

Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006

By Anthony J. Gotvald, Nancy A. Barth, Andrea G. Veilleux, and Charles Parrett

Prepared in cooperation with the Federal Emergency Management Agency

Scientific Investigations Report 2012–5113

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2012

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Conversion Factors and Datums

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch	2.54	centimeter (cm)
inch	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	259.0	hectare (ha)
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
cubic foot (ft^3)	28.32	cubic decimeter (dm^3)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
	Flow rate	
foot per mile (ft/mi)	0.1894	meter per kilometer (m/km)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

SI to Inch/Pound

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch
millimeter (mm)	0.03937	inch
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
	Area	
square kilometer (km^2)	0.3861	square mile (mi^2)
	Volume	
cubic meter (m^3)	35.31	cubic foot (ft^3)
cubic meter (m^3)	1.308	cubic yard (yd^3)
cubic kilometer (km^3)	0.2399	cubic mile (mi^3)
	Flow rate	
cubic meter per second (m^3/s)	35.31	cubic foot per second (ft^3/s)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F = (1.8 \times °C) + 32$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$°C = (°F - 32) / 1.8$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Elevation refers to distance above or below NAVD 88.

Water year is the 12-month period October 1 through September 30 and is designated by the calendar year in which the period ends. Thus, the water year ending September 30, 2001, is called “water year 2001.”

Acronyms

AEP	annual exceedance probability
APS	all possible subsets
EMA	expected moments algorithm
EVR	error variance ratio
FEMA	Federal Emergency Management Agency
GIS	geographic information system
GLS	generalized least squares
LP3	log-Pearson Type 3
MBV*	misrepresentation of the beta variance statistic
MSE	mean square error
NHDPlus	National Hydrologic Dataset
NLCD	National Land Cover Dataset
NWIS	National Water Information System
OLS	ordinary least squares
PRISM	Parameter-Elevation Regressions on Independent Slopes Model
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WIE	weighted independent estimates
WLS	weighted least squares
WREG	weighted-multiple-linear regression

Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006

By Anthony J. Gotvald, Nancy A. Barth, Andrea G. Veilleux, and Charles Parrett

Abstract

Methods for estimating the magnitude and frequency
fected
by regulation or diversions have been updated. Annual

having 10 or more years of data. Flood-frequency estimates were computed for the streamgages by using the expected
Type III distribution to

outlier and historic information were incorporated into the

streamgages in the desert region in southeastern California. Additionally, basin characteristics for the streamgages were computed by using a geographical information system.

Regional regression analysis, using generalized least squares regression, was used to develop a set of equations

0.2-percent annual exceedance probabilities for ungaged basins in California that are outside of the southeastern desert region. Flood-frequency estimates and basin characteristics

used in the regional regression analysis. Five hydrologic regions were developed for the area of California outside of the desert region.
are functions of drainage area and mean annual precipitation

mean basin elevation, and mean annual precipitation. Average standard errors of prediction for the regression equations in all

For the desert region of California, an analysis of 33 streamgages was used to develop regional estimates of all three parameters (mean, standard deviation, and skew) of the log-Pearson Type III distribution. The regional estimates were then used to develop a set of equations for estimating

annual exceedance probabilities for ungaged basins.
regional regression equations are functions of drainage area. Average standard errors of prediction for these regression equations range from 214.2 to 856.2 percent.

analyzed for eight streamgages in California having 10 or more years of data considered to be affected by urbanization. Flood-frequency estimates were computed for the urban
Type III distribution to

frequency estimation equations for urban streams because of the limited number of sites. Flood-frequency estimates for

frequency estimates for 630 non-urban sites.

The regression equations developed from this study will be incorporated into the U.S. Geological Survey (USGS) StreamStats program. The StreamStats program is a Web-

characteristics for USGS streamgages and ungaged sites of interest. StreamStats can also compute basin characteristics

sites when users select the location of a site along any stream in California.

Introduction

Reliable estimates of the magnitude and frequency of

management, and the design of transportation and water-conveyance structures, such as roads, bridges, culverts, dams,

on these estimates to effectively plan and manage land use

Stedinger (2007a) determined that estimates of magnitude and

-

after referred to as streamgages, with shorter records of annual

when compared to estimates using streamgages with longer

Thus, long-term data collection at streamgages is important in the determination of reliable

not recorded. Therefore, other methods, such as regionalization, must be used to estimate the magnitude and frequency

information determined for a group of streamgages within a hydrologic region to various basin characteristics for the same streamgages. The resultant equations then can be used

within the hydrologic region.

Purpose and Scope

The purpose of this report, prepared in cooperation with the Federal Emergency Management Agency (FEMA), is to present methods for estimating the magnitude and frequency

The report (1) describes the general statistical methods used to estimate the magnitude and

-

-

cally

r in the report); (3) presents estimates of the

0.2-percent annual exceedance probabilities determined for 769 streamgages in California (including 339 streamgages for which data were previously reported by Parrett and others (2011)); (4) describes methods used to develop regression

for ungaged sites in California; (5) describes the accuracy and limitations of the equations; (6) shows example applications of the methods; (7) describes an analysis of the magnitude and

affected by urbanization; and (8) describes the StreamStats Web application for automatically measuring required basin-characteristics data and solving the regression equations so

Previous Studies

California was done by Cruff and Rantz (1965), which

basins in California. A series of reports entitled “Magnitude and Frequency of Floods in the United States” was published by the U.S. Geological Survey (USGS) as Water-Supply Papers.

frequency at ungaged sites. Data and methods used for the Great Basin are given in USGS Water-Supply Paper 1684

presented in two parts in Water-Supply Papers 1685 and 1686 (Young and Cruff, 1967; Young, 1967). Crippen and Beall

characteristics. The analysis included 385 streamgages, using

a small area in the San Bernardino and San Gabriel Mountains were described in a report by Busby and Hirashima (1972). Flood-frequency information for streamgages and methods

California were developed and described in a report by Waananen and Crippen (1977). In addition, methods for

were described in a report by Thomas and others (1997). The methods described by Thomas and others (1997) subsequently were updated for use in desert regions of California by Teal and Gusman (2007).

The regionalization methods described by Waananen and Crippen (1977) for use throughout California were based on data only through 1975 and thus may be unreliable given the 30 years of additional data now available. In addition, improved regionalization techniques have become available since the completion of previous reports. A study by Parrett and others (2011) began the process of updating

development of a method for estimating regional skew, a key component in the statistical analysis of gaged data. The method for determination of regional skew was used to update

which are in the Sacramento–San Joaquin River Basin.

Description of the Study Area

California is a state of widely varying topography and climate and consequently experiences a wide range of

The State borders about 800 miles of the

gives California two distinct seasons—a wet winter and a dry summer. In addition, much of California is rugged and mountainous, with several major mountain ranges (Klamath Mountains, Cascade and Sierra Nevada, Coast Ranges, Transverse Range, and San Gabriel/San Bernardino Ranges) most of

As a result of
generally dif
Ocean annually delivers more moisture into northern California than it does into southern California. Much of the southern part of the Great Basin physiographic region, together with the Salton Trough and Sonoran Desert physiographic regions, can be considered desert, largely as a result of smaller amounts of

the west that intercept much of the reduced precipitation source. Consequently
analysis was delineated on the basis of physiographic regions

by Thomas and others (1997) and Teal and Gusman (2007).

As a result of the rugged and variable topography and dif
mean annual precipitation in California ranges from about 3 inches in the desert region to more than 120 inches in the coastal mountains near the Oregon border. Lar
California most often occur during the winter rainy season,

larger streams draining the mountains. Convective rainstorms

throughout California.

Data Compilation

estimates for streams is the compilation of streamgages with

records and homogeneity or absence of trends, which implies relatively constant watershed and climatic conditions during

reviewed, then basin characteristics must be determined for each of the streamgages.

Peak-Flow Data

Streamgages record the water-surface elevation, or stage, of a stream at various intervals, typically every 15 minutes, throughout the course of a water year , or discharge, is periodically measured throughout the range of recorded stages, and a relation between stage and discharge is developed for the streamgage. Using this stage-discharge relation, or rating, discharges for all recorded stages at the streamgage are determined. The largest discharge that occurs , and

record.
from the USGS National Water Information System (NWIS) database at *http://nwis.waterdata.usgs.gov/usa/nwis/peak*.

Hundreds of streamgages in California were investigated for possible use in this study. Streamgages were only used in

fected substantially
by diversions or urbanization.
streamgages that meet these criteria were then compiled and reviewed by using the PFReports computer program described by Ryberg (2008).

Parrett and others (2011) performed a monotonic analysis

of California using Kendall's tau, a non-parametric test for trends described by Helsel and Hirsch (1992). Trends are

than or equal to 0.05. A p-value of 0.05 indicates that there is a 5 percent probability that the test will identify a trend when no actual trend is present. Parrett and others (2011) determined

to be a factor anywhere in California outside the desert region. For this study, six long-term streamgages in the desert region

(40 years) were analyzed using Kendall's tau test and also were . The
6 streamgages are representative of all 33 streamgages used for

For the streamgages with regulation, if 10 or more years

pre-regulation portion of the record was considered for this study. Also, 14 streamgages below dams selected by the U.S. Army Corps of Engineers (USACE) that are detailed in Parrett and others (2011) were considered for use in this study.
were estimated using methods described in Parrett and others (2011).
of 858 streamgages that were considered for use in this study.

Physical and Climatic Basin Characteristics

through a multiple regression analysis that develops a relation

exceedance probability and selected physical and climatic basin characteristics for gaged drainage basins. Selected basin characteristics for each of the 858 streamgages considered for use in this study were derived from various national geo-spatial datasets, including the National Hydrologic Dataset (NHDPlus), the 2001 National Land Cover Dataset (NLCD), and the Parameter-Elevation Regressions on Independent Slopes Model (PRISM) climatic dataset, which is based on data from 1971 to 2000. Basin-characteristic names, descriptions, units, and sources of information considered for this study are given in table 1. At most of the streamgages, the drainage area determined from the NHDPlus dataset closely matched the drainage area manually determined from topographic maps The NHDPlus dataset is based on relatively coarse digital elevation data (30 meter), however, and may not always provide accurate

with little topographic relief. In addition, the NHDPlus dataset

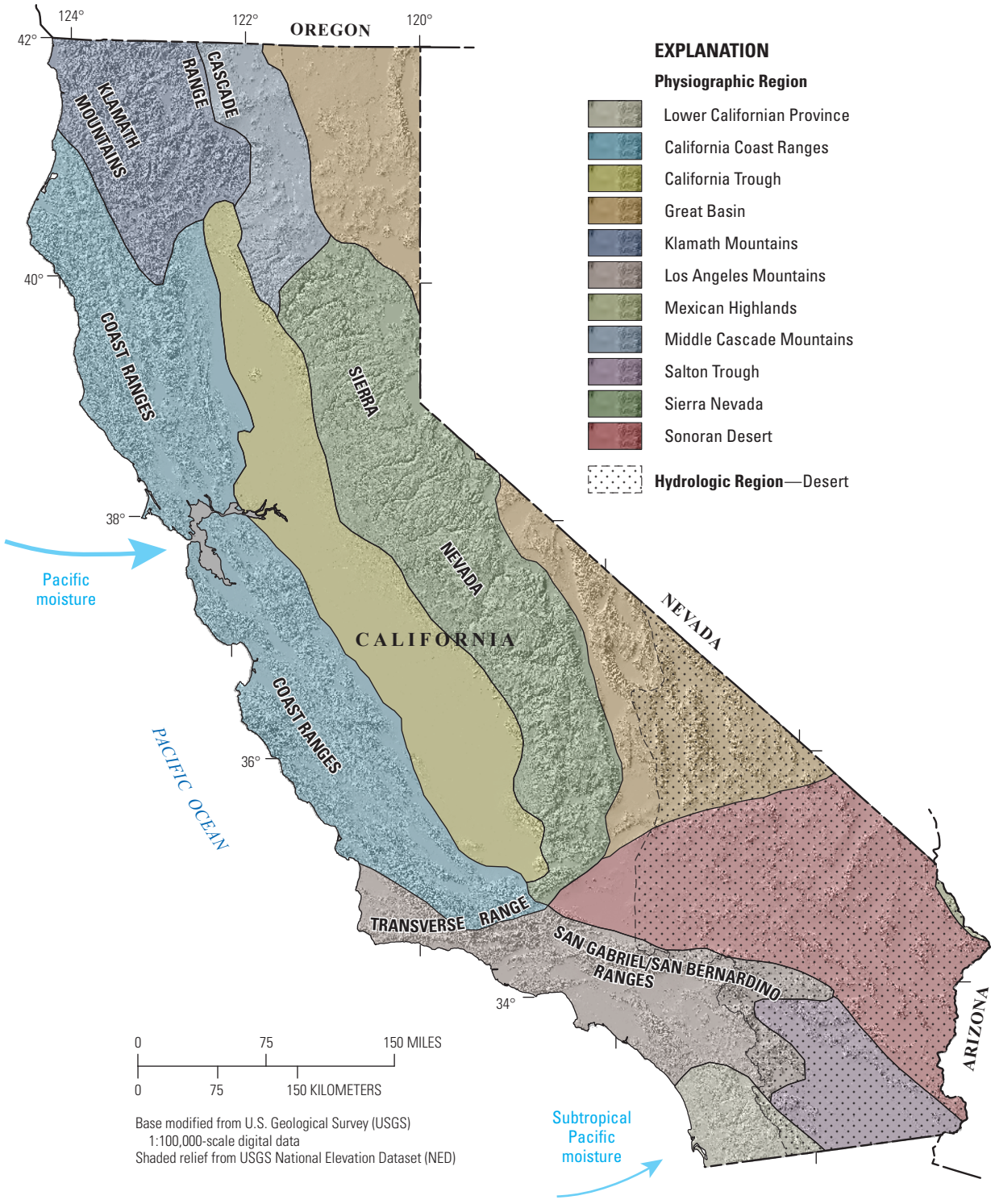


Figure 1. Physiographic regions in California (Fenneman and Johnson, 1946).

Table 1. Basin characteristics considered for use in regional regression analysis for California.

[DEM, digital elevation model; NHDPlus, National Hydrography Dataset Plus; PRISM, Parameter-elevation Regressions on Independent Slopes Model]

Name	Description	Unit	Data source
DRNAREA	Drainage area of the basin	Square miles	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
BASINPERIM	Perimeter of the basin	Miles	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
RELIEF	Difference between maximum and minimum elevations in the basin	Feet	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
ELEVMAX	Maximum elevation in the basin	Feet	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
ELEVMIN	Minimum elevation in the basin	Feet	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
LAKEAREA	Percentage of basin area covered by lakes and ponds	Percent	2001 National Land Cover Database (NLCD)—Land Cover *http://www.mrlc.gov/nlcd2001.php*
EL6000	Percentage of basin area above an elevation of 6,000 feet	Percent	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
OUTLETELEV	Elevation at the outlet of the basin	Feet	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
RELRELF	Basin relief divided by the basin perimeter	Feet per mile	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
DIST2COAST	Distance from basin centroid to coast along a line perpendicular to eastern California border	Miles	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
ELEV	Average basin elevation	Feet	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
BSLDEM30M	Average basin slope	Percent	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
FOREST	Percentage of basin area covered by forest	Percent	2001 National Land Cover Database (NLCD)—Percent Canopy *http://www.mrlc.gov/nlcd2001.php*
IMPERV	Percentage of basin area covered by impervious surface	Percent	2001 National Land Cover Database (NLCD)—Percent Impervious *http://www.mrlc.gov/nlcd2001.php*
PRECIP	Mean annual precipitation	Inches	800-meter resolution PRISM 1971–2000 data *http://www.prism.oregonstate.edu/products/*
JANMAX	Average maximum January temperature in the basin	Degrees Fahrenheit	800-meter resolution PRISM 1971–2000 data *http://www.prism.oregonstate.edu/products/*
JANMIN	Average minimum January temperature in the basin	Degrees Fahrenheit	800-meter resolution PRISM 1971–2000 data *http://www.prism.oregonstate.edu/products/*
LONG_CENT	Longitude of the basin centroid	Degrees	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*
LAT_CENT	Latitude of the basin centroid	Degrees	30-meter DEM, NHDPlus elev_cm grid *http://www.horizon-systems.com/NHDPlus/*

was found to have errors in the stream network that resulted in drainage basin errors in portions of the upper Sacramento River Basin, including some parts of the Pit and Feather River drainages. The basin characteristics computed using a geographic information system (GIS) were used for all streamgages in the study, but some streamgages in the upper Sacramento River Basin were eliminated from further analysis because of potential inaccuracies in the computed basin characteristics. Streamgages were eliminated from further analysis if the GIS-calculated drainage areas differed substantially from

ferences in drainage area were considered substantial if they exceeded 50 percent for drainage basins smaller than 0.1 square mile, 20 percent for drainage basins between 0.1 and 1 square mile in size, and 10 percent for basins greater than 1 square mile in size. These criteria resulted in 771 streamgages that were considered for further use in the study (pl. 1; table 2). Streamgages that were excluded from analysis because they did not meet the criteria for drainage area differences included

previously reported by Parrett and others (2011). Because of the limitations of the NHDPlus dataset, users are cautioned to verify basin boundaries and drainage areas computed at ungaged sites to ensure that results are reasonable.

Table 2. Summary of streamgages in California that were considered for use in the regional regression analysis, 2006.

[Table 2 is available in a Microsoft© Excel spreadsheet and can be accessed and downloaded at *http://pubs.usgs.gov/sir/2012/5113/*]

Flood Magnitude and Frequency at Streamgages

A

were described in previous USGS reports as T

The use of recurrence-interval terminology is now discouraged because it can be confusing to the general public. The term has been interpreted to imply a set

using probabilistic terms. While the T-year recurrence interval

average, once during the T-year period, it may be equaled or exceeded multiple times during the period or not at all.

T
is shifting away from the T

The use of percent AEP
the probability
being equaled or exceeded in any given year. For example, a 1-percent AEP of being equaled or exceeded in any given year. The P-percent is computed as the reciprocal of the recurrence interval "T" multiplied by 100 (for example, $1/100 \times 100 = 1$ percent). T-year recurrence intervals with corresponding percent AEPs are listed in table 3 (Gotvald and others, 2009).

Table 3. T-year recurrence intervals with corresponding P-percent annual exceedance probabilities for flood-frequency flow estimates.

T-year recurrence interval	P-percent annual exceedance probability
2	50
5	20
10	10
25	4
50	2
100	1
200	0.5
500	0.2

Flood-frequency estimates for streamgages are computed

ual

The statistical distribution commonly used in the United States is the log-Pearson Type III distribution (hereafter referred to as the LP3 distribution). Guidelines and computational methods for using the LP3 distribution are described in Bulletin 17B of the Hydrology Subcommittee of the Interagency Advisory Committee on Water Data (1982). General procedures

(EMA), a new method for statistically detecting multiple

distribution, a special application of the LP3 method developed for the desert region of California, and a trial application of a

streamgages in the California mountains are described in the following sections of the report.
estimates from the LP3 analysis for the 771 streamgages in California considered in this study are given in table 4. Flood-frequency estimates could not be computed for station 1

fects

Also, estimates could not be computed for station 11142500 Arroyo De La Cruz near

of the uncertainty of the indirect-discharge measurements used to determine the lar

Table 4. Flood-frequency statistics for streamgages in California that were considered for use in the regression equations, 2006.

[Table 4 is available in a Microsoft© Excel spreadsheet and can be accessed and downloaded at *http://pubs.usgs.gov/sir/2012/5113/*]

General Log-Pearson Type III Frequency Analysis

Flood-frequency estimates for the streamgages outside of -

described in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982). Fitting the distribution requires calcu-

curve, respectively. Estimates of the P-percent AEP computed by inserting the three statistics of the frequency distribution into the equation:

$$\log Q_P = \overline{X} + K_P S \,, \tag{1}$$

where

Q_P is the P-percent annual exceedance probability , in cubic feet per second (ft^3/s);

$\overline{X}$ is the mean of the logarithms of the annual

K_P and the given percent annual exceedance probability and is obtained from appendix 3 in Bulletin 17B; and

S is the standard deviation of the logarithms of

of the degree of variation of the annual values about the mean value.

can be estimated from the available sample data (recorded

small samples tends to be an unreliable estimator of the Accordingly, the guidelines in Bulletin 17B (Interagency Advisory Committee on Water

at-site sample data (station skew) needs to be weighted with a generalized, or regional, skew determined from an analysis of selected long-term streamgages in the study region. The value

skew that is based on station skew and regional skew. The

the desert region were weighted with the generalized skew 1).

A include statistically determined outliers, which are annual peak

period of collected data, also called systematic record. These

are considered to have been the lar extended period of time that is longer than the systematic record. Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) provides guidelines for detecting outliers and interpreting historical data points and provides computational methods for appropriate corrections to the distribution to account for the outliers and historical information. While -

mates, the EMA

and others, 1997) than the methods outlined in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982).

Expected Moments Algorithm (EMA)

The EMA method was used for all sites in this study to determine LP3 at-site frequency estimates. For sites that have systematic annual peak-discharge records for complete

the EMA method calculates identical values of the LP3 parameters (mean log, standard deviation log, and station skew) as the conventional method of moments described in Bulletin 17B. The EMA method, however, can incorporate censored and interval peak-discharge data into the analysis. Censored data may be expressed in terms of discharge perception thresholds that are most often used during historical periods outside the period of systematic data collection. For example, a site may have historical information that indicates that a recorded peak discharge, Q_{hist}, was the largest since 1900, before systematic data collection was started in 1930. Each annual peak from 1900 to 1929 can be characterized as a censored discharge for which the value is known not to have exceeded the perception threshold, Q_{hist}, and estimates of those bounded discharges between 0 and Q_{hist} can be used The EMA method also allows use of interval dischar

in discharge. Interval discharges commonly are used by the EMA method to characterize missing data during periods of systematic data collection. For example, if a peak discharge was not determined because the water level did not reach the bottom of the gage, the missing peak can be characterized as an interval discharge with a range that is bounded by zero and the discharge associated with the elevation of the bottom of the gage. Missing peaks during periods of systematic data collection typically are ignored when the conventional LP3 method is used (Parrett and others, 2011).

Multiple Grubbs-Beck Test for Detecting Low Outliers

The Grubbs-Beck test is recommended in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) for detecting low outliers that can be subsequently censored in EMA so they do not have a lar
upper tail (that is, lar AEPs) of the LP3 distribution. The Grubbs-Beck test uses the at-site logarithms

sample.
streamgage may be smaller than the Grubbs-Beck critical
-
. As described by Parrett and others (2011), many streamgages in California have several

streamgages. Consequently
frequency curves were used by Parrett and others (2011) to

to the lar -selected low-outlier thresholds resulted in 50 percent of the recorded

Since completion of the report by Parrett and others (2011), a method for statistically detecting multiple potentially

was developed (T.A. Cohn, U.S. Geological Survey, written commun., February 2011). The multiple Grubbs-Beck test

critical value for a normally distributed sample, but the test is constructed so that groups of ordered data are examined (for example, the eight smallest values) and excluded from the dataset when the critical value is calculated. If the critical value is greater than the eighth smallest value in the example, then all eight values are considered to be low outliers. As described by Cohn (T.A. Cohn, U.S. Geological Survey, written commun., February 201
Grubbs-Beck test closely match user-selected low-outlier

The multiple Grubbs-Beck test was used for this study, but user-selected low-outlier thresholds determined in the previous
1)
were not changed. The streamgages that had multiple low outliers determined from a user-selected threshold or the new multiple Grubbs-Beck test are noted in table 2. An example of

lower tail of the distribution (50 percent of all recorded annual

The shape of the resultant LP3 curve would have been different if all low outliers had not been censored.

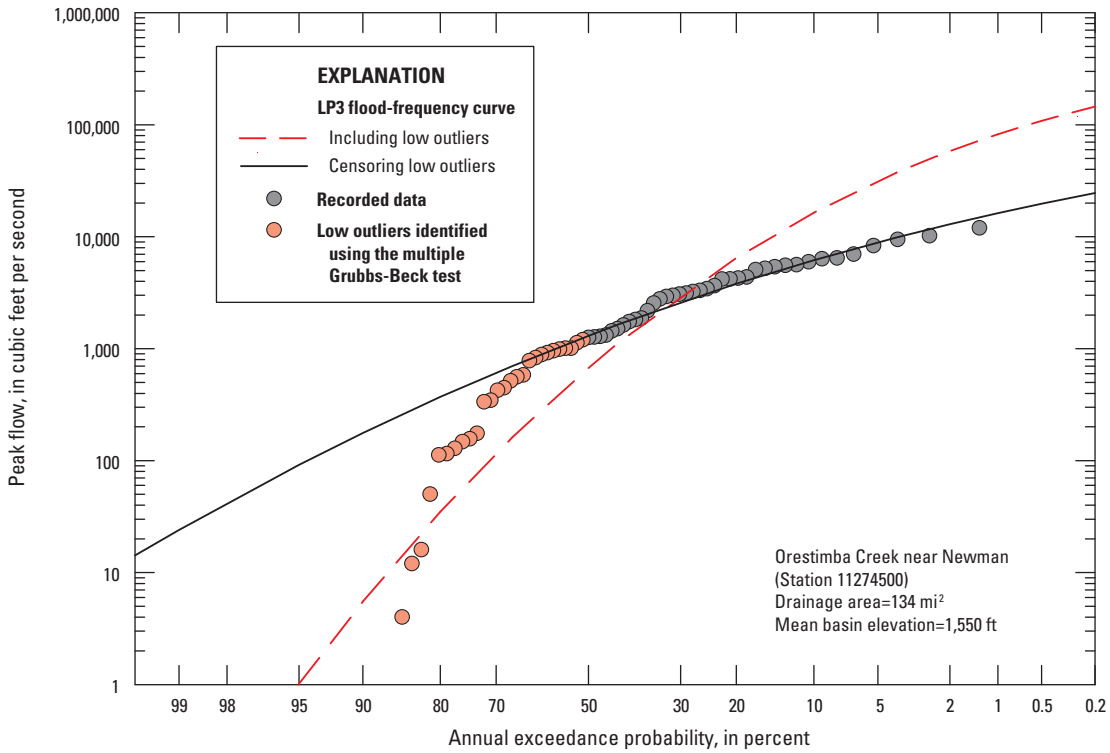


Figure 2. Flood-frequency curves for Orestimba Creek near Newman, California (station 11274500), showing the effects of including or censoring potentially influential low outliers identified from the multiple Grubbs-Beck test.

Parameter Estimation Method for Frequency Analysis in the Desert Region

Flood-frequency analysis in the California desert is com-

outliers for many streamgages. Estimates of the three param-

the LP3 distribution are likely to be highly unreliable based on the limited and heavily censored at-site data. Although the

frequency in the California desert (Waananen and Crippen, 1977), two more recent studies (Thomas and others, 1997; Teal and Gusman, 2007) used a hybrid method based on

.

For this study, a generalization of the recommendations in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) was used to develop a method based on the use of the LP3 distribution and regional estimates for all three param-

frequency estimates in the desert. As described in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982),

skew with more robust estimates of regional skew. Because

estimates are believed to be more robust and reliable if the at-site mean and standard deviation also are weighted with regional estimates of those parameters. Consequently, regional regression models for the mean and standard deviation developed using weighted least squares (WLS) regression, together with a previously developed model for regional skew (Thomas and others, 1997), and the appropriate model error metrics for weighting purposes were used to compute the

desert region. The EMA program (PeakfqSA, version 0.972)

standard deviation in a similar fashion to the weighting of at-site and regional skew (T.A. Cohn, U.S. Geological Survey, written commun., October 2011).

Thirty-three streamgages in the desert region had

analysis. Figure 3 shows the number of zero and non-zero

that about half the streamgages had record lengths of less

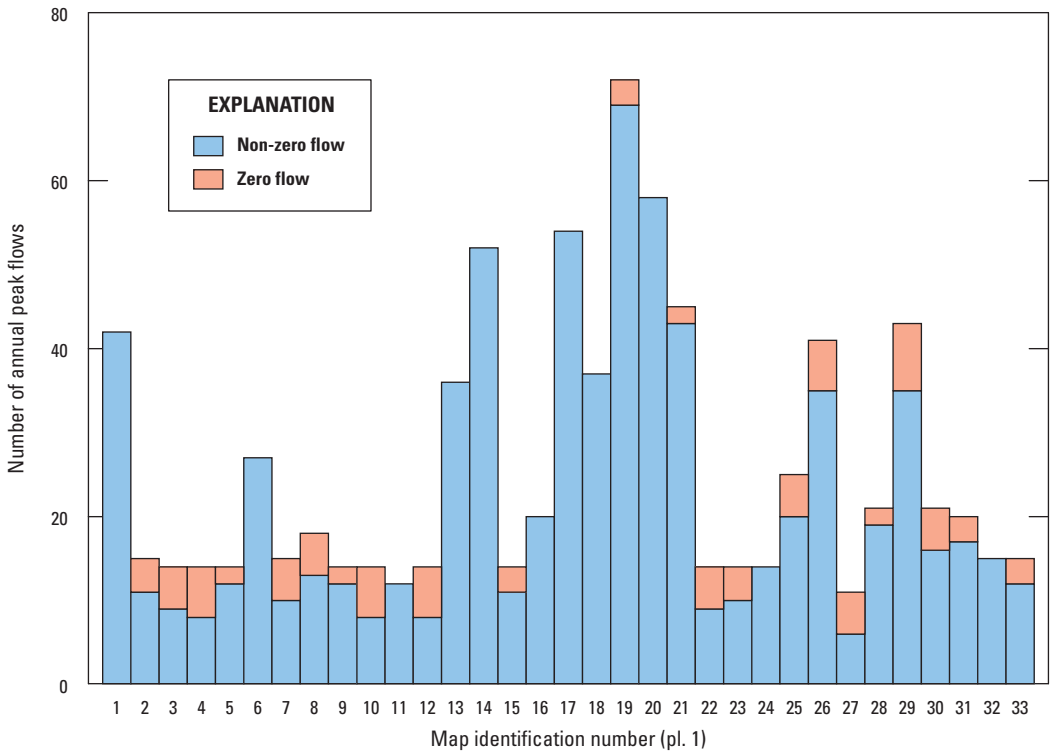


Figure 3. Number of zero and non-zero annual peak flows for streamgages used in the regional regression analysis in the California desert region.

the recorded data. Use of the EMA method with the multiple

at many desert streamgages in addition to the zero peak

This extensive

large effect on the initial at-site values for the mean, standard deviation, and skew for the desert streamgages. These initial at-site values were used to develop regional estimates of the mean and standard deviation using regression and were also subsequently weighted with those regional values to calculate The details of the

desert are described in the appendix.

33 streamgages in the desert region are given in table 4.

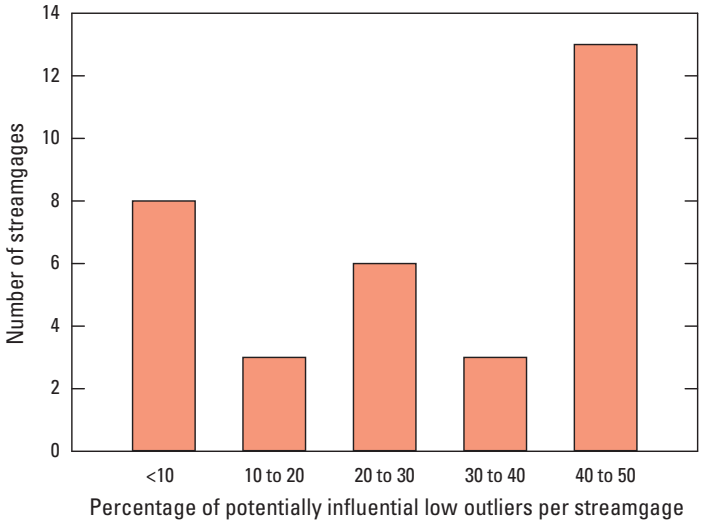


Figure 5. Distribution of the percentage of annual peak-flow data identified as potentially influential low outliers for each streamgage in the California desert region.

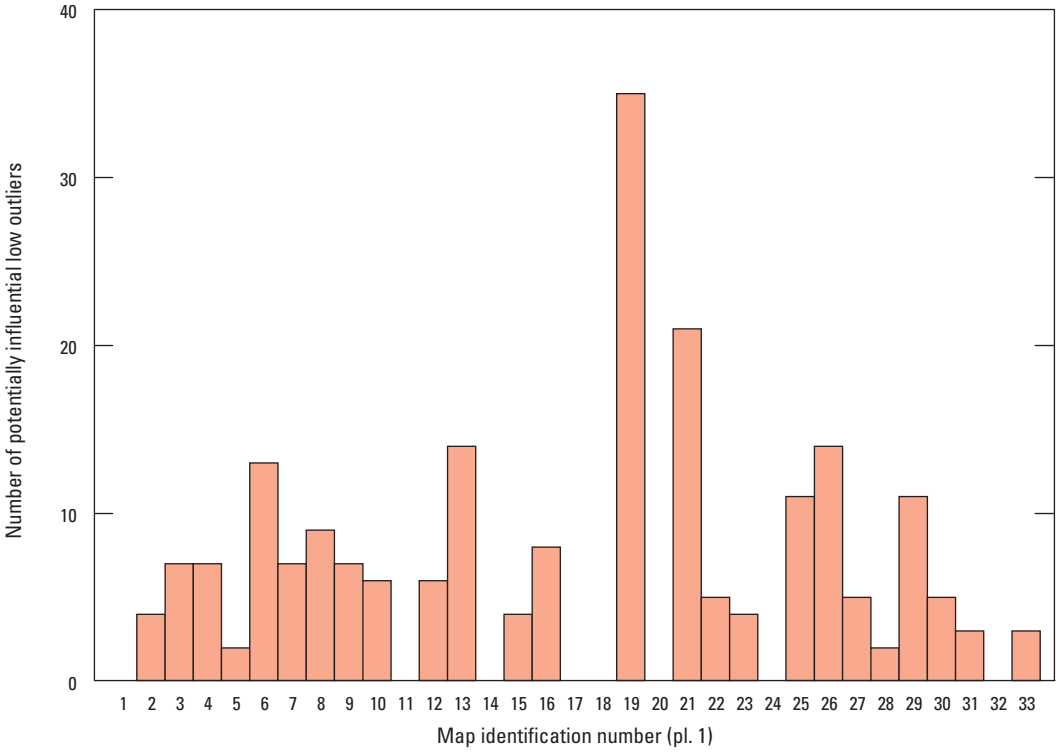


Figure 4. Number of potentially influential low outliers identified by the multiple Grubbs-Beck test for the streamgages in the California desert region.

Trial Mixed-Population Frequency Analysis

As described by Parrett and others (2011), annual peak

by winter rainstorms, springtime snowmelt runoff, or some combination of snowmelt mixed with rainstorm runoff.

caused by snowmelt runoff tends to increase with increasing mean basin elevation. At most mountainous streamgages in

data. At 10 streamgages in the Sierra Nevada region, however,

ge annual peak

considered for those streamgages. Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) also described the Sierra Nevada region of California as an example region

At each of the 10 streamgages, the recorded annual

to be predominantly caused by rain and those assumed to be predominantly caused by snowmelt. Separate LP3 curves

statistically combined using conditional probability calculations. Unfortunately, six of the streamgages had only a small

were considered unreliable. At the four streamgages having

the resultant combined LP3 curves for those streamgages also were considered to be unreliable. The rain-caused peak

were pooled together in an attempt to develop a regional LP3

10 streamgages, but that also produced inconsistent combined The LP3

were considered to be at least as reliable as the curves based on the mixed-population trial approach and were used for all streamgages in the study. The resultant LP3 curve for one of The LP3

for all 10 trial mixed-population sites. Despite the relatively

frequency at this site given the general uncertainty about mixed populations and the analysis with the limited at-site data available.

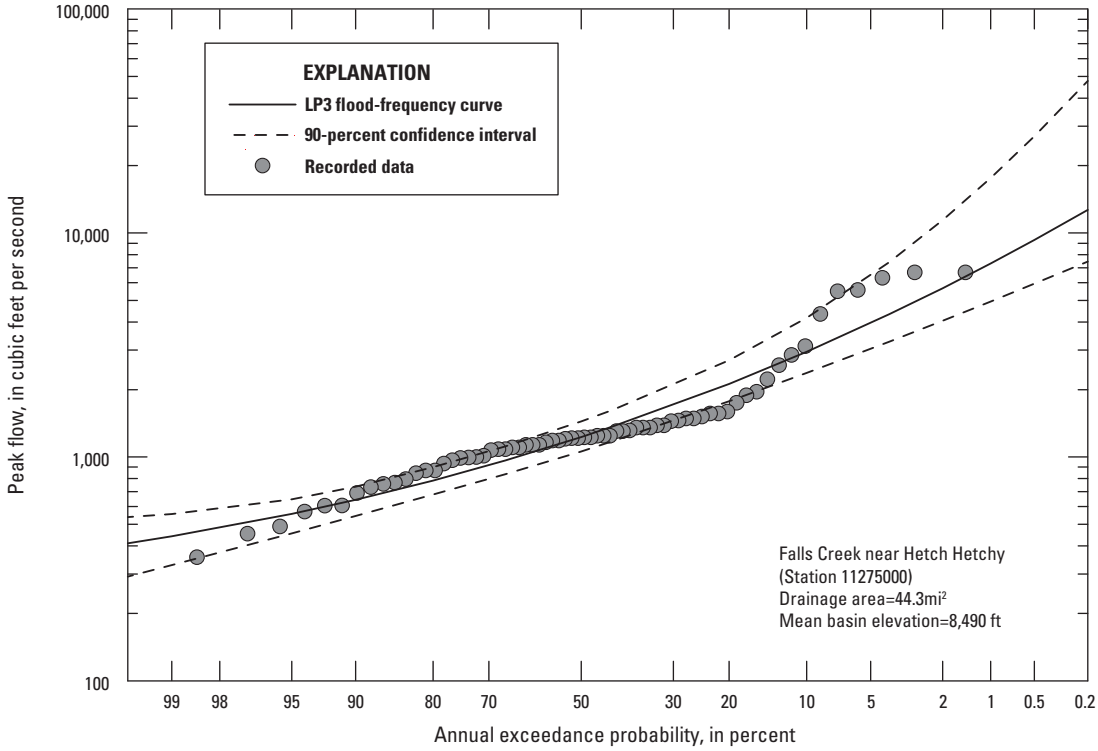


Figure 6. Flood-frequency curve for Falls Creek near Hetch Hetchy, California (station 11275000).

Estimation of Flood Magnitude and Frequency at Ungaged Sites

A regional regression analysis was used to develop a set of equations for estimating the magnitude and frequency These equations relate the 50-, 20-, 10-, 4-, 2-, 1-, 0.5-, and 0.2-percent AEP

measured basin characteristics of the associated drainage basins.
basin characteristics had been determined were considered for use in the regional regression analysis (table 4).

Regression Analysis

Ordinary least squares (OLS) regression techniques were used in the exploratory analysis to determine the best candidate regression models for all combinations of basin characteristics and the development of hydrologic regions with dif
OLS regression uses a linear relation between the explanatory (basin characteristics) and response variables (P-percent AEP
create linear relations. For example, the relation between the arithmetic values of basin drainage area and P-percent AEP , the relation between the logarithms of basin drainage area and the logarithms of P-percent AEP . Homoscedasticity (a constant variance in the response variable over the range of the explanatory variables) and normality of the residuals also are requirements for an OLS regression. The logarithmic transformation of the P-percent AEP
enhances the homoscedasticity of the data. Homoscedasticity and normality of residuals were examined graphically.

Selection of the explanatory variables for each hydrologic region was based on all-possible-subsets (APS) regression methods (Neter and others, 1985).
explanatory variables for inclusion into each model for each hydrologic region was based on several factors, including standard error of the estimate, Mallow's C_p statistic, statistical

determination (R^2), and ease of computing the basin characteristics. Multicollinearity (correlation among the candidate explanatory variables) also was assessed by the variance *VIF*).

In all regions except the desert region, generalized least square (GLS) regression methods, as described by Stedinger and T
P-percent AEP
weighted-multiple-linear regression (WREG) program, version 1.03 (U.S. Geological Survey, 2010). Details on this computer program are described by Eng and others (2009). Stedinger and Tasker (1985) found that GLS regression equations are more accurate and provide a better estimate of the regression accuracy than the simpler OLS regression equations when ferent and ferent streamgages are correlated. The GLS regression techniques give less weight to streamgages that have shorter periods of record than to streamgages with longer periods of record. Less weight is also given to streamgages where concurrent peak

other streamgages (Hodgkins, 1999). For the desert region of California, however, regression analysis was not used to relate P-percent AEP , a WLS regression analysis (Tasker, 1980) was used to develop regional estimates of the mean and standard deviation. These regional estimates, together with a regional estimate of skew from a previous report (Thomas and others, 1997) were used

estimation equations for P-percent AEP
regional regression analysis for the desert region are provided in the appendix.

Regression analysis requires that data be as spatially independent as possible. Redundancy results when the drainage basins of two streamgages are nested, meaning that one is contained inside the other, and the sizes of the two basins are similar. Then, instead of providing two independent spatial observations depicting how basin characteristics are related to AEP
same hydrologic response to a given storm and thus represent only one spatial observation. A statistical analysis using redundant streamgages misrepresents the information in the regional dataset (Gruber and Stedinger, 2008). In order to remove the errors associated with nested streamgages for the regional regression analysis, the methods detailed in Veilleux (2009) and Parrett and others (2011) were used to determine the redundant streamgages for this study. Of the 769 streamgages, 104 were omitted from the regional regression analysis because of redundant record, leaving a total of 665 streamgages for further regional analysis.

Regionalization of Flood-Frequency Estimates

Because the streamgages in the desert region of Cali-

ge number of censored

consisting of the desert streamgages was developed using the desert regions from Waananen and Crippen (1977) and Thomas and others (1997). An OLS regression analysis was performed on the 632 streamgages outside of the desert region to determine whether additional hydrologic regions needed to be determined for California. All response and non-zero explanatory variables were transformed to logarithms (base 10) prior to the regression analyses to (1) obtain linear relations between the response variables and the explanatory

variables and (2) achieve homoscedasticity. The standard errors of estimate using varying combinations of explanatory variables ranged from 86.0 to 99.3 percent for the 1-percent AEP
outside the desert region. Regression residuals for the 1-percent AEP
tive drainage basin in order to determine geographical patterns of bias. Large errors of estimate and geographic bias of the regression residuals indicated that California needed to be subdivided into hydrologic regions. The physiographic regions Waananen and Crippen (1977) study were used together with the observed patterns of regression residuals to develop the hydrologic regions for the area of California outside of the desert region. A total of six hydrologic regions, including the desert region, were developed for California (pl. 1).

In addition to the six hydrologic regions determined suitable for development of regression equations, a region including only two gages was delineated as an indeterminate This indeterminate region that includes Mono Lake and the upper Owens River valley is generally high in elevation but also generally dry. This region is outside the area for which regional skew was determined in California (Parrett and others, 2011), and it is Thomas and others (1997) for which regional skew was determined to be zero.
region are smaller than those from comparably sized drainages in any of the adjoining hydrologic regions. Consequently, expanding the adjoining hydrologic regions to include portions of this indeterminate region was considered likely to result

region. Using a rainfall-runoff model, calibrated with stream-

The APS regression methods were conducted on each of

to determine the candidate explanatory variables for each hydrologic region. The results of the APS analyses indicated

exceedance probabilities, while the addition of mean annual precipitation reduced the standard error of estimate more than any of the other explanatory variables. In the Sierra Nevada region, adding mean basin elevation helped remove a bias in regression residuals that was pronounced at both low elevations and high elevations. Adding other variables to drainage

improve prediction equations in the other four regions. Thus, drainage area, mean basin elevation, and mean annual precipitation were selected as the only basin characteristics for further analysis in the Sierra Nevada region, and only drainage area and mean annual precipitation were selected in the other four regions outside the California desert. An OLS regression analysis was performed for the Sierra Nevada region using the following regression model:

$$Q_P = a_0 (DRNAREA)^{b_0} (ELEV)^{c_0} (PRECIP)^{d_0}, \quad (2)$$

where

Q_P is the P-percent annual exceedance probability , in cubic feet per second;
DRNAREA is the drainage area, in square miles;
ELEV is the mean basin elevation, in feet;
PRECIP is the mean annual precipitation, in inches; and
a_0, b_0, c_0, and d_0

The regression model was logarithmically transformed to the following linear form:

$$\log Q_P = \log a_0 + b_0 (\log DRNAREA) + c_0 (\log ELEV) + d_0 (\log PRECIP) \quad . \quad (3)$$

For the other four regions outside the California desert, equations 2 and 3 included only the variables *DRNAREA* and *PRECIP* a_0, b_0, and c_0.

The residuals from the OLS analysis were plotted for each region in order to determine the need for dividing the regions into subregions. The residuals showed no geographical

hydrologic regions outside the desert region were used for the

Regional Regression Equations

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outside of the desert that were considered for the regional regression analysis by using the WREG program. The multiple performance metrics from the WREG program were used to identify possible problem streamgages used in the regression. Residuals randomly distributed around zero are preferred. The leverage metric is used to measure how unusual the values of independent variables at one streamgage are compared to the values of the same variables at all other streamgages. The

had a lar
values (Eng and others, 2009). A streamgage may have a large leverage metric, indicating that its independent variables are substantially different from those at all other streamgages, but the same streamgage may not have a lar
regression parameters. Conversely, a streamgage with a large ge leverage metric. Measurement or typographic errors in reported values of some independent variables may produce lar
and streamgages with such errors may need to be excluded. WREG program as having lar
excluded because no known errors were associated with the

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Combinations of independent explanatory variables that do not have multicollinearity and provide the lowest estimation error for each AEP - sion equations. Drainage area, mean basin elevation, and mean annual precipitation were the most appropriate basin character-

sites in the Sierra Nevada region, and drainage area and mean annual precipitation were the basin characteristics used in the other regions outside of the desert region of California. regional regression equations for the 50- through 0.2-percent AEP The values of drainage area, mean annual precipitation, and mean basin elevation for the 630 streamgages used in the regression analysis are given in table 2.

As previously described, regression analysis relating P-percent AEP develop estimation equations for ungaged sites in the desert region. A WLS regression was used to determine regional models for the standard deviation and mean. The best model for the standard deviation was a constant model with a value of 0.91 log units. The best model for the mean was a linear model relating the mean to the log of drainage area. The best model for skew was previously determined by Thomas and others (1997) to be a constant value of zero. Placing these regional values of LP3 parameters into the basic LP3

P-percent AEP *DRNAREA*) as the only explanatory variable. Details on the development of the equations for estimating P-percent AEP region are given in the appendix. for the 50- through 0.2-percent AEP region are given in table 5. The values of drainage area for the 33 streamgages used in the regression analysis are given in table 2.

Table 5. Regional flood-frequency equations for rural ungaged streams in California.

[mi^2, square miles; *DRNAREA*, drainage area, in mi^2; *PRECIP*, mean annual precipitation, in inches; *ELEV*, mean basin elevation, in feet]

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)		
	North Coast (Region 1)	Lahontan (Region 2)	Sierra Nevada (Region 3)
50	$1.82(DRNAREA)^{0.904}(PRECIP)^{0.983}$	$0.0865(DRNAREA)^{0.736}(PRECIP)^{1.59}$	$2.43(DRNAREA)^{0.924}(ELEV)^{-0.646}(PRECIP)^{2.06}$
20	$8.11(DRNAREA)^{0.887}(PRECIP)^{0.772}$	$0.182(DRNAREA)^{0.733}(PRECIP)^{1.58}$	$11.6(DRNAREA)^{0.907}(ELEV)^{-0.566}(PRECIP)^{1.70}$
10	$14.8(DRNAREA)^{0.880}(PRECIP)^{0.696}$	$0.260(DRNAREA)^{0.734}(PRECIP)^{1.59}$	$17.2(DRNAREA)^{0.896}(ELEV)^{-0.486}(PRECIP)^{1.54}$
4	$26.0(DRNAREA)^{0.874}(PRECIP)^{0.628}$	$0.394(DRNAREA)^{0.733}(PRECIP)^{1.58}$	$20.7(DRNAREA)^{0.885}(ELEV)^{-0.386}(PRECIP)^{1.39}$
2	$36.3(DRNAREA)^{0.870}(PRECIP)^{0.589}$	$0.532(DRNAREA)^{0.733}(PRECIP)^{1.58}$	$21.1(DRNAREA)^{0.879}(ELEV)^{-0.316}(PRECIP)^{1.31}$
1	$48.5(DRNAREA)^{0.866}(PRECIP)^{0.556}$	$0.713(DRNAREA)^{0.731}(PRECIP)^{1.56}$	$20.6(DRNAREA)^{0.874}(ELEV)^{-0.250}(PRECIP)^{1.24}$
0.5	$61.0(DRNAREA)^{0.863}(PRECIP)^{0.531}$	$0.944(DRNAREA)^{0.729}(PRECIP)^{1.55}$	$19.4(DRNAREA)^{0.870}(ELEV)^{-0.188}(PRECIP)^{1.18}$
0.2	$79.3(DRNAREA)^{0.860}(PRECIP)^{0.503}$	$1.35(DRNAREA)^{0.727}(PRECIP)^{1.52}$	$17.4(DRNAREA)^{0.865}(ELEV)^{-0.110}(PRECIP)^{1.11}$

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)		
	Central Coast (Region 4)	South Coast (Region 5)	Desert (Region 6)
50	$0.00459(DRNAREA)^{0.856}(PRECIP)^{2.58}$	$3.60(DRNAREA)^{0.672}(PRECIP)^{0.753}$	$10.3(DRNAREA)^{0.506}$
20	$0.0984(DRNAREA)^{0.852}(PRECIP)^{1.97}$	$7.43(DRNAREA)^{0.739}(PRECIP)^{0.872}$	$60.0(DRNAREA)^{0.506}$
10	$0.460(DRNAREA)^{0.846}(PRECIP)^{1.66}$	$6.56(DRNAREA)^{0.783}(PRECIP)^{1.07}$	$151(DRNAREA)^{0.506}$
4	$2.13(DRNAREA)^{0.842}(PRECIP)^{1.34}$	$4.71(DRNAREA)^{0.832}(PRECIP)^{1.32}$	$403(DRNAREA)^{0.506}$
2	$5.32(DRNAREA)^{0.840}(PRECIP)^{1.15}$	$3.84(DRNAREA)^{0.864}(PRECIP)^{1.47}$	$760(DRNAREA)^{0.506}$
1	$11.0(DRNAREA)^{0.840}(PRECIP)^{0.994}$	$3.28(DRNAREA)^{0.891}(PRECIP)^{1.59}$	$1{,}350(DRNAREA)^{0.506}$
0.5	$20.3(DRNAREA)^{0.840}(PRECIP)^{0.865}$	$2.84(DRNAREA)^{0.915}(PRECIP)^{1.70}$	$2{,}270(DRNAREA)^{0.506}$
0.2	$39.0(DRNAREA)^{0.842}(PRECIP)^{0.729}$	$2.31(DRNAREA)^{0.943}(PRECIP)^{1.83}$	$4{,}280(DRNAREA)^{0.506}$

Accuracy and Limitations

When applying regression equations, users are advised against interpreting the empirical results as exact. Regression equations are statistical models that must be interpreted and applied within the limits of the data and with the understanding

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or variance. The development and use of a regression equation raises questions about how well the predicted values represent true values. Differences between predicted and observed values at streamgages can be used to describe the accuracy of a regression equation, which depends on both the model and sampling error. Model error measures the ability of a set

characteristics calculated from the streamgage records that were used to develop the equation. The model error depends on the number and predictive power of the explanatory variables in a regression equation. Sampling error measures the ability of

for a streamgage. The sampling error depends on the number of streamgages and record length of streamgages used in the analysis and decreases as either the number of streamgages or length of record increases.

A measure of the uncertainty in a regression equation estimate for a site, *i*, is the variance of prediction, VP_i. The VP_i is the sum of the model error variance and sampling error variance and is computed using the following equation:

$$VP_i = \sigma_\delta^2 + \sigma_{\eta,i}^2, \quad (4)$$

where

σ_δ^2 is the model error variance; and

$\sigma_{\eta,i}^2$ is the sampling mean square error for site *i*.

Assuming that the explanatory variables for the streamgages in a regression analysis are representative of all streamgages in the region, the average accuracy of prediction for a regression equation can be determined by computing the average variance of prediction, *AVP*, for *n* number of streamgages:

$$AVP = \sigma_\delta^2 + \left(\frac{1}{n}\right)\sum_{i=1}^{n}\sigma_{\eta,i}^2, \quad (5)$$

A more traditional measure of the accuracy of P-percent AEP regression equations is the standard error of prediction, SE_P, which is simply the square root of the variance of prediction. The average standard error of prediction for a regression equation can be computed in error percentage by using *AVP*, in log units, and the following transformation formula:

$$SE_{P,ave} = 100\left[10^{2.3026(AVP)} - 1\right]^{0.5}, \quad (6)$$

where

$SE_{P,ave}$ is the average standard error of prediction, in percent.

Approximately two-thirds of the estimates obtained from a regression equation for ungaged sites will have errors less than the standard error of prediction (Helsel and Hirsch, 1992).

A measure of the proportion of the variation in the dependent variable explained by the independent variables

R^2

(Montgomery and others, 2001). For WLS and GLS regressions, a more appropriate performance metric than R^2 is

R_{pseudo}^2

R^2 metric, R_{pseudo}^2 is based on the variability in the dependent variable explained by the regression after removing the effect of the time-sampling error. The R_{pseudo}^2 is computed by using the following formula:

$$R_{pseudo}^2 = 1 - \frac{\sigma_\delta^2(k)}{\sigma_\delta^2(0)}, \quad (7)$$

where

$\sigma_\delta^2(k)$ is the model error variance from a GLS regression with *k* independent variables; and

$\sigma_\delta^2(0)$ is the model error variance from a GLS regression with no independent variables.

The average variance of prediction, average standard error of prediction, and R_{pseudo}^2 equations are given in table 6. The R_{pseudo}^2 values cannot be computed for the desert region, because a regional regression on the P-percent AEP

The results in table 6 indicate that the average standard errors of prediction are smallest for all AEP Coast region (hydrologic region 1), with a range in values from 42.7 percent for the 4-percent and 2-percent AEP to 58.6 percent for the 50-percent AEP . Conversely, the average standard errors of prediction are largest for all AEP

values range from 214.2 percent for the 50-percent AEP to 856.2 percent for the 0.2-percent AEP , indicating the

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The standard errors of estimate for hydrologic regions 1 through 5 are less than the standard errors of estimate for the similar regions in Waananen and Crippen (1977; table 7); however, there are substantial differences in some of the regional boundaries used in the two studies, especially for regions 2 and 3 in this study. Likewise, results from the report by Busby and Hirashima (1972) cannot be compared to results from this study because the study areas are markedly different. Also, the standard errors of estimate for the California desert region shown by Waananen and Crippen (1977) cannot be compared to the standard errors of estimate for the desert region (hydrologic region 6) from this study, primarily because Waananen and Crippen (1977) included many sites draining mountainous areas and did not include

, the average standard errors of prediction in the desert region given in table 6 are

Table 6. Average variance of prediction, average standard error of prediction, and pseudo coefficient of determination for the regional regression equations.

[*AVP*, average variance of prediction; $SE_{p,ave}$, average standard error of prediction; R^2_{pseudo}

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)								
	North Coast (Region 1)			Lahontan (Region 2)			Sierra Nevada (Region 3)		
	AVP (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)	*AVP* (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)	*AVP* (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)
50	0.056	58.6	93.7	0.126	97.5	82.6	0.083	74.4	88.3
20	0.038	47.4	95.4	0.098	82.7	85.6	0.049	54.4	92.0
10	0.034	44.2	95.9	0.089	77.7	86.6	0.044	51.5	92.3
4	0.032	42.7	96.0	0.086	76.1	86.7	0.046	52.3	91.6
2	0.032	42.7	96.0	0.085	75.7	86.6	0.049	54.6	90.8
1	0.034	44.3	95.6	0.088	77.2	86.0	0.055	58.0	89.6
0.5	0.034	44.4	95.6	0.091	78.9	85.3	0.060	61.5	88.5
0.2	0.036	46.0	95.2	0.099	82.9	84.0	0.070	67.3	86.7

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)								
	Central Coast (Region 4)			South Coast (Region 5)			Desert (Region 6)		
	AVP (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)	*AVP* (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)	*AVP* (log units)	$SE_{p,ave}$ (percent)	R^2_{pseudo} (percent)
50	0.243	161.9	76.9	0.194	134.2	60.6	0.325	214.2	—
20	0.125	97.0	86.3	0.099	83.1	78.8	0.342	226.2	—
10	0.092	79.4	89.2	0.065	64.0	86.4	0.371	248.1	—
4	0.075	69.9	90.7	0.044	51.5	91.4	0.432	297.6	—
2	0.069	66.2	91.4	0.038	47.6	93.1	0.494	356.9	—
1	0.070	66.9	91.0	0.038	47.2	93.7	0.572	444.3	—
0.5	0.071	67.6	90.8	0.039	47.7	93.9	0.665	574.5	—
0.2	0.078	71.5	89.8	0.045	52.0	93.3	0.813	856.2	—

Table 7. Standard errors of estimate from this investigation and from Waananen and Crippen (1977).

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)									
	North Coast (Region 1)		Lahontan (Region 2)		Sierra Nevada (Region 3)		Central Coast (Region 4)		South Coast (Region 5)	
	Standard error of estimate (SE_e) (log units)									
	This investigation (2012)	Waananen and Crippen (1977)	This investigation (2012)	Waananen and Crippen (1977)	This investigation (2012)	Waananen and Crippen (1977)	This investigation (2012)	Waananen and Crippen (1977)	This investigation (2012)	Waananen and Crippen (1977)
50	0.23	0.26	0.34	0.46	0.33	0.34	0.48	0.47	0.43	0.47
20	0.19	0.24	0.30	0.38	0.26	0.32	0.34	0.39	0.30	0.37
10	0.18	0.24	0.28	0.38	0.23	0.27	0.29	0.35	0.24	0.33
4	0.17	0.24	0.27	0.40	0.22	0.30	0.25	0.35	0.19	0.32
2	0.17	0.25	0.27	0.42	0.22	0.34	0.24	0.38	0.17	0.35
1	0.18	0.26	0.27	0.45	0.23	0.37	0.24	0.41	0.17	0.39

smaller than comparable errors reported for the prediction equations for the Southwestern United States by Thomas and others (1997). Although Teal and Gusman (2007) used the same method as Thomas and others (1997) to develop prediction equations for the desert region, their reported errors did not account for the extreme variability and uncertainty of the

compared to the errors listed in table 6.

Users of the regression models may be interested in a

as opposed to the average uncertainty based on all streamgage data used to generate the regression models. One such measure

interval of a prediction, or prediction interval. A prediction interval is the range in values of an estimated response variable over which the true value of the response variable occurs with some stated probability. For example, the 90-percent

is 90 percent. Tasker and Driver (1988) determined that a 100 (1–α
estimated at an ungaged site from a regression equation can be computed as follows:

$$Q / C < Q < CQ, \tag{8}$$

where

Q
ungaged site; and

C is computed as:

$$C = 10^{t_{(\alpha/2,\, n-p)}\, SE_{P,i}}, \tag{9}$$

where

$t_{(\alpha/2,\, n-p)}$ is the critical value from the student's t-distribution at a particular alpha-level (α) and degrees of freedom ($n-p$) and is equal to 1.653, 1.675, 1.653, 1.662, and 1.661 for hydrologic regions 1, 2, 3, 4, and 5, respectively, for a prediction interval of 90 percent ($\alpha = 0.1$); and

$SE_{P,i}$ is the standard error of prediction for site i and is computed as

$$SE_{P,i} = [\sigma_\delta^2 + \mathbf{X}_i \mathbf{U} \mathbf{X}_i^T]^{0.5}, \tag{10}$$

where

σ_δ^2 is the model error variance;

$\mathbf{X}_i$ is a row vector of the explanatory variables for site i, augmented by

$\mathbf{U}$ is the covariance matrix for the regression

$\mathbf{X}_i^T$ is the transpose of $\mathbf{X}_i$ (Ludwig and Tasker, 1993).

The values for σ_δ^2 and $\mathbf{U}$ are presented in table 8. Prediction intervals cannot be computed for the desert region (hydrologic region 6) because of the non-standard methods used to develop the equations.

The procedure required to obtain the prediction intervals for P-percent AEP
following example computation of the 2-percent AEP for a hypothetical ungaged site on Indian Creek near Big City, Calif., in hydrologic region 1. The results are rounded to three

1. Obtain the drainage area and mean annual precipitation for the ungaged site (*DRNAREA*= 5.00 mi^2, *PRECIP* = 30.0 inches);

2. Compute $Q_{2\%}$ using the equation in table 5 for hydrologic region 1 ($Q_{2\%} = 36.3 \times (5.00^{0.870} \times 30.0)^{0.589} = 1{,}090$ ft^3/s);

3. Determine the $\mathbf{X}_i$ vector ($\mathbf{X}_i = \{1, \log_{10}(5.00), \log_{10}(30.0)\}$);

4. Compute the standard error of prediction using equation 10 with σ_δ^2 and $\mathbf{U}$ for the 2-percent AEP from table 8; $SE_{P,i} = (0.0291 + 0.003339)^{0.5} = 0.1801$;

5. Compute C using equation 9; $C = 10^{(1.653 \times 0.1801)} = 1.985$; and

6. Compute the 90-percent prediction interval using equation 8; $(1{,}090/1.985) < Q_{2\%} < (1{,}090 \times 1.985)$ or 549 ft^3/s < $Q_{2\%}$ < 2,160 ft^3/s.

Table 8. Values used to determine prediction intervals for the regional regression equations.

[σ_δ^2, the regression model error variance used in equation 10; **U**, the covariance matrix used in equation 10; —, not applicable]

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)												
	North Coast (Region 1)				Lahontan (Region 2)				Sierra Nevada (Region 3)				
	σ_δ^2	U			σ_δ^2	U			σ_δ^2	U			
50	0.053	4.82E-2	–5.42E-4	–2.61E-2	0.116	1.93E-1	–3.72E-3	–1.15E-1	0.079	7.91E-2	–1.81E-3	–7.28E-3	–2.81E-2
		–5.42E-4	4.81E-4	–1.80E-4		–3.72E-3	3.36E-3	–5.86E-4		–1.81E-3	8.95E-4	–4.81E-4	1.14E-3
		–2.61E-2	–1.80E-4	1.50E-2		–1.15E-1	–5.86E-4	7.29E-2		–7.28E-3	–4.81E-4	6.44E-3	–9.12E-3
										–2.81E-2	1.14E-3	–9.12E-3	3.51E-2
20	0.036	3.86E-2	–4.49E-4	–2.07E-2	0.089	1.67E-1	–4.22E-3	–9.77E-2	0.046	5.55E-2	–1.10E-3	–5.32E-3	–1.92E-2
		–4.49E-4	3.62E-4	–1.24E-4		–4.22E-3	2.84E-3	3.42E-5		–1.10E-3	6.26E-4	–4.76E-4	9.60E-4
		–2.07E-2	–1.24E-4	1.18E-2		–9.77E-2	3.42E-5	6.10E-2		–5.32E-3	–4.76E-4	5.46E-3	–7.88E-3
										–1.92E-2	9.60E-4	–7.88E-3	2.69E-2
10	0.032	3.93E-2	–4.76E-4	–2.09E-2	0.080	1.66E-1	–4.86E-3	–9.57E-2	0.041	5.86E-2	–1.04E-3	–6.20E-3	–1.92E-2
		–4.76E-4	3.46E-4	–1.01E-4		–4.86E-3	2.76E-3	3.96E-4		–1.04E-3	6.17E-4	–5.27E-4	1.02E-3
		–2.09E-2	–1.01E-4	1.19E-2		–9.57E-2	3.96E-4	5.93E-2		–6.20E-3	–5.27E-4	6.19E-3	–8.75E-3
										–1.92E-2	1.02E-3	–8.75E-3	2.85E-2
4	0.029	4.28E-2	–5.35E-4	–2.26E-2	0.075	1.77E-1	–5.78E-3	–1.01E-1	0.041	6.90E-2	–1.11E-3	–7.85E-3	–2.16E-2
		–5.35E-4	3.54E-4	–8.46E-5		–5.78E-3	2.88E-3	7.36E-4		–1.11E-3	6.80E-4	–6.23E-4	1.18E-3
		–2.26E-2	–8.46E-5	1.27E-2		–1.01E-1	7.36E-4	6.20E-2		–7.85E-3	–6.23E-4	7.60E-3	–1.06E-2
										–2.16E-2	1.18E-3	–1.06E-2	3.34E-2
2	0.029	4.63E-2	–5.86E-4	–2.44E-2	0.074	1.86E-1	–6.46E-3	–1.06E-1	0.044	7.85E-2	–1.21E-3	–9.22E-3	–2.41E-2
		–5.86E-4	3.72E-4	–8.01E-5		–6.46E-3	3.00E-3	9.51E-4		–1.21E-3	7.55E-4	–7.09E-4	1.33E-3
		–2.44E-2	–8.01E-5	1.37E-2		–1.06E-1	9.51E-4	6.47E-2		–9.22E-3	–7.09E-4	8.84E-3	–1.22E-2
										–2.41E-2	1.33E-3	–1.22E-2	3.81E-2
1	0.031	5.11E-2	–6.46E-4	–2.69E-2	0.075	2.01E-1	–7.19E-3	–1.13E-1	0.049	8.92E-2	–1.33E-3	–1.07E-2	–2.71E-2
		–6.46E-4	4.06E-4	–8.52E-5		–7.19E-3	3.21E-3	1.13E-3		–1.33E-3	8.51E-4	–8.11E-4	1.50E-3
		–2.69E-2	–8.52E-5	1.51E-2		–1.13E-1	1.13E-3	6.94E-2		–1.07E-2	–8.11E-4	1.02E-2	–1.41E-2
										–2.71E-2	1.50E-3	–1.41E-2	4.36E-2
0.5	0.031	5.42E-2	–6.90E-4	–2.84E-2	0.077	2.16E-1	–7.91E-3	–1.21E-1	0.054	9.99E-2	–1.46E-3	–1.21E-2	–3.02E-2
		–6.90E-4	4.23E-4	–8.23E-5		–7.91E-3	3.43E-3	1.29E-3		–1.46E-3	9.52E-4	–9.15E-4	1.67E-3
		–2.84E-2	–8.23E-5	1.59E-2		–1.21E-1	1.29E-3	7.43E-2		–1.21E-2	–9.15E-4	1.16E-2	–1.60E-2
										–3.02E-2	1.67E-3	–1.60E-2	4.92E-2
0.2	0.033	5.95E-2	–7.56E-4	–3.12E-2	0.082	2.41E-1	–8.95E-3	–1.35E-1	0.063	1.15E-1	–1.64E-3	–1.41E-2	–3.47E-2
		–7.56E-4	4.61E-4	–8.87E-5		–8.95E-3	3.81E-3	1.48E-3		–1.64E-3	1.11E-3	–1.07E-3	1.93E-3
		–3.12E-2	–8.87E-5	1.75E-2		–1.35E-1	1.48E-3	8.25E-2		–1.41E-2	–1.07E-3	1.37E-2	–1.89E-2
										–3.47E-2	1.93E-3	–1.89E-2	5.76E-2

Table 8. Values used to determine prediction intervals for the regional regression equations.—Continued

[σ_δ^2, the regression model error variance used in equation 10; **U**, the covariance matrix used in equation 10; —, not applicable]

Percent annual exceedance probability	Hydrologic region (shown in pl. 1)									
	Central Coast (Region 4)				South Coast (Region 5)				Desert (Region 6)	
	σ_δ^2	U			σ_δ^2	U			σ_δ^2	U
50	0.228	3.36E-1	–1.01E-2	–2.29E-1	0.184	3.28E-1	–1.06E-2	–2.22E-1	—	—
		–1.01E-2	3.90E-3	2.52E-3		–1.06E-2	3.72E-3	4.24E-3		
		–2.29E-1	2.52E-3	1.65E-1		–2.22E-1	4.24E-3	1.56E-1		
20	0.115	2.13E-1	–7.16E-3	–1.41E-1	0.091	1.95E-1	–6.30E-3	–1.32E-1	—	—
		–7.16E-3	2.37E-3	2.16E-3		–6.30E-3	2.17E-3	2.66E-3		
		–1.41E-1	2.16E-3	9.96E-2		–1.32E-1	2.66E-3	9.32E-2		
10	0.083	1.89E-1	–6.67E-3	–1.23E-1	0.058	1.57E-1	–5.00E-3	–1.06E-1	—	—
		–6.67E-3	2.02E-3	2.16E-3		–5.00E-3	1.66E-3	2.26E-3		
		–1.23E-1	2.16E-3	8.50E-2		–1.06E-1	2.26E-3	7.47E-2		
4	0.065	1.85E-1	–6.67E-3	–1.18E-1	0.037	1.41E-1	–4.36E-3	–9.48E-2	—	—
		–6.67E-3	1.91E-3	2.25E-3		–4.36E-3	1.40E-3	2.11E-3		
		–1.18E-1	2.25E-3	8.08E-2		–9.48E-2	2.11E-3	6.71E-2		
2	0.058	1.89E-1	–6.83E-3	–1.20E-1	0.030	1.43E-1	–4.33E-3	–9.62E-2	—	—
		–6.83E-3	1.90E-3	2.34E-3		–4.33E-3	1.38E-3	2.17E-3		
		–1.20E-1	2.34E-3	8.10E-2		–9.62E-2	2.17E-3	6.82E-2		
1	0.058	2.02E-1	–7.31E-3	–1.28E-1	0.029	1.55E-1	–4.61E-3	–1.04E-1	—	—
		–7.31E-3	2.02E-3	2.52E-3		–4.61E-3	1.46E-3	2.36E-3		
		–1.28E-1	2.52E-3	8.62E-2		–1.04E-1	2.36E-3	7.37E-2		
0.5	0.058	2.15E-1	–7.77E-3	–1.36E-1	0.029	1.68E-1	–4.98E-3	–1.13E-1	—	—
		–7.77E-3	2.13E-3	2.70E-3		–4.98E-3	1.56E-3	2.58E-3		
		–1.36E-1	2.70E-3	9.13E-2		–1.13E-1	2.58E-3	8.05E-2		
0.2	0.064	2.40E-1	–8.63E-3	–1.51E-1	0.033	1.97E-1	–5.83E-3	–1.33E-1	—	—
		–8.63E-3	2.36E-3	3.00E-3		–5.83E-3	1.82E-3	3.02E-3		
		–1.51E-1	3.00E-3	1.02E-1		–1.33E-1	3.02E-3	9.48E-2		

The following limitations need to be recognized when

1. The ranges of explanatory variables used to develop the regional regression equations are given in table 9. Applying the equations to sites on streams having explanatory variables outside the ranges of those used in this study may result in prediction errors that are considerably greater than those indicated by the standard error of prediction percentages listed in table 6.
2. The methods are not appropriate (or applicable) for sites fected substantially
3. The methods are not appropriate (or applicable) for streams in urban areas (impervious area greater than 10 percent) unless the ef
4. The methods may not be applicable at some high-elevation locations where mixed populations of snow-

described by a single LP3 distribution.

Table 9. Ranges of explanatory variables used to develop the regional regression equations for California.

[Min, minimum; Max, maximum; mi^2, square miles; —, not applicable]

Basin characteristic	Hydrologic region (shown in pl. 1)											
	North Coast (Region 1)		Lahontan (Region 2)		Sierra Nevada (Region 3)		Central Coast (Region 4)		South Coast (Region 5)		Desert (Region 6)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Drainage area (mi^2)	0.04	3,200	0.45	1,500	0.07	2,000	0.11	4,600	0.04	850	0.04	173
Mean annual precipitation (inches)	20.0	125.0	13.0	85.0	15.0	100.0	7.0	46.0	10.0	45.0	—	—
Mean basin elevation (feet)	—	—	—	—	90	11,000	—	—	—	—	—	—

Application of Methods

are obtained through a weighted combination of estimates produced from more than one method. Tasker (1975) dem-

statistic are available, a properly weighted average of the independent estimates will provide an estimate that is more accurate than either of the independent estimates. Improved

streamgages outside of the desert region by weighting estimates determined from the Bulletin 17B analysis with estimates obtained from the regression equations provided in this report. Weighting of estimates in the desert region is not appropriate, because the at-site estimates determined using the special LP3 analysis previously described almost exclusively depend on regional estimates of the three LP3 parameters. AEP and estimates from regional equations are not independent. Flow estimates at ungaged sites on the same stream as gaged sites in California can be improved by weighting the estimates obtained from the regression equations with estimates that

downstream streamgage. The following sections describe the weighting process for streamgages and ungaged sites in more detail and provide example calculations. The results are

Estimation for a Streamgage

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statistics for a streamgage can be obtained by combining

for the streamgage from regression equations. Optimal

prediction for each of the two estimates is known or can be estimated accurately. The variance of prediction can be thought of as a measure of the uncertainty in either the at-site estimate or the regional regression results. If the two estimates can be assumed to be independent and are weighted inversely proportional to their associated variances, the variance of the weighted estimate will be less than the variance of

estimates were computed for the study using the Weighted Independent Estimates (WIE) computer program available at *http://water.usgs.gov/usgs/osw/swstats/freq.html*. Details on this computer program are described by Cohn and others (2012).

The variance of prediction corresponding to the at-site

asymptotic formula given in Cohn and others (2001) with the addition of the mean-squared error of generalized skew

This variance varies as a function

(mean, standard deviation, and weighted skew), and the accuracy of the method used to determine the generalized skew component of the weighted skew. The variance of prediction for the at-site estimate generally decreases with increasing length of record and generally improving quality

The variance of prediction values

outside the desert region of California are given in table 10. The variance of prediction from the regional regression equations is a function of the regression equations and the

estimate from the regression equations. This variance generally increases as the values of the independent variables move further from the mean values of the independent variables. The variance of prediction values for the regional regression equations used in this study are given in table 10.

Table 10. Variance of prediction values for streamgages in California that were weighted using the Bulletin 17B estimates and the regional regression estimates.

[Table 10 is available in a Microsoft© Excel spreadsheet and can be accessed and downloaded at *http://pubs.usgs.gov/sir/2012/5113/*]

Once the variances have been computed, the two

following equation:

$$\log Q_{P(g)w} = \frac{VP_{P(g)r} \log Q_{P(g)s} + VP_{P(g)s} \log Q_{P(g)r}}{VP_{P(g)s} + VP_{P(g)r}}, \quad (11)$$

where

$Q_{P(g)w}$ any P-percent annual exceedance probability for a streamgage, *g*, in cubic feet per second;

$VP_{P(g)r}$ is the variance of prediction at the streamgage derived from the applicable regional regression equations for the selected P-percent annual exceedance probability (from table 6), in log units;

$Q_{P(g)s}$ from the log-Pearson Type III analysis for the selected P-percent annual exceedance probability, in cubic feet per second;

$VP_{P(g)s}$ is the variance of prediction at the streamgage from the log-Pearson Type III analysis for the selected P-percent annual exceedance probability (from table 10), in log units; and

$Q_{P(g)r}$ annual exceedance probability at the streamgage derived from the applicable regional regression equations in table 5, in cubic feet per second.

When the variance of prediction corresponding to one of the estimates is high, the uncertainty is also high, and the weight for that estimate is relatively small. Conversely, when the variance of prediction is low, the uncertainty is also low and the weight is correspondingly large. The variance of prediction associated with the weighted estimate, $VP_{P(g)w}$, is computed using the following equation:

$$VP_{P(g)w} = \frac{VP_{P(g)s} VP_{P(g)r}}{VP_{P(g)s} + VP_{P(g)r}} . \quad (12)$$

equation 11 along with the variance of prediction values from tables 6 and 10 for the 734 streamgages in California that are outside of the desert region.
for the 734 streamgages are listed in table 4. The variance of prediction values associated with the weighted estimates are given in table 10.

An example of the application of the procedure described above is the following computation of the weighted 1-percent AEP
Calif. (station number 11159200):

1. Obtain the at-site estimate of the 1-percent AEP the streamgage based on the Bulletin 17B analysis from table 4 ($Q_{1\%(g)s}$ = 6,980 ft^3/s);
2. Obtain drainage area and mean annual precipitation from table 2 for the streamgage (*DRNAREA* = 27.8 mi^2, *PRECIP* = 32.7 inches);
3. Compute $Q_{1\%(g)r}$ using equation in table 5 for hydrologic region 1 ($Q_{1\%(g)r} = 48.5(27.8^{0.866} \times 32.7^{0.556})$ = 6,000 ft^3/s);
4. Obtain the variance of prediction for the at-site estimate for the 1-percent AEP from table 10 ($VP_{1\%(g)s}$ = 0.0127);
5. Obtain the variance of prediction for the 1-percent AEP $VP_{1\%(g)r}$ = 0.0338);
6. Compute the weighted 1-percent AEP streamgage using equation 11 (log $Q_{1\%(g)w}$ = ((0.0338) (log 6,980)+(0.0127)(log 6,000))/(0.0127+0.0338) = 3.826, and $Q_{1\%(g)w}$ = 6,700 ft^3/s); and
7. Compute the weighted variance for the streamgage using equation 12 ($VP_{1\%(g)w}$ = (((0.0127)(0.0338))/ (0.0127+0.0338) = 0.0092).

-

lent years of record associated with the regression equations in addition to the length of record at the streamgage to weight the

and the LP3 analysis. The length of record, however, often

estimates. For example, although longer record lengths generally result in decreased variance, record length fails to account for the improvement in information content provided

two different streamgage records of the same length may not be of equal reliability, owing to differences in underlying

, more highly varied peak-

a large basin, hence the LP3 distributions could be expected to have larger variances. More importantly, the equivalent year of record concept, while relatively easy to grasp, can sometimes

and associated variances. Using variances provides a more accurate characterization of the underlying uncertainty of the

Estimation for an Ungaged Site Near a Streamgage

Sauer (1974) presented the following method to

streamgage, on the same stream, having 10 or more years of

T $Q_{P(u)w}$ for P-percent AEP
for an upstream or downstream streamgage $Q_{P(g)w}$
be determined by using the equation provided in the previous section.
($Q_{P(u)w}$) is then computed using the following equation:

$$Q_{P(u)w} = \left[\left(\frac{2\Delta A}{A_{(g)}}\right) + \left(1 - \frac{2\Delta A}{A_{(g)}}\right)\left(\frac{Q_{P(g)w}}{Q_{P(g)r}}\right)\right] Q_{P(u)r} , \quad (13)$$

where

$Q_{P(u)w}$ the selected P-percent annual exceedance probability at the ungaged site, *u*, in cubic feet per second;

ΔA is the absolute value of the difference between the drainage areas of the streamgage and the ungaged site, in square miles;

$A_{(g)}$ is the drainage area for the streamgage, in square miles; and

$Q_{P(u)r}$ applicable regional equations in table 5 for the selected P-percent annual exceedance probability at the ungaged site, in cubic feet per second.

Use of equation 13 gives full weight to the regression equation estimates when the drainage area for the ungaged site is equal to 0.5 or 1.5 times the drainage area for the streamgage and increasing weight to the streamgage estimates as the drainage area ratio approaches 1. The weighting procedure is not applicable when the drainage area ratio for the ungaged site and streamgage is less than 0.5 or greater than 1.5.

An example application of the procedure described in this section is the following computation of the weighted 1-percent AEP
Creek located above the USGS streamgage at Freedom, Calif. (station number 11159200) cited in the previous section:

1. Calculate the value of $Q_{1\%(g)w}$ ($Q_{1\%(g)w}$ = 6,700 ft^3/s);

2. Obtain the drainage areas and mean annual precipitation for both the gaged and ungaged sites ($DRNAREA_g$ = 27.8 mi^2, $DRNAREA_u$ = 25.0 mi^2, $PRECIP_g$ = 32.7 inches, and $PRECIP_u$ = 32.5 inches);

3. Compute $Q_{1\%(u)r}$ for the ungaged site using the equation in table 5 for hydrologic region 1 ($Q_{1\%(u)r}$ = $48.5(25.0^{0.866} \times 32.5^{0.556})$ = 5,460 ft^3/s);

4. Compute $Q_{1\%(g)r}$ for the streamgage using the equation in table 5 for hydrologic region 1 ($Q_{1\%(g)r}$ = 6,000 ft^3/s);

5. Compute ΔA, where ΔA = (27.8–25.0) = 2.8 mi^2; and

6. Compute the weighted estimate for the ungaged site, $Q_{1\%(u)w}$, using equation 13

$$\left(Q_{1\%(u)w} = \left[\left(\frac{2 \times 2.8}{27.8} \right) + \left(1 - \frac{2 \times 2.8}{27.8} \right) \left(\frac{6,700}{6,000} \right) \right] \times 5,460 = 5,970 \text{ ft}^3/\text{s} \right)$$

For an ungaged site that is located between two

made using the methods and criteria outlined in this section. Some additional hydrologic judgment may be necessary to determine which of the two estimates (or some interpolation thereof) is most appropriate. Other factors that might be considered when evaluating the two estimates include differences in the length of record for the two streamgages and the hydrologic conditions that existed during the data-collection period for each streamgage (that is, does the time series represent a climatic period that was predominately wet or dry?).

Estimation for an Ungaged Site Draining More Than One Hydrologic Region

For an ungaged site on a stream that crosses hydrologic regions, the regression equations for each region can be applied separately using basin characteristics for the entire drainage basin above the ungaged site. The individual results can then be weighted by the proportion of drainage area within each

site. For example, if 40 percent of the drainage area at an ungaged site is in the upstream region and 60 percent is in the downstream region, the discharge estimate based on equations for the upstream region are multiplied by 0.40 and added to 0.60 times the regression estimate based on equations for the downstream region. The variance of prediction for such a weighted estimate can also be approximated by using the same weighting procedure based on proportional drainage areas.

Effects of Urbanization on Floods

basins requires an understanding of the effects of urbanization

precipitation. The most common ef -

Agriculture, 1986). Engineers and planners routinely consider the potential effects of urban

ef

relations developed for streams in rural areas are not always applicable to urban streams. This section describes an analysis that was done to try to determine the effects of urbanization on California streams.

Waananen and Crippen (1977) provided an evaluation of the effects of urbanization on California basins and presented -

ization based on simulated rather than recorded data (Rantz, -

regression equations that were developed using simulated data predicted lar
equations that were developed using recorded data. Although the methods used by Rantz (1971) to simulate the data are not the same as the methods used for the simulated data analyzed by Feaster and Guimaraes (2004) and Southard (2010), the simulated data used by Rantz (1971) may also be biased high. Durbin (1974) found that the effects of urbanization on the lar
the southern California river basins they analyzed, even with

Urban streamgages in California were investigated for possible use in developing methods for estimating the

in California. Because of the potential for bias in simulated The percentage of impervious surface area has long been recognized as an effective indicator of the intensity of urban development and its potential ef
1979).

between 5 and 21 percent (Brabec and others, 2002). For this study, a streamgage was considered urban if the impervious area within the drainage area was 10 percent or greater.

Urban streamgages were used in the analysis only if

were available. Homogeneous, in this context, means that

which further implies that the percentage of impervious area was stable throughout the period of record.
records for the candidate urban streamgages were then

compiled and reviewed for quality by using the PFReports computer program (Ryberg, 2008). Kendall's tau was chosen

record attributed to the effects of urbanization (Helsel and Hirsch, 1992). If it was determined that a streamgage record was not homogeneous, the entire record for that streamgage was not considered. However
record was determined to be homogeneous, the homogeneous portion of the record was considered for this study if the basin characteristics were representative of that portion of record. Topographic maps and aerial photographs were used

magnitude was a result of increasing urbanization during the gaged period of record in the basin. The data quality review

urban streamgages for use in this study (pl. 1; table 11).

Flood-frequency estimates were computed for the eight urban streamgages by using general Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) guidelines. Station

frequency at the urban streamgages because of uncertainty about the value of regional skew for urban sites.

the eight urban streamgages in California are given in table 12.

Although the number of urban streamgages in California is too small to develop estimation equations using regres-

630 rural streamgages used in the regional regression analysis The actual P-percent AEP
estimates determined using the LP3 analysis of the annual AEP
quantile estimates from the regional regression equations. Figure 7 shows that the regression equations developed in this study for the rural streams generally tend to underpredict the fected by urbanization in
regions 1 and 5, and adjustments are needed to account for the effects of urbanization in these regions. Additional data from urban streamgages likely would provide a better understanding of the effects of urbanization and enable the development of

10 California urban streamgages into a nationwide study of Thus, methods developed
by Sauer and others (1983) can be used to assess the effects of

data become available in California.

StreamStats

StreamStats is a Web-based GIS that provides users with access to an assortment of analytical tools that are useful for water-resources planning and management, and for engineering design applications, such as the design of bridges.

basin characteristics, and other information for user-selected sites on streams. StreamStats users can choose locations of interest from an interactive map and obtain information for these locations. If a user selects the location of a USGS streamgage, the user will be provided with a list of previously published information for the station. If a user selects a location where no data are available (an ungaged site), StreamStats will delineate the drainage-basin boundary, measure basin

StreamStats also allows users to identify stream reaches that are upstream or downstream from user-selected sites and to identify and obtain information for locations along the streams fected by human activities.
Ries and others (2008) provide a detailed description of the application. Although designed to eventually be a national application, StreamStats is being implemented on a state-by-state basis, typically through cooperative funding agreements between the USGS and local partners.

Complete instructions for using StreamStats are provided through links on the StreamStats Web site at *http://water.usgs.gov/osw/streamstats/index.html*. The Web site also provides links to (1) information about general limitations of the application, (2) other State applications,

to frequently asked questions, (6) downloadable presentations and other technical information about the application, (7) information that can be accessed only by USGS employees, and (8) contact information.

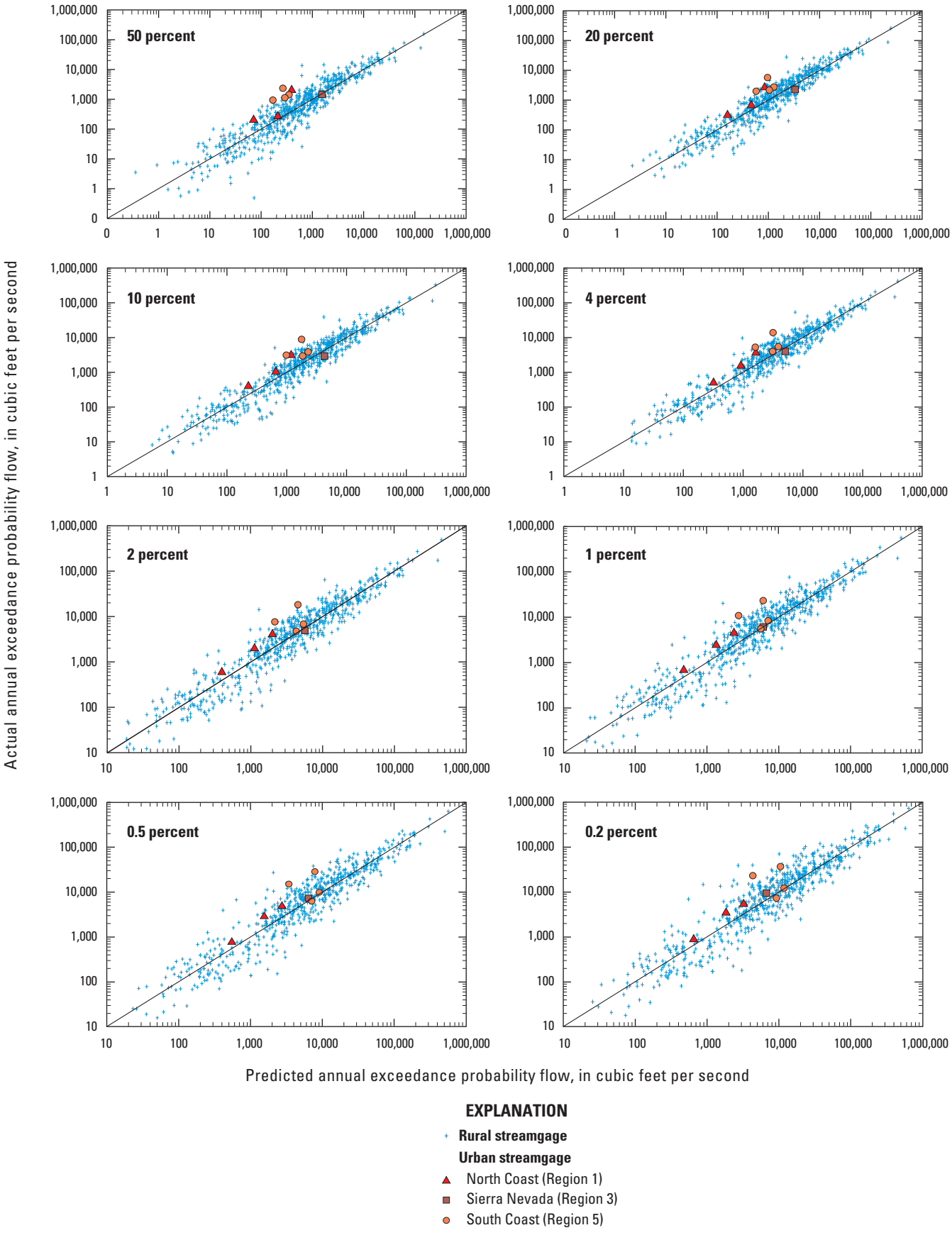


Figure 7. Actual and predicted annual exceedance probability flows for streamgages in California.

Table 11. Summary of streamgages with 10 or more years of record in urban areas of California, 2006.

[USGS, U.S. Geological Survey; GIS, geographic information system; mi², square miles]

Map identification number (pl. 1)	USGS station number	Station name	Hydrologic region (pl. 1)	GIS derived drainage area (mi²)	Mean annual precipitation (inches)
772	11023330	Los Penasquitos Creek below Poway Creek near Poway, CA	5	31.3	15.7
773	11023340	Los Penasquitos Creek near Poway, CA	5	42.3	15.4
774	11047200	Oso Creek at Crown Valley Pkwy near Mission Viejo, CA	5	14.1	15.8
775	11120000	Atascadero Creek near Goleta, CA	5	19.0	21.9
776	11162720	Colma Creek at South San Francisco, CA	1	11.0	26.2
777	11162800	Redwood Creek at Redwood City, CA	1	1.77	24.8
778	11182500	San Ramon Creek at San Ramon, CA	1	5.89	24.8
779	11447360	Arcade Creek near Del Paso Heights, CA	3	31.7	23.8

Map identification number (pl. 1)	Percentage of impervious area (percent)	Systematic record length (years)	Historical record length (years)	Period of historical record (water years)	Number of low outliers	Perception threshold discharges for missing peaks (cubic feet per second)
772	17.1	12	12	1982–1993	0	—
773	20.0	25	25	1982–2006	0	—
774	31.9	11	11	1971–1981	0	—
775	10.3	16	16	1991–2006	0	—
776	37.3	14	15	1982–1996	0	[5]7,120
777	14.7	38	38	1960–1997	9[u]	—
778	39.2	54	54	1953–2006	0	—
779	42.3	12	12	1996–2006	0	—

[u]

[5] Perception threshold set equal to twice the highest recorded discharge.

Table 12. Flood-frequency statistics for urban streamgages in California that were considered in the regression equations, 2006.

[USGS, U.S. Geological Survey]

Map identification number (pl. 1)	USGS station number	Annual exceedance probability flow (cubic feet per second)							
		50 percent	20 percent	10 percent	4 percent	2 percent	1 percent	0.5 percent	0.2 percent
South Coast (Hydrologic Region 5)									
772	11023330	1,130	2,180	2,960	3,980	4,750	5,510	6,270	7,260
773	11023340	1,430	2,770	3,870	5,480	6,830	8,300	9,890	12,200
774	11047200	940	1,990	3,120	5,290	7,630	10,800	15,100	23,000
775	11120000	2,350	5,750	8,900	13,900	18,200	23,100	28,600	36,700
North Coast (Hydrologic Region 1)									
776	11162720	2,220	2,910	3,360	3,920	4,330	4,730	5,140	5,690
777	11162800	223	344	430	542	629	717	808	931
778	11182500	292	733	1,110	1,660	2,100	2,560	3,020	3,650
Sierra Nevada (Hydrologic Region 3)									
779	11447360	1,460	2,260	2,940	3,990	4,940	6,050	7,350	9,400

Summary and Conclusions

magnitude and frequency at streamgages and ungaged sites in California. For this study, 771 streamgages in California were considered for use in the regional regression analysis. The streamgages used for this study have 10 or more years of peak- fected by regulation or urbanization. Flood-frequency estimates were computed for the

Pearson Type III distribution to the logarithms of annual peak Advisory Committee on Water Data, 1982). Low-outlier and historic information were incorporated in the analysis, and a generalized Grubbs- w outliers.

(2011) for the streamgages outside of the desert region of California. For the streamgages in the desert region, the station

Thomas and others (1997). Because

outliers for many streamgages in the desert, the station mean and standard deviations also were weighted with a generalized mean and standard deviation developed using weighted least squares regression for the streamgages in the desert region.

Regional regression analysis, using generalized least squares regression, was used to develop a set of equations

0.2-percent annual exceedance probabilities for ungaged basins in California that are outside of the desert region. Flood-frequency estimates and basin characteristics for - base used in the regional regression analysis. Five hydrologic regions were developed for the area of California outside of the desert region.
area, mean basin elevation, and mean annual precipitation for the Sierra Nevada region and functions of drainage area and mean annual precipitation for the other four regions. Average standard errors of prediction for these regression equations range from 42.7 to 161.9 percent.

For the desert region of California, a set of equations

0.2-percent annual exceedance probabilities for ungaged basins was developed by directly combining the separate regional relations developed for the skew, standard deviation, and mean into the LP3 equation in Bulletin 17B (eq. 1; Interagency Advisory Committee on Water Data, 1982).
equations are functions of drainage area. Average standard errors of prediction for these regression equations range from 214.2 to 856.2 percent. While the prediction errors are large in the desert region, they are smaller than comparable errors reported by Thomas and others (1997) for the Southwestern United States.

At 10 streamgages in the Sierra Nevada, the log-Pearson T ger

analysis was considered for those streamgages. Nevertheless,

peaks presumably caused by both rainfall and snowmelt and statistically combining the separate curves were not reliable. Thus, the LP3 curves based on the use of all at-site recorded

frequency information at the 10 gaged sites, given the general uncertainty about mixed populations and their analysis with the limited at-site data available.

analyzed for eight streamgages in California having 10 or more years of data considered to be affected by urbanization. Flood-frequency estimates were computed for the urban Type III distribution to -

estimation equations for urban streams because of the limited number of sites. Flood-frequency estimates for the eight

estimates for 630 non-urban sites. Additional data from urban streamgages likely would provide a better understanding of the ef
estimates for urban streams in California.

The regression equations developed in this study will be incorporated into the U.S. Geological Survey (USGS) StreamStats program. The StreamStats program is a Web-

characteristics for USGS streamgages and ungaged sites of interest. StreamStats can also compute basin characteristics

sites when users select the location of a site along any stream in California.

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Appendix. Parameter Estimation Method for the Desert Region of California

As recommended in Bulletin 17B (Interagency Advisory Committee on W

and mean also were weighted with regional estimates of those parameters in the desert region. A description of the methods used to regionalize both the standard deviation and mean and their model error metrics for weighting purposes are described in this appendix.

Bulletin 17B (Interagency Advisory Committee on Water Data, 1982) recommends using the log-Pearson Type 3 (LP3) The LP3 distribution uses the method-of-moments to relate the mean,

the skew, where results from a previous study with some adjustment of the error term were used. The complex regional analysis of the standard deviation is discussed next, followed by a discussion of the regional analysis for the mean. Finally, this appendix describes the weighting procedures for combining at-site parameter estimates with the new regional values and new

the desert region.

Regional Skew Model

In a recent analysis of regional skew for California, Parrett and others (2011) found that regional skew could not be reliably

Thomas and others (1997) used data from more than 1,000 streamgages in desert areas of several states to estimate regional skew and its variance for the multi-state study area. Thomas and others (1997) tried several methods for determining regional skew, including multiple regression analysis and kriging, and concluded that regional skew was a constant value of zero with an associated total error, or variance, of 0.31 log units.

for the effects of different at-site record lengths and thus different reliabilities of at-site sample skew; nor did it account for cross correlation among at-site skew values. Newer Bayesian generalized least square (GLS) regression methods for estimating regional skew that were successfully applied in California outside the desert region (Parrett and others, 2011) and in the southeastern United States (Gotvald and others, 2009) have been shown to provide more reliable error metrics for regional skew than other methods, especially methods that ignore differences in at-site station skew reliability and cross correlations of station skews. Thus, for example, the mean square error (MSE) for the Bayesian GLS regression model for regional skew in California outside the desert region was 0.14 log units. In comparison, the MSE for the national skew map in Bulletin 17B is 0.303 log units. The error for the national skew map, like that reported by Thomas and others (1997) for the Southwestern United States, did not account for differences in at-site station skew reliability and cross correlations of station skews. On this basis, the MSE (0.31 log units) for the regional skew of zero reported by Thomas and others (1997) is believed to overestimate the true error for desert areas of the Southwestern United States, including the desert region of California. On the other hand, the MSE for skew (0.14 log units) reported by Parrett and others (2011) for the rest of California is probably too small for the desert region An average of the two reported regional skew MSEs, rounded to one digit (0.2), was thus considered to be a reasonable representation of the true error for a constant skew model for the California desert region.

Regional Regression Model for Standard Deviation

Tasker and Stedinger (1986) suggest using a weighted least squares (WLS) procedure for estimating regional standard deviation unless there is substantial cross correlation between at-site standard deviations, in which case a GLS regression should , 2007b). The basic regression model for a regional standard deviation analysis for n sites is:

$$\tilde{\boldsymbol{\sigma}} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon} \tag{1–1}$$

where

$\tilde{\boldsymbol{\sigma}}$ is an ($n \times 1$) vector of the model estimates of at-site standard deviation for every station;

$\mathbf{X}$ is an ($n \times k$) matrix of k basin characteristics with a column of ones corresponding to a constant in the model;

$\boldsymbol{\beta}$ is a ($k \times$

$\boldsymbol{\varepsilon}$ is the ($n \times 1$) vector of total errors, including both model and sampling errors where $E[\boldsymbol{\varepsilon}]=0$ and $\boldsymbol{\Lambda}$ is the covariance matrix that represents $E[\boldsymbol{\varepsilon}\boldsymbol{\varepsilon}^T]$.

The standard WLS or GLS estimator of $\boldsymbol{\beta}$ is given by

$$\hat{\boldsymbol{\beta}} = (\mathbf{X}^T\boldsymbol{\Lambda}^{-1}\mathbf{X})^{-1}\mathbf{X}^T\boldsymbol{\Lambda}^{-1}\hat{\boldsymbol{\sigma}} \tag{1–2}$$

where

$\boldsymbol{\Lambda}$ is the ($n \times n$) weighting covariance matrix; and

$\hat{\boldsymbol{\sigma}}$ is the ($n \times 1$) vector of estimates of at-site standard deviation based on the sample data;

and all other terms are as previously described.

In WLS, which is a special case of GLS, the $\boldsymbol{\Lambda}$ - ability due to differences in record length (sampling variability). In GLS, the $\boldsymbol{\Lambda}$ matrix contains the same diagonal elements; however, the of estimators $\hat{\sigma}_i$.

The matrix $\boldsymbol{\Lambda}$ can be decomposed into two covariance matrices (Reis and others, 2005), $\sigma_\delta^2\mathbf{I} + \boldsymbol{\Sigma}(\hat{\sigma})$, where σ_δ^2 is the model error variance describing the precision with which the proposed model $\mathbf{X}\boldsymbol{\beta}$ (eq. 1–1) can predict the true standard deviations, which are denoted σ_i, and $\boldsymbol{\Sigma}(\hat{\sigma})$ represents the sampling variances and covariances of the standard deviation estimators $\hat{\sigma}_i$. The model error variance, σ_δ^2, and $\hat{\boldsymbol{\beta}}$ values in equation 1–2 are jointly determined by iteratively searching for a positive- $\boldsymbol{\Lambda}$ Tasker, 1985):

$$(\hat{\boldsymbol{\sigma}} - \mathbf{X}\hat{\boldsymbol{\beta}})^T\,\boldsymbol{\Lambda}^{-1}\left(\hat{\boldsymbol{\sigma}} - \mathbf{X}\hat{\boldsymbol{\beta}}\right) = n - \left(k+1\right) \tag{1–3}$$

When performing a least squares regional regression on standard deviation, the residuals, $\boldsymbol{\varepsilon}$, are equal to the at-site estimates, $\hat{\boldsymbol{\sigma}}$, minus the regional (model) estimates, $\tilde{\boldsymbol{\sigma}}$:

$$\boldsymbol{\varepsilon} = \hat{\boldsymbol{\sigma}} - \tilde{\boldsymbol{\sigma}} \tag{1–4}$$

Substituting equation 1–1 and 1–2 into equation 1–4 yields the following:

$$\boldsymbol{\varepsilon} = \hat{\boldsymbol{\sigma}}\left\{\mathbf{I} - \mathbf{X}(\mathbf{X}^T\boldsymbol{\Lambda}^{-1}\mathbf{X})^{-1}\mathbf{X}^T\boldsymbol{\Lambda}^{-1}\right\} \tag{1–5}$$

As described previously, $\boldsymbol{\Lambda}$ is the covariance matrix, which is the sum of the model error variance and the sampling variance. The sampling variance is a function of the standard deviation, $\hat{\boldsymbol{\sigma}}$, estimates and $\boldsymbol{\Lambda}$ for a WLS regression can be expressed as a function of $\hat{\boldsymbol{\sigma}}$, together with some other terms, (see equations 1–9 and 1–10 for a detailed discussion of $\boldsymbol{\Lambda}$) as:

$$\boldsymbol{\Lambda}_{WLS} = \begin{bmatrix} f(\hat{\sigma}, etc) & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & f(\hat{\sigma}, etc) \end{bmatrix} \tag{1–6}$$

By substituting equation 1–6 into equation 1–5, the residuals can be expressed in terms of the at-site standard deviation estimates as:

$$\boldsymbol{\varepsilon} = \hat{\boldsymbol{\sigma}}\left\{\mathbf{I} - \mathbf{X}\left(\mathbf{X}^T\begin{bmatrix} f(\hat{\sigma},etc) & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & f(\hat{\sigma},etc) \end{bmatrix}^{-1}\mathbf{X}\right)^{-1}\mathbf{X}^T\begin{bmatrix} f(\hat{\sigma},etc) & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & f(\hat{\sigma},etc) \end{bmatrix}^{-1}\right\} \quad (1\text{–}7)$$

Equation 1–7 violates a requirement of least squares regression that the residuals should not be correlated with the regressors, which in this case are the at-site standard deviation estimates $\hat{\boldsymbol{\sigma}}$. , 2007b, a separate simple ordinary least squares (OLS) regression was used to estimate the at-site standard deviations by using the following equation:

$$\tilde{\boldsymbol{\sigma}}_{OLS} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon} \quad (1\text{–}8)$$

where

$\tilde{\boldsymbol{\sigma}}_{OLS}$ is an ($n \times 1$) vector of OLS model estimates of at-site standard deviation;

$\mathbf{X}\boldsymbol{\beta}$

the error $\boldsymbol{\varepsilon}$ is normally distributed with zero mean and variance $\sigma_{\varepsilon}^2 = \sigma^2[10^{\ln(10)\sigma_{\delta}^2} - 1]$.

$\hat{\sigma}_i$, using the OLS regression in equation 1–8. The best OLS model was a constant model with a value of 0.91 log units for $\tilde{\boldsymbol{\sigma}}_{OLS}$.

The values of $\hat{\Sigma}(\hat{\sigma})_{ii}$ and $\hat{\Sigma}(\hat{\sigma})_{ij}$ in $\boldsymbol{\Lambda}$ are determined by the length of record at each station, the regional standard deviation estimates from an OLS regression of at-site standard deviations, the regional skew, and the cross-correlation of the concurrent , 2007b):

$$\hat{\Sigma}(\hat{\sigma})_{ii} = Var(\hat{\sigma}) = \frac{1}{2}(1 + 0.75\tilde{\gamma}_i)\frac{\tilde{\sigma}_{OLS,i}^2}{m_i}, \text{ for } i = j \quad (1\text{–}9)$$

$$\hat{\Sigma}(\hat{\sigma})_{ij} = Cov[\hat{\sigma}_i, \hat{\sigma}_j] = \frac{1}{2}(\hat{\rho}_{ij} + 0.75\tilde{\gamma}_i\tilde{\gamma}_j)\hat{\rho}_{ij}^2\frac{m_{ij}\tilde{\sigma}_{OLS,i}\tilde{\sigma}_{OLS,j}}{m_i m_j}, \text{ for } i \neq j \quad (1\text{–}10)$$

where

$\tilde{\gamma}_i$ and $\tilde{\gamma}_j$ are the regional skew values at sites i and j; the regional skew is assumed to be zero;

$\tilde{\sigma}_{OLS,i}$ and $\tilde{\sigma}_{OLS,j}$ are the estimated regional standard deviations from an OLS regression;

m_i and m_j are record lengths for sites i and j;

$\hat{\rho}_{ij}$ is an estimated i and j

(Tasker and Stedinger, 1986); and

m_{ij} is the concurrent record length for sites i and j.

Therefore, the covariance matrix $\boldsymbol{\Lambda}$ required for solving the general WLS or GLS equation 1–2 is estimated using:

$$\hat{\Lambda}_{\hat{\sigma},ii} = E[\tilde{\sigma}_{OLS,i}]^2[10^{\ln(10)\sigma_{\delta}^2} - 1] + \hat{\Sigma}(\hat{\sigma})_{ii} \text{ and } \hat{\Lambda}_{\hat{\sigma},ij} = \hat{\Sigma}(\hat{\sigma})_{ij} \quad (1\text{–}11)$$

As described in Parrett and others (2011), the error variance ratio (EVR) is a modeling diagnostic used to evaluate whether a more sophisticated WLS or GLS analysis is appropriate to correctly interpret the data rather than a simple OLS regression. The EVR is the ratio of the average sampling error variance to the model error variance. An OLS regression is An EVR value of 550 percent was found for the constant WLS model, meaning the sampling variability of standard deviation estimators was considerably larger than model error variance of the regional model. Thus, given the wide variation in record lengths ranging from 11 to 72 years, use of a WLS or GLS analysis is important

standard deviation estimators.

The misrepresentation of the beta variance statistic, MBV*, is used to determine whether a WLS regression or a GLS regression is appropriate to determine the precision of the estimated regression parameters (Parrett and others, 2011). If the MBV* is substantially greater than 1, a GLS error analysis should be used. In this study, the MBV* value was 1, indicating that a

WLS constant model and error metrics are given in table 1–1. Also given in table 1–1 for comparison purposes are the WLS model and metrics for the regression using *DRNAREA* as an explanatory variable. As WLS regressions use only the sampling error (eq. 1–9), the cross-correlation error is set to zero (eq. 1–10) in the $\boldsymbol{\Lambda}$ matrix. As indicated in equation 1–9, the sampling error is a function of the $\widetilde{\boldsymbol{\sigma}}_{OLS}$ estimates, which are constant, and the at-site record lengths. In essence, those sites

The regional WLS constant model of 0.91 log units has a pseudo-R_{δ}^2 of zero percent and a MSE (AVP_{new}) of 0.03 log units (table 1–1). The pseudo-R_{δ}^2 is zero percent because a constant value of regional standard deviation does not describe any variability of at-site standard deviation estimators. The model that includes *DRNAREA* also has a pseudo-R_{δ}^2 of zero percent, indicating that $\widehat{\boldsymbol{\sigma}}$ -related with *DRNAREA*. The MSE for the model with *DRNAREA* as an explanatory variable is 0.04 log units, which is greater than that for the constant model. Figure 1–1 shows the at-site standard deviation estimators for the 33 desert sites, the WLS regional regression model for a constant standard deviation (0.91 log units), and the WLS regional regression model relating standard deviation to *DRNAREA*.

Table 1–1. Regional standard deviation models for California.

[Constant is the linear regression model with a constant standard deviation; DRNAREA is the linear regression model relating standard deviation to *DRNAREA* (drainage area); β_0, regression model constant, β_1 σ_{δ}^2, model error variance; ASEV, average sampling error variance; AVP_{new}, average variance of prediction for a new site; Pseudo-R_{δ}^2, describes the fraction of the variability in the true standard deviations explained by each model (Gruber and other, 2007); standard deviations are in parentheses; —, not applicable]

Model	Model equation	β_0	β_1	σ_{δ}^2	ASEV	AVP_{new}	Pseudo-R_{δ}^2 (percent)
Constant	$\widetilde{\sigma}_{WLS} = \beta_0$	0.91 (0.07)	—	0.03	0.004	0.03	0
DRNAREA	$\widetilde{\sigma}_{WLS} = \beta_0 + \beta_1[\log(DRNAREA)]$	0.89 (0.07)	0.058 (0.06)	0.03	0.009	0.04	0

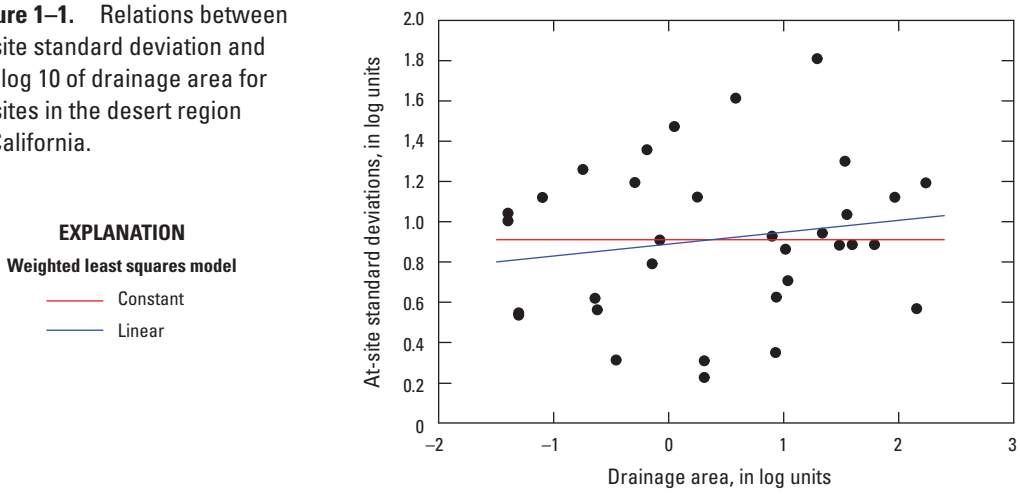


Figure 1–1. Relations between at-site standard deviation and the log 10 of drainage area for 33 sites in the desert region of California.

Regional Regression Model for Mean

Traditionally, GLS regression is used to build a regional model for estimati $\widetilde{\mathbf{Q}}_P$, with an exceedance probability P. If the quantile estimator is a function of drainage area, for example, then the regional quantile model for $\widetilde{\mathbf{Q}}_P$ would be

$$\log(\widetilde{Q}_P)_i = \beta_0 + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–12}$$

where

β_0 and β_1 are the estimated regression parameters;
$DRNAREA_i$ is the drainage area at gage site *i*; and
ε_i is the error associated with the model.

The generalized LP3 equation in Bulletin 17B for calculating at-site quantile is:

$$\log(\widetilde{Q}_P)_i = \hat{\mu}_i + K(\gamma_{W,i}, P) \times \hat{\sigma}_i \tag{1–13}$$

where

$\hat{\mu}_i$ is the at-site log-space mean;
$\hat{\sigma}_i$ is the at-site log-space standard deviation; and
$K(\gamma_{W,i}, P)$ is a factor that is a function $\gamma_{W,i}$ and the selected exceedance probability *P*.

$\hat{\gamma}_i$

and the regional skew $\tilde{\gamma}_i$ inversely proportional to their respective mean square errors by using the following equation:

$$\gamma_{W,i} = \frac{MSE_{\tilde{\gamma},i}(\hat{\gamma}_i) + MSE_{\hat{\gamma},i}(\tilde{\gamma}_i)}{MSE_{\tilde{\gamma},i} + MSE_{\hat{\gamma},i}} \tag{1–14}$$

where $MSE_{\hat{\gamma},i}$ and $MSE_{\tilde{\gamma},i}$ are the mean square errors of the at-site and regional skew, respectively. Thus, equations 1–12 and 1–13 can be combined to form

$$\log(\widetilde{Q}_P)_i = \hat{\mu}_i + K(\gamma_{W,i}, P) \times \hat{\sigma}_i = \beta_0 + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–15}$$

As previously described, regional models for both skew $\tilde{\boldsymbol{\gamma}}$ and standard deviation $\tilde{\boldsymbol{\sigma}}$ were developed in the desert region

quantile estimates. Both regional parameter estimates were determined to be constant. When weighting the at-site estimates of skew and standard deviation with the constant regional values using equation 1–14, the resulting weighted estimates were

inversely proportional to the record length. Therefore, three distinct types of weighted at-site estimates of the skew and standard deviation and their related MSEs were determined for sites with short, long, or intermediate record lengths. The resulting at-site quantile estimators for these three types of record lengths produced very different error structures than is typical.

regional estimates ($\tilde{\boldsymbol{\gamma}}$ and $\tilde{\boldsymbol{\sigma}}$, respectively) than the at-site estimates ($\hat{\boldsymbol{\gamma}}$ and $\hat{\boldsymbol{\sigma}}$) and can generally be set equal to the regional skew and standard deviation ($\boldsymbol{\gamma}_W = \tilde{\boldsymbol{\gamma}}, \boldsymbol{\sigma}_W = \tilde{\boldsymbol{\sigma}}$). These weighted estimates can be inserted into equation 1–15 to produce

$$\log(\widetilde{Q}_P)_i = \hat{\mu}_i + K(\tilde{\gamma}, P) \times \tilde{\sigma} = \beta_0 + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–16}$$

The term $[K(\tilde{\gamma},P)\times\tilde{\sigma}]$ is a constant for a given P because $\tilde{\boldsymbol{\gamma}}$ and $\tilde{\boldsymbol{\sigma}}$ are constants.

$$\hat{\mu}_i = \beta_0^{'} + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–17}$$

where

$\beta_0^{'}$ is a new constant equal to β_0 minus $[K(\tilde{\gamma},P)\times\tilde{\sigma}]$; and

ε_i is the sum of the model error for the mean $\sigma_{\delta,\hat{\mu}}$ plus the sample error for the mean $\sigma_{\eta,\hat{\mu}}$ $(\varepsilon=\sigma_{\delta,\hat{\mu}}+\sigma_{\eta,\hat{\mu}})$.

The variance of the error term is:

$$Var(\varepsilon_i) = \sigma^2_{\delta,\hat{\mu}} + (\sigma^2_{\eta,\hat{\mu}})_i \tag{1–18}$$

where

$\sigma^2_{\delta,\hat{\mu}}$ is the model error variance for equation 1–17; and

$(\sigma^2_{\eta,\hat{\mu}})_i$ is the sampling variance in the at-site mean estimator $\hat{\mu}_i$.

Equations 1–16 to 1–18 are applicable at short record sites where the regional estimates of skew and standard deviation have considerably more weight than the at-site estimates of standard deviation and skew, respectively. Conversely, for those sites with long-term streamgaging records, the at-site standard deviation and skew are more heavily weighted than the regional estimates. Therefore, in general, $\boldsymbol{\gamma}_W = \hat{\boldsymbol{\gamma}}, \boldsymbol{\sigma}_W = \hat{\boldsymbol{\sigma}}$, and these weighted estimates can be inserted into equation 1–15 to produce the following:

$$\log(\widetilde{Q}_P)_i = \hat{\mu}_i + K(\hat{\gamma}_i,P)\times\hat{\sigma}_i = \beta_0 + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–19}$$

where $\hat{\mu}_i, \hat{\sigma}_i$, and $\hat{\gamma}_i$ are at-site estimates of the mean, standard deviation, and skew, respectively. Because $[\hat{\mu}_i + K(\hat{\gamma}_i,P)\times\hat{\sigma}_i]$ is assumed to be an unbiased estimate of the true $Q_{P,i}$, ε_i will be the error describing the difference between the regression equation $\log(\widetilde{Q}_P)_i$ and the true $\log\left(Q_P\right)_i$.

In this case, the estimated model error variance is

$$(\sigma^2_{\delta,Q_P})_i = \sigma^2_{\delta,\hat{\mu}_i} + E^2[K(\hat{\gamma}_i,P)]\times Var(\hat{\sigma}) + E^2[\hat{\sigma}_i^2]\times Var(\hat{\gamma})\times\left(\frac{dK(\hat{\gamma}_i,P)}{d\hat{\gamma}_i}\right)^2 \tag{1–20}$$

Thus, the $Var(\varepsilon_i)$

$$Var(\varepsilon_i) = (\sigma^2_{\delta,Q_P})_i + Var[\hat{\mu}_i + K(\hat{\gamma}_i\times\hat{\sigma}_i)] \tag{1–21}$$

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tions are weighted averages of the at-site estimates and the regional estimates. In this case, $\log(\widetilde{Q}_P)_i$ is a weighted average of $[\hat{\mu}_i + K(\hat{\gamma}_i,P)\times\hat{\sigma}_i]$ and $[\hat{\mu}_i + K(\tilde{\gamma},P)\times\tilde{\sigma}]$, and ε_i will have a variance between those indicated in equations 1–18 and 1–21.

Using GLS regression as described in the equations above is quite complicated. While GLS regression can accommodate the different sampling variances, it cannot easily accommodate multiple equations for estimating the model error variance. GLS regression can best estimate the model error variance when each equation has the same model error variance.

Thus, instead of regressing on $\log(\widetilde{Q}_P)$, it is possible to instead regress on the at-site mean $\hat{\mu}_i$. This allows the use of GLS to analyze the model

$$\tilde{\mu}_i = \beta_0 + \beta_1 \log(DRNAREA_i) + \varepsilon_i \tag{1–22}$$

Now each streamgage in equation 1–22 has the same model error variance.

Similar regression techniques were used to regionalize the mean for California's desert region as were used for the standard deviation. The same basic regression model described in equation 1–1 was used. The **Λ** matrix is computed as the sum of two covariance matrices:

$$\hat{\Lambda}_{\hat{\mu},ii} = \sigma_{\delta}^2 + \frac{\hat{\sigma}_i^2}{m_i}, \qquad (i=j) \tag{1–23}$$

$$\hat{\Lambda}_{\hat{\mu},ij} = \frac{\hat{\rho}_{ij}\hat{\sigma}_i\hat{\sigma}_j m_{ij}}{m_i m_j}, \qquad (i\neq j) \tag{1–24}$$

(Eng and others, 2009) where the model error variance, σ_{δ}^2, is described in equation 1–2, $\hat{\sigma}_i$ and $\hat{\sigma}_j$ are the at-site standard deviation estimators from EMA using the multiple Grubbs-Beck test, and $\hat{\rho}_{ij}, m_{ij}, m_i$, and m_j

As described in the regionalization of standard deviation, both WLS and GLS regression models were initially considered for regionalization of the mean. An EVR value of 117 percent and a MBV* value of 1.2 were determined. These two regression diagnostics indicate that

regression and that the GLS model was not needed because of a lack of cross correlation between the at-site mean estimators.

Unlike the constant regional skew and constant standard deviation models for the desert region, one basin characteristic, drainage area (*DRNAREA* The constant WLS model for regional mean had a pseudo-R_{δ}^2 value of zero percent (table 1–2), while the model based on *DRNAREA* had a pseudo-R_{δ}^2 value of 51 percent. The model error variance, σ_{δ}^2, was 0.61 log units for the constant model and only 0.30 log units for the model using *DRNAREA*. Finally, the MSE (AVP_{new}), which describes the precision of the regional mean, was 0.63 log units for the constant model and only 0.32 log units for the model using *DRNAREA*. Figure 1–2 shows the relation between the at-site mean estimators and the WLS constant model and the model using *DRNAREA*.

Table 1–2. Regional mean models for California.

[Constant is the linear regression model with a constant mean; DRNAREA is the linear regression model relating mean to *DRNAREA* (drainage area); β_0, regression model constant; β_1 σ_{δ}^2, model error variance; ASEV, average sampling error variance; AVP_{new}, average variance of prediction for a new site; Pseudo-R_{δ}^2, describes the fraction of the variability in the true mean explained by each model (Gruber and others, 2007); standard deviations are in parentheses; —, not applicable]

Model	Model equation	β_0	β_1	σ_{δ}^2	ASEV	AVP_{new}	Pseudo-R_{δ}^2 (percent)
Constant	$\tilde{\mu}_{WLS} = \beta_0$	1.20 (–0.14)	—	0.61	0.02	0.63	0
DRNAREA	$\tilde{\mu}_{WLS} = \beta_0 + \beta_1[\log(DRNAREA)]$	1.01 (–0.11)	0.51 (0.09)	0.3	0.02	0.32	51

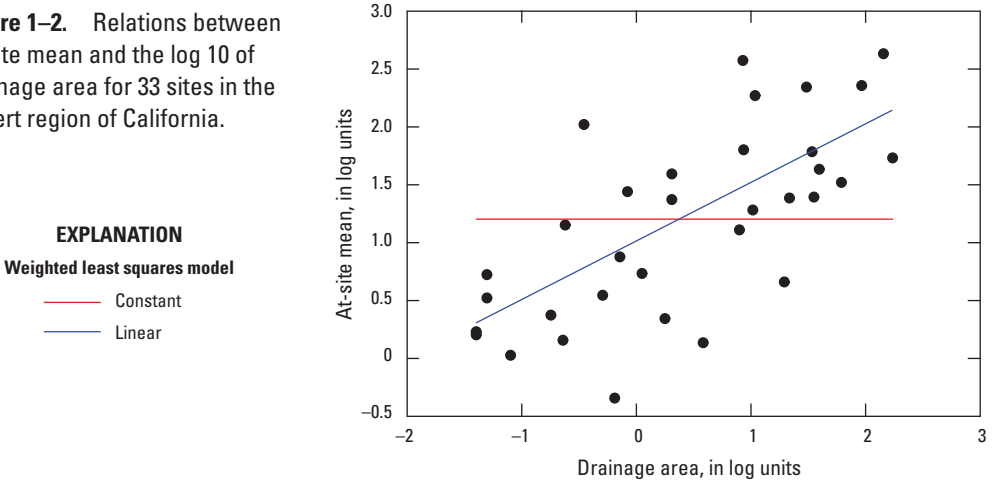


Figure 1–2. Relations between at-site mean and the log 10 of drainage area for 33 sites in the desert region of California.

Equations for Estimating Flood Frequency at Ungaged Sites

-

sites (eq. 1–13). For the desert region of California, however, the separate regional relations developed for the skew, standard deviation, and mean can be combined directly in a form that results in estimation equations for ungaged sites. Thus, the basic

standard deviation, and skew as:

$$\log(Q_P)_i = \tilde{\mu}_i + K(\gamma_{W,i}, P) \times \tilde{\sigma}_i, \tag{1–25}$$

where

Q_P , in cubic feet per second;

$\tilde{\mu}_i$ is the WLS model of the regional mean: $\tilde{\mu}_{WLS,i} = 1.01 + 0.51 \times \log(DRNAREA)_i$;

$K(\gamma_{W,i}, P)$ is the *K* factor obtained from appendix 3 in Bulletin 17B that relates a regional skew of zero to the probability of exceedance, *P*; and

$\tilde{\sigma}_i$ is the WLS constant model of the regional standard deviation, 0.91 log units.

exceedance probabilities (AEP) in the desert region of California are given in table 5.

The MSE for the regional regression equations described in equation 1–25 can be expressed as follows:

$$MSE_{\log Q_P} = Var[\tilde{\mu}\{\log(DRNAREA)\}] + E^2[K(\tilde{\gamma}, P)] \times Var[\tilde{\sigma}] + E^2[\tilde{\sigma}] \times Var[K(\tilde{\gamma}, P)], \tag{1–26}$$

where

$Var[\tilde{\mu}\{\log(DRNAREA)\}]$ equals 0.32 log units;

$E[K(\tilde{\gamma}, P)]$ is the *K* factor obtained from appendix 3 in Bulletin 17B that relates a regional skew of zero to the probability of exceedance, *P*;

$Var[\tilde{\sigma}]$ equals 0.03 log units;

$E[\tilde{\sigma}]$ equals 0.91 log units;

$Var[K(\tilde{\gamma}, P)]$ is approximated by: $Var[\tilde{\gamma}] \times \left\{ \frac{dK(\tilde{\gamma}, P)}{d\tilde{\gamma}} \right\}^2$;

$Var[\tilde{\gamma}]$ equals 0.20 log units; and

$\left\{ \frac{dK(\tilde{\gamma}, P)}{d\tilde{\gamma}} \right\}^2$ is approximated by: $\frac{\left(Z_P^2 - 1\right)}{6}$, when $\tilde{\gamma} = 0$ (Eng and others, 2009).

The values of the MSE for the regional regression equations for ungaged sites in California's desert region are listed in table 6.

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Attachment 14

Ultimate Build-Out Condition Models and Input Data

Ultimate Build-Out Draft Report
TR-55 Hydrology Models
Flowmaster Proposed Pipe Calculation
Slope Calculations
CCCVC Landuse and Impervious Areas
Conceptual Ultimate (Phase 1-11) Basin Staged Storage
Figure 14.1 Ultimate Build-Out Condition Landuse Exhibit
Figure 14.2 Ultimate Build-Out Condition Hydrology Exhibit
Figure 14.3 Ultimate Build-Out Topographic Work Map – Area of Revision
Figure 14.4 Conceptual Basin Grading for Ultimate Build-Out (Phase 1-11)

ULTIMATE BUILD-OUT CONDITION DETERMINATION OF 100-YEAR FLOODPLAIN

FOR

CALIFORNIA CENTRAL COAST VETERANS CEMETERY

City of Seaside, CA

HZ PROJECT NO. R305029.02

Prepared for:

California Department of Veterans Affairs and California Department of General Services

February 18, 2019

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1. Introduction

1.1 PROJECT AREA DESCRIPTION

This drainage report shows the results of analysis performed to evaluate the proposed changes to the 100-year floodplain for the Ultimate Build-Out (Phase 1-11) of the California Central Coast Veterans Cemetery (CCCVC) located in the City of Seaside, California. The property will be developed into a veteran's cemetery that will be owned and operated by the State of California. The property is south of Normandy Road and Parker Flats Road and east of Parker Flats Cut Off Road. This area will hereby be described as the "project area" for the duration of the report. The study is intended to show that the flood hazards areas as shown in the effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel #06053C0195H are modified for the proposed development based on hydrology/hydraulic analysis and therefore will justify a modification of the current FIRM.

1.2 REPORT OBJECTIVES

The purpose of this study is to:

1. Update the limits of the 1% annual probability flooding area to reflect the future cemetery development. The FEMA FIRM will be updated to show that the proposed onsite infiltration basin has capacity to contain the 100-year flood volume for the future development of the tributary area.

This report provides:

1. Review of previous studies, grading plans, and any other applicable study produced in the area.
2. Outline of the methodology used to define the new limits of the 100-year flood plain condition.
3. Supporting information for the flood plain revision.

1.3 HYDROLOGY AND FLOODING PATTERNS

Watershed Hydrology

The proposed cemetery development is located in a watershed that has a local sump that does not drain to any water body. All surface runoff flows to an onsite infiltration basin located in a natural depression. The site does not receive runoff from adjacent watersheds because each watershed has capacity to retain the 100-year storm event runoff.

The proposed development will be constructed in 11 phases. The existing condition model reflects the conditions as of January 2019, in which Phase 1 has been constructed. The ultimate build-out condition of the project site was considered for the development of the FEMA 100-year flood model, in which all 11 phases of construction are complete.

1.4 EXISTING STUDIES

LOMR #14-09-3525P and LOMR Application for California Central Coast Veterans Cemetery by Wood Rodgers, Inc. dated May 27, 2014

A LOMR by Wood Rodgers dated May 27, 2014 was approved for the project site on March 23, 2015. The LOMR considered only the existing condition of the site, prior to any construction, and assumed an imperviousness of 1%. A 100-year 72-hour duration storm event was modeled in HEC-HMS, per the former County standard criteria. The report evaluated the undeveloped hillside drainage to the north and east of the cemetery project site and delineated existing drainage areas. The drainage area containing the cemetery was designated Basin 5, and was found to have no offsite run-on from adjacent watersheds due to existing local depressions that contain and infiltrate runoff. The existing local depression in the Basin 5 drainage area was found sufficient to contain the 100-year flood volume, yielding a Base Flood Elevation of 286.1 feet.

Drainage Report for California Central Coast Veterans Cemetery – Phase 1 by Wood Rodgers, Inc. dated July 2, 2014

This report documents drainage for Phase 1 of the cemetery and offsite improvements on Parker Flats Road. The report details on-site pipe design for Phase 1. The report details design of an infiltration chamber to take 100-year flows from a local sump in Parker Flats Road, north of the cemetery, preventing runon onto the cemetery project area. The report evaluated the drainage area north of Parker Flats Road that was shown as tributary to the cemetery site in the 2014 LOMR and determined that the hillside and northern half of the road are retained in a depression. The 100-year storm flow will not cross the road to enter the infiltration chamber on the south side or the cemetery site tributary area.

1.5 FIELD RECONNAISSANCE

Four field reconnaissance visits were performed in the vicinity of the study area from November 2017 through December 2018. Photos taken during the reconnaissance visits provide the basis for the development of runoff curve numbers for the existing cover within the drainage area.







Existing cover in the project area

The existing cover in the project drainage area is oak woods and brush. Areas of woods and brush were delineated using ESRI imagery.

1.6 METHODOLOGY AND MODELING ASSUMPTIONS

Methodology

Calculations and design criteria in this report are based on hydrologic models meeting the minimum requirement of the NFIP.

Delineation of Subbasins

Drainage area delineation was based on existing site topography, the proposed ultimate condition masterplan, and the previous studies by Wood Rogers. The Basin 5 existing condition drainage area from the 2014 LOMR application was updated to reflect the findings of the Woods Rogers Drainage Study dated July 3, 2014, which show no offsite run-on north of the cemetery. The proposed condition drainage boundary was expanded in two locations where the proposed development extends outside the existing condition drainage boundary.

The following plans and elevation data were used for drainage delineation:

- State of California Department of Veterans Affairs California Central Coast Veterans Cemetery – Phase 1 FAI No. CA-09-05 record plan set, dated June 11, 2014
- RHA Masterplan Concept, dated September 2015
- Phase 2 proposed grading
- A topographic survey of the 5547 Paradise Valley Rd photographed in July 2010 (and updated in March 2014), spliced with Phase 1 development topography and Phase 2 proposed development topography

Hydrology

Hydrologic computations were performed using the WinTR-55 software.

Storm data

The 100-year 24-hour storm with a Type 1 SCS rainfall distribution was modeled for the tributary drainage area. The Type 1 distribution is applicable to the Monterey County area. The 100-year 72-hour rainfall distribution used in the 2014 LOMR model was not used because the 100-yr 24-hour rainfall distribution is the new County standard. The existing condition flow from the new model was compared with the 2014 LOMR model, as discussed in the Model Calibration section below.

- 24-hour precipitation depths are from NOAA Atlas 14. The 100-year 24-hour depth is 4.93 inches.
- The infiltration basin was modeled without infiltration losses to ensure it can contain the entire 100-year volume. In reality, infiltration will occur throughout the storm, as the watershed has no outlet for surface flow.

Soil and geotechnical

The watershed is entirely on NRCS Soil A. A geotechnical report was prepared by SCST, LLC on December 10, 2018 for Phase 2 of the development. The report showed that the native soil at the existing basin location has a minimum infiltration rate of 5.3 in/hr, based on two tests. This is a high infiltration rate that allows the existing basin and depression to infiltrate the entire storm volume for the watershed. The proposed basin is

proposed to excavate the existing basin approximately 6 feet, to a new invert elevation of 266 ft. Groundwater depth is not a concern in lowering the basin invert. The geotechnical report states that no groundwater was encountered during boring at the site of the basin, and nearby historic high groundwater is 400 feet below existing ground at the site.

Landuse

Development curve numbers are based on the Phase 1 and Phase 2 plans and the RHA Masterplan Concept for Phases 3-11. There is a slight increase in the proposed watershed area due to hilltop development on the edge of the watershed. Pervious cover in the development will consist of shrubs and grass over uncompacted, decomposed granite. The crypts and cremains will consist of uncompacted decomposed granite on top of the burial. No proposed condition grading is available for Phases 3-11 of the masterplan, so the area of vegetated hillslope along the outside of the pads is currently unknown. The existing cover was preserved as much as possible along the development edge in Phase 1, so it was assumed that would be the case in future phases. This is a conservative estimate because the calibrated runoff curve number is higher (more runoff) for the existing pervious landuse than for the proposed pervious development landuse. The existing woods and brush outside the proposed development will remain untouched and were delineated using ESRI imagery. The proposed ultimate build-out condition landuse exhibit is shown in Attachment 2, Figure 14.1.

Flowpaths and tc

The flowpath in the existing condition was delineated based on the topography. The proposed condition flowpath was delineated based on the existing topography and the development Masterplan and proposed basin grading. In both models, concentrated flow is input into the TR-55 program as a velocity and length. The velocity was calculated in Bentley Flowmaster. Flowmaster and slope calculations are shown in Attachment 1. The Ultimate Build-Out hydrology map and topographic workmap are shown in Attachment 2, Figure 14.2 and Figure 14.3.

Table 1 - Runoff Curve Numbers

Cover	CN (soil A)	Impervious fraction	Existing Condition Area (ac)	Proposed Condition Area (ac)
Existing cover, undeveloped				
Oak- aspen, fair	48	0	91.77	56.85
Desert shrub, poor	63	0	50.83	46.92
Pervious development				
Decomposed granite/mulch, brush and grass = open space, fair	49	0	7.65	27.23
Crypts and cremains = bare soil	77	0	0.0	13.80
Impervious development				
Roads, sidewalks, columbariums, buildings	98	0.9	4.42	12.55
		SUM	**154.67**	**157.35**

Model Calibration

The project area is in a local sump and is not tributary to any water body by surface flow, so flow records cannot be used for calibration.

Regional runoff frequency equations

To calibrate the model, a regional runoff frequency equation that applies to the Central Coast of California was evaluated.

Reference: *Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2016* (USGS Scientific Investigations Report 2012-5113 developed in collaboration with FEMA). Regional flood-frequency equations are based on 771 streamflow-gaging stations in California having 10 or more years of data.

The 1%-AEP regional flood frequency equation for the Central Coast (Region 4) is as follows:

$$Q_{100}[cfs] = 11.0 \cdot (Drainage\ Area[mi^2])^{0.840} \cdot (Mean\ Annual\ Precipitation[in])^{0.994}$$

The 2018 Salinas Valley Hydrologic Subareas Hydrologic Report published by the Monterey County Water Resources Agency identifies the seasonal average precipitation depth at nearby Salinas Municipal Airport to be 12.06 inches based on a data record from 1981-2010.

The 1% AEP peak discharge for the existing condition watershed calculates 39.64 cfs. The USGS report identifies that the standard error of estimate is of 0.24 for the Central Coast Region.

Hydrograph calibration

The flood frequency equation applies to undeveloped watersheds, so the existing condition model (3% impervious) was calibrated to meet or exceed the peak discharge calculated by the equation. Using TR-55, the natural vegetation Curve Number in the existing condition model was adjusted to calibrate the peak discharge. The time of concentration is a relatively stable hydrologic parameter developed based on the flowpath, so it was not changed. A rainfall distribution of Type 1A was tested and found to flatten the hydrograph and decrease the peak flow by 50%. This seemed unreasonable, so the Type 1 distribution recommended by the SCS map was not changed for calibration.

The calibrated peak discharge was achieved by changing the runoff Curve Number to 52 for undeveloped areas (originally oak and desert shrub). Other parameters remained the same. This change was applied to the proposed model to get the peak discharge and flood volume. Results from the existing, calibrated existing, Wood Rogers old effective model, and proposed models are shown below.

Table 2 - Model Results

Model	Runoff Depth, in	TDA, ac	Vol, ac-ft	Q, cfs
Existing	0.886	154.67	11.42	46.81
Existing calibrated	0.829	154.67	10.69	39.88
Proposed (Ph1-2)	0.829	154.67	10.69	39.97
Ultimate (Ph1-11)	1.067	157.35	13.99	72.46
2014 LOMR (no development)	0.355	165.70	4.90	47.90

The Wood Rogers existing condition model resulted in a similar peak flow and smaller volume than the calibrated model. The difference can be attributed to the 72-hour rainfall distribution used in the Wood Rogers model, and their use of a soil constant loss rate instead of a runoff curve number. The Wood Rogers model was not available for comparison to this study's existing model. Because the floodplain mapping process relies on a volume, and the calibrated existing model exceeds the flood volume calculated by the previous existing model by Wood Rogers, these results seem reasonable. All results from the TR-55 model are saved under Attachment 1: Model and Model Inputs.

Basin volume

The proposed basin will contain the 100-year proposed condition flood volume with 1 foot of freeboard. The basin will infiltrate the entire volume. The basin volume at 1-ft freeboard is 14.2 ac-ft. Basin staged storage calculations are shown in Attachment 1, and the conceptual Ultimate Build-Out basin grading is shown in Attachment 2, Figure 14.4.

2. 100-Year Storm Event Floodplain Mapping

2.1 METHOD AND PURPOSE

The 100-year storm study area model is based upon the assumptions listed under Section 1.6. The results from the model of the existing study area allow a comparison to the flooding zones delineated in the effective DFIRM as well as determine the flooding characteristics of the study area.

2.2 RESULTS

Based on model results, the proposed flood zones were re-shaped and designated as Zone AE. The 100-year floodplain shown in the 2014 LOMR was designated Zone AH (1-3ft depth flooding). The change from Zone AH to AE is due to the proposed construction of an onsite 18-foot deep infiltration basin in the natural low point of the watershed, which will increase the ponding depth.

The Proposed Base Effective Floodplain elevation is 283 feet. The previous BFE elevation was 286.1. The new BFE of 283 is 22 feet below the lowest point in any adjacent watershed, 305 feet on Parker Flats Road.

2.3 PROPOSED CHANGES TO FIRM PANEL #06053C0195H

This project has no impact on adjacent properties because the watershed has no outflow. The ultimate build-out basin will infiltrate the entire 100-year proposed condition volume, and the proposed base flood elevation will be 3 feet lower than the current effective floodplain.

2.4 CONCLUSIONS

This report shows that the Phase 1-11 development of the California Central Coast Veterans Cemetery will not adversely impact the mapped floodplain. The results from the TR-55 hydrologic model demonstrate that:

1. The proposed ultimate build-out condition infiltration basin has capacity to hold the proposed condition 100-year volume for Phases 1-11, lowering the 100-year floodplain by 3 feet.
2. No stormwater will exit the watershed, so there will be no flooding impacts to adjacent properties.
3. The evaluation was performed using the best available information at the time of the study.

3. Attachments

Attachment 1	Model and Model Inputs
Attachment 2	Exhibits

Attachment 1
Model and Model Inputs

TR-55 Hydrology Models
Flowmaster Proposed Pipe Calculation
Slope Calculations
CCCVC Landuse and Impervious Areas
Conceptual Ultimate (Phase 1-11) Basin Staged Storage

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

```
WinTR-20: Version 1.10                  0         0         0.05
CCCVC
Basin 5 - Ultimate (Ph1-11) Condition

SUB-AREA:
          Basin 5   Basin 5             .24586    57.       .206

STREAM REACH:
          Basin 5   Outlet    Xsec 1              2.

STORM ANALYSIS:
          100-Yr                        4.93      Type I    2

STRUCTURE RATING:

STREAM CROSS SECTION:
          Xsec 1    0.0       0.0       0.0
                    0.0       0.000     0.00      50.00     0.0100
                    0.5       236.984   26.00     54.00     0.0100
                    1.0       762.951   54.00     58.00     0.0100
                    2.0       2498.047  116.00    66.00     0.0100
                    5.0       12745.897 350.00    90.00     0.0100
                    10.0      47976.498 900.00    130.00    0.0100
                    20.0      203602.9862600.00   210.00    0.0100


GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN
```

WinTR-20 Printed Page File End of Input Data List

CCCVC
Basin 5 - Ultimate (Ph1-11) Condition

Name of printed page file:
TR20.out

STORM 100-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 5	0.246		1.067		10.05	72.46	294.74

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.597	0.08	0.14	0.23	0.36	0.54	0.77	1.06
9.688	1.42	1.84	2.35	2.95	3.66	4.49	5.48
9.779	6.65	7.99	9.51	11.25	13.29	15.67	18.47
9.870	21.80	25.70	30.15	34.99	40.05	45.18	50.22
9.961	54.97	59.25	63.01	66.23	68.84	70.76	71.99
10.052	72.46	72.06	70.67	68.44	65.66	62.54	59.27
10.143	55.90	52.65	49.55	46.66	44.09	41.96	40.19
10.234	38.66	37.32	36.15	35.10	34.13	33.29	32.53
10.325	31.85	31.23	30.65	30.10	29.57	29.06	28.58
10.416	28.13	27.69	27.26	26.84	26.41	25.96	25.53
10.507	25.10	24.70	24.30	23.92	23.55	23.18	22.82
10.598	22.48	22.16	21.87	21.60	21.35	21.12	20.91
10.689	20.70	20.53	20.37	20.22	20.09	19.97	19.85

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206		

STREAM REACH:

10.781	19.73	19.62	19.52	19.42	19.32	19.23	19.14
10.872	19.05	18.95	18.85	18.76	18.67	18.59	18.50
10.963	18.41	18.31	18.21	18.12	18.03	17.94	17.85
11.054	17.77	17.68	17.60	17.51	17.44	17.37	17.30
11.145	17.24	17.19	17.13	17.08	17.03	16.99	16.96
11.236	16.93	16.90	16.87	16.84	16.81	16.78	16.75
11.327	16.73	16.71	16.68	16.66	16.64	16.61	16.59
11.418	16.56	16.54	16.52	16.49	16.47	16.44	16.42
11.509	16.39	16.37	16.34	16.32	16.30	16.27	16.24
11.600	16.21	16.19	16.16	16.13	16.11	16.08	16.05
11.691	16.02	15.99	15.96	15.93	15.90	15.87	15.84
11.782	15.81	15.78	15.75	15.71	15.68	15.65	15.62
11.873	15.59	15.55	15.52	15.48	15.45	15.42	15.39
11.964	15.35	15.32	15.28	15.24	15.21	15.17	15.14
12.056	15.10	15.07	15.04	15.00	14.97	14.94	14.91
12.147	14.88	14.86	14.83	14.80	14.78	14.76	14.73
12.238	14.71	14.69	14.67	14.65	14.63	14.61	14.59
12.329	14.57	14.55	14.53	14.51	14.49	14.46	14.44
12.420	14.42	14.40	14.38	14.36	14.34	14.32	14.30
12.511	14.28	14.26	14.24	14.22	14.19	14.17	14.15
12.602	14.13	14.10	14.08	14.06	14.04	14.02	13.99
12.693	13.97	13.94	13.92	13.90	13.87	13.85	13.83
12.784	13.80	13.78	13.75	13.73	13.71	13.68	13.66
12.875	13.63	13.61	13.58	13.55	13.53	13.50	13.48
12.966	13.45	13.43	13.40	13.37	13.35	13.32	13.30
13.057	13.27	13.24	13.21	13.19	13.16	13.13	13.11
13.148	13.08	13.05	13.02	12.99	12.97	12.94	12.91

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
13.240	12.88	12.86	12.83	12.80	12.77	12.74	12.71
13.331	12.68	12.65	12.62	12.59	12.56	12.53	12.50
13.422	12.47	12.44	12.41	12.38	12.35	12.32	12.29
13.513	12.26	12.23	12.20	12.17	12.14	12.11	12.07
13.604	12.04	12.01	11.98	11.95	11.92	11.89	11.85
13.695	11.82	11.79	11.76	11.72	11.69	11.66	11.63
13.786	11.59	11.56	11.53	11.50	11.46	11.43	11.40
13.877	11.36	11.33	11.29	11.26	11.23	11.20	11.16
13.968	11.13	11.09	11.06	11.02	10.99	10.96	10.93
14.059	10.90	10.87	10.84	10.81	10.79	10.76	10.74
14.150	10.72	10.71	10.69	10.68	10.66	10.65	10.64
14.241	10.64	10.63	10.62	10.62	10.61	10.61	10.60
14.332	10.60	10.59	10.59	10.59	10.58	10.58	10.58
14.423	10.58	10.57	10.57	10.57	10.57	10.56	10.56
14.515	10.56	10.55	10.55	10.55	10.55	10.55	10.54
14.606	10.54	10.54	10.53	10.53	10.53	10.53	10.52
14.697	10.52	10.52	10.52	10.51	10.51	10.51	10.51
14.788	10.50	10.50	10.50	10.50	10.49	10.49	10.49
14.879	10.48	10.48	10.48	10.48	10.47	10.47	10.47

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

14.970	10.46	10.46	10.46	10.45	10.45	10.45	10.45
15.061	10.44	10.44	10.44	10.43	10.43	10.43	10.42
15.152	10.42	10.42	10.41	10.41	10.41	10.40	10.40
15.243	10.40	10.39	10.39	10.39	10.38	10.38	10.38
15.334	10.37	10.37	10.37	10.36	10.36	10.36	10.35
15.425	10.35	10.34	10.34	10.34	10.33	10.33	10.33
15.516	10.32	10.32	10.32	10.31	10.31	10.30	10.30
15.607	10.30	10.29	10.29	10.29	10.28	10.28	10.27
15.699	10.27	10.27	10.26	10.26	10.25	10.25	10.25
15.790	10.24	10.24	10.23	10.23	10.23	10.22	10.22
15.881	10.21	10.21	10.20	10.20	10.20	10.19	10.19
15.972	10.18	10.18	10.18	10.17	10.17	10.16	10.16
16.063	10.15	10.15	10.14	10.14	10.14	10.13	10.13
16.154	10.12	10.12	10.11	10.11	10.10	10.10	10.10
16.245	10.09	10.09	10.08	10.08	10.07	10.07	10.06
16.336	10.06	10.05	10.05	10.05	10.04	10.04	10.03
16.427	10.03	10.02	10.02	10.01	10.01	10.00	10.00
16.518	9.99	9.99	9.98	9.98	9.97	9.97	9.96
16.609	9.96	9.95	9.95	9.94	9.94	9.93	9.93
16.700	9.92	9.92	9.91	9.91	9.90	9.90	9.89
16.791	9.89	9.88	9.88	9.87	9.87	9.86	9.86
16.882	9.85	9.84	9.84	9.83	9.83	9.82	9.82
16.974	9.81	9.81	9.80	9.80	9.79	9.79	9.78
17.065	9.78	9.77	9.76	9.76	9.75	9.75	9.74
17.156	9.74	9.73	9.73	9.72	9.71	9.71	9.70
17.247	9.70	9.69	9.69	9.68	9.68	9.67	9.66
17.338	9.66	9.65	9.65	9.64	9.64	9.63	9.62
17.429	9.62	9.61	9.61	9.60	9.59	9.59	9.58
17.520	9.58	9.57	9.57	9.56	9.55	9.55	9.54
17.611	9.54	9.53	9.52	9.52	9.51	9.51	9.50
17.702	9.49	9.49	9.48	9.48	9.47	9.46	9.46
17.793	9.45	9.44	9.44	9.43	9.43	9.42	9.41

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
17.884	9.41	9.40	9.39	9.39	9.38	9.38	9.37
17.975	9.36	9.36	9.35	9.34	9.34	9.33	9.33
18.066	9.32	9.31	9.31	9.30	9.29	9.29	9.28
18.157	9.27	9.27	9.26	9.25	9.25	9.24	9.23
18.249	9.23	9.22	9.22	9.21	9.20	9.19	9.19
18.340	9.18	9.18	9.17	9.16	9.16	9.15	9.14
18.431	9.14	9.13	9.12	9.12	9.11	9.10	9.09
18.522	9.09	9.08	9.07	9.07	9.06	9.05	9.05
18.613	9.04	9.03	9.03	9.02	9.01	9.01	9.00
18.704	8.99	8.98	8.98	8.97	8.96	8.96	8.95
18.795	8.94	8.94	8.93	8.92	8.92	8.91	8.90
18.886	8.89	8.89	8.88	8.87	8.87	8.86	8.85
18.977	8.84	8.84	8.83	8.82	8.82	8.81	8.80
19.068	8.79	8.79	8.78	8.77	8.76	8.76	8.75

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:
Basin 5 Basin 5 .24586 57. .206

STREAM REACH:

19.159	8.74	8.74	8.73	8.72	8.71	8.71	8.70
19.250	8.69	8.68	8.68	8.67	8.66	8.65	8.65
19.341	8.64	8.63	8.63	8.62	8.61	8.60	8.59
19.433	8.59	8.58	8.57	8.57	8.56	8.55	8.54
19.524	8.53	8.53	8.52	8.51	8.50	8.50	8.49
19.615	8.48	8.47	8.47	8.46	8.45	8.44	8.44
19.706	8.43	8.42	8.41	8.40	8.40	8.39	8.38
19.797	8.37	8.37	8.36	8.35	8.34	8.34	8.33
19.888	8.32	8.31	8.30	8.30	8.29	8.28	8.27
19.979	8.26	8.26	8.25	8.24	8.23	8.22	8.22
20.070	8.21	8.20	8.19	8.18	8.18	8.17	8.16
20.161	8.15	8.15	8.14	8.13	8.12	8.11	8.11
20.252	8.10	8.09	8.08	8.07	8.06	8.06	8.05
20.343	8.04	8.03	8.02	8.02	8.01	8.00	7.99
20.434	7.98	7.98	7.97	7.96	7.95	7.94	7.93
20.525	7.93	7.92	7.91	7.90	7.89	7.88	7.88
20.616	7.87	7.86	7.85	7.84	7.83	7.83	7.82
20.708	7.81	7.80	7.79	7.78	7.78	7.77	7.76
20.799	7.75	7.74	7.73	7.73	7.72	7.71	7.70
20.890	7.69	7.68	7.67	7.67	7.66	7.65	7.64
20.981	7.63	7.62	7.61	7.61	7.60	7.59	7.58
21.072	7.57	7.56	7.56	7.55	7.54	7.53	7.52
21.163	7.51	7.50	7.50	7.49	7.48	7.47	7.46
21.254	7.45	7.44	7.43	7.43	7.42	7.41	7.40
21.345	7.39	7.38	7.37	7.36	7.36	7.35	7.34
21.436	7.33	7.32	7.31	7.30	7.29	7.29	7.28
21.527	7.27	7.26	7.25	7.24	7.23	7.22	7.21
21.618	7.21	7.20	7.19	7.18	7.17	7.16	7.15
21.709	7.14	7.13	7.13	7.12	7.11	7.10	7.09
21.800	7.08	7.07	7.06	7.05	7.05	7.04	7.03
21.892	7.02	7.01	7.00	6.99	6.98	6.97	6.96
21.983	6.95	6.95	6.94	6.93	6.92	6.91	6.90
22.074	6.89	6.88	6.87	6.86	6.86	6.85	6.84
22.165	6.83	6.82	6.81	6.80	6.79	6.78	6.77
22.256	6.76	6.75	6.74	6.74	6.73	6.72	6.71
22.347	6.70	6.69	6.68	6.67	6.66	6.65	6.64
22.438	6.63	6.63	6.62	6.61	6.60	6.59	6.58

CCCVC
Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
22.529	6.57	6.56	6.55	6.54	6.53	6.52	6.51
22.620	6.50	6.49	6.48	6.48	6.47	6.46	6.45
22.711	6.44	6.43	6.42	6.41	6.40	6.39	6.38
22.802	6.37	6.36	6.35	6.34	6.33	6.32	6.32
22.893	6.31	6.30	6.29	6.28	6.27	6.26	6.25
22.984	6.24	6.23	6.22	6.21	6.20	6.19	6.18
23.075	6.17	6.16	6.15	6.14	6.13	6.12	6.11
23.167	6.11	6.10	6.09	6.08	6.07	6.06	6.05
23.258	6.04	6.03	6.02	6.01	6.00	5.99	5.98

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

23.349	5.97	5.96	5.95	5.94	5.93	5.92	5.91
23.440	5.90	5.89	5.88	5.87	5.86	5.85	5.84
23.531	5.83	5.82	5.81	5.80	5.79	5.78	5.77
23.622	5.77	5.76	5.75	5.74	5.73	5.72	5.71
23.713	5.70	5.69	5.68	5.67	5.66	5.65	5.64
23.804	5.63	5.62	5.61	5.60	5.59	5.58	5.57
23.895	5.56	5.55	5.54	5.53	5.52	5.51	5.50
23.986	5.49	5.48	5.46	5.41	5.33	5.20	5.00
24.077	4.73	4.40	4.02	3.62	3.21	2.81	2.43
24.168	2.08	1.76	1.48	1.25	1.06	0.90	0.77
24.259	0.65	0.55	0.47	0.40	0.34	0.28	0.24
24.351	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.442	0.06	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 5	0.246	Upstream	1.067	0.15	10.05	72.46	294.74

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
9.597	0.08	0.14	0.23	0.36	0.54	0.77	1.06
9.688	1.42	1.84	2.35	2.95	3.66	4.49	5.48
9.779	6.65	7.99	9.51	11.25	13.29	15.67	18.47
9.870	21.80	25.70	30.15	34.99	40.05	45.18	50.22
9.961	54.97	59.25	63.01	66.23	68.84	70.76	71.99
10.052	72.46	72.06	70.67	68.44	65.66	62.54	59.27
10.143	55.90	52.65	49.55	46.66	44.09	41.96	40.19
10.234	38.66	37.32	36.15	35.10	34.13	33.29	32.53
10.325	31.85	31.23	30.65	30.10	29.57	29.06	28.58
10.416	28.13	27.69	27.26	26.84	26.41	25.96	25.53
10.507	25.10	24.70	24.30	23.92	23.55	23.18	22.82
10.598	22.48	22.16	21.87	21.60	21.35	21.12	20.91
10.689	20.70	20.53	20.37	20.22	20.09	19.97	19.85
10.781	19.73	19.62	19.52	19.42	19.32	19.23	19.14
10.872	19.05	18.95	18.85	18.76	18.67	18.59	18.50
10.963	18.41	18.31	18.21	18.12	18.03	17.94	17.85
11.054	17.77	17.68	17.60	17.51	17.44	17.37	17.30
11.145	17.24	17.19	17.13	17.08	17.03	16.99	16.96

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
11.236	16.93	16.90	16.87	16.84	16.81	16.78	16.75
11.327	16.73	16.71	16.68	16.66	16.64	16.61	16.59
11.418	16.56	16.54	16.52	16.49	16.47	16.44	16.42
11.509	16.39	16.37	16.34	16.32	16.30	16.27	16.24

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

11.600	16.21	16.19	16.16	16.13	16.11	16.08	16.05
11.691	16.02	15.99	15.96	15.93	15.90	15.87	15.84
11.782	15.81	15.78	15.75	15.71	15.68	15.65	15.62
11.873	15.59	15.55	15.52	15.48	15.45	15.42	15.39
11.964	15.35	15.32	15.28	15.24	15.21	15.17	15.14
12.056	15.10	15.07	15.04	15.00	14.97	14.94	14.91
12.147	14.88	14.86	14.83	14.80	14.78	14.76	14.73
12.238	14.71	14.69	14.67	14.65	14.63	14.61	14.59
12.329	14.57	14.55	14.53	14.51	14.49	14.46	14.44
12.420	14.42	14.40	14.38	14.36	14.34	14.32	14.30
12.511	14.28	14.26	14.24	14.22	14.19	14.17	14.15
12.602	14.13	14.10	14.08	14.06	14.04	14.02	13.99
12.693	13.97	13.94	13.92	13.90	13.87	13.85	13.83
12.784	13.80	13.78	13.75	13.73	13.71	13.68	13.66
12.875	13.63	13.61	13.58	13.55	13.53	13.50	13.48
12.966	13.45	13.43	13.40	13.37	13.35	13.32	13.30
13.057	13.27	13.24	13.21	13.19	13.16	13.13	13.11
13.148	13.08	13.05	13.02	12.99	12.97	12.94	12.91
13.240	12.88	12.86	12.83	12.80	12.77	12.74	12.71
13.331	12.68	12.65	12.62	12.59	12.56	12.53	12.50
13.422	12.47	12.44	12.41	12.38	12.35	12.32	12.29
13.513	12.26	12.23	12.20	12.17	12.14	12.11	12.07
13.604	12.04	12.01	11.98	11.95	11.92	11.89	11.85
13.695	11.82	11.79	11.76	11.72	11.69	11.66	11.63
13.786	11.59	11.56	11.53	11.50	11.46	11.43	11.40
13.877	11.36	11.33	11.29	11.26	11.23	11.20	11.16
13.968	11.13	11.09	11.06	11.02	10.99	10.96	10.93
14.059	10.90	10.87	10.84	10.81	10.79	10.76	10.74
14.150	10.72	10.71	10.69	10.68	10.66	10.65	10.64
14.241	10.64	10.63	10.62	10.62	10.61	10.61	10.60
14.332	10.60	10.59	10.59	10.59	10.58	10.58	10.58
14.423	10.58	10.57	10.57	10.57	10.57	10.56	10.56
14.515	10.56	10.55	10.55	10.55	10.55	10.55	10.54
14.606	10.54	10.54	10.53	10.53	10.53	10.53	10.52
14.697	10.52	10.52	10.52	10.51	10.51	10.51	10.51
14.788	10.50	10.50	10.50	10.50	10.49	10.49	10.49
14.879	10.48	10.48	10.48	10.48	10.47	10.47	10.47
14.970	10.46	10.46	10.46	10.45	10.45	10.45	10.45
15.061	10.44	10.44	10.44	10.43	10.43	10.43	10.42
15.152	10.42	10.42	10.41	10.41	10.41	10.40	10.40
15.243	10.40	10.39	10.39	10.39	10.38	10.38	10.38
15.334	10.37	10.37	10.37	10.36	10.36	10.36	10.35
15.425	10.35	10.34	10.34	10.34	10.33	10.33	10.33
15.516	10.32	10.32	10.32	10.31	10.31	10.30	10.30
15.607	10.30	10.29	10.29	10.29	10.28	10.28	10.27
15.699	10.27	10.27	10.26	10.26	10.25	10.25	10.25
15.790	10.24	10.24	10.23	10.23	10.23	10.22	10.22

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time	Flow Values @ time increment of 0.013 hr						
(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5 Basin 5 .24586 57. .206

STREAM REACH:

15.881	10.21	10.21	10.20	10.20	10.20	10.19	10.19
15.972	10.18	10.18	10.18	10.17	10.17	10.16	10.16
16.063	10.15	10.15	10.14	10.14	10.14	10.13	10.13
16.154	10.12	10.12	10.11	10.11	10.10	10.10	10.10
16.245	10.09	10.09	10.08	10.08	10.07	10.07	10.06
16.336	10.06	10.05	10.05	10.05	10.04	10.04	10.03
16.427	10.03	10.02	10.02	10.01	10.01	10.00	10.00
16.518	9.99	9.99	9.98	9.98	9.97	9.97	9.96
16.609	9.96	9.95	9.95	9.94	9.94	9.93	9.93
16.700	9.92	9.92	9.91	9.91	9.90	9.90	9.89
16.791	9.89	9.88	9.88	9.87	9.87	9.86	9.86
16.882	9.85	9.84	9.84	9.83	9.83	9.82	9.82
16.974	9.81	9.81	9.80	9.80	9.79	9.79	9.78
17.065	9.78	9.77	9.76	9.76	9.75	9.75	9.74
17.156	9.74	9.73	9.73	9.72	9.71	9.71	9.70
17.247	9.70	9.69	9.69	9.68	9.68	9.67	9.66
17.338	9.66	9.65	9.65	9.64	9.64	9.63	9.62
17.429	9.62	9.61	9.61	9.60	9.59	9.59	9.58
17.520	9.58	9.57	9.57	9.56	9.55	9.55	9.54
17.611	9.54	9.53	9.52	9.52	9.51	9.51	9.50
17.702	9.49	9.49	9.48	9.48	9.47	9.46	9.46
17.793	9.45	9.44	9.44	9.43	9.43	9.42	9.41
17.884	9.41	9.40	9.39	9.39	9.38	9.38	9.37
17.975	9.36	9.36	9.35	9.34	9.34	9.33	9.33
18.066	9.32	9.31	9.31	9.30	9.29	9.29	9.28
18.157	9.27	9.27	9.26	9.25	9.25	9.24	9.23
18.249	9.23	9.22	9.22	9.21	9.20	9.19	9.19
18.340	9.18	9.18	9.17	9.16	9.16	9.15	9.14
18.431	9.14	9.13	9.12	9.12	9.11	9.10	9.09
18.522	9.09	9.08	9.07	9.07	9.06	9.05	9.05
18.613	9.04	9.03	9.03	9.02	9.01	9.01	9.00
18.704	8.99	8.98	8.98	8.97	8.96	8.96	8.95
18.795	8.94	8.94	8.93	8.92	8.92	8.91	8.90
18.886	8.89	8.89	8.88	8.87	8.87	8.86	8.85
18.977	8.84	8.84	8.83	8.82	8.82	8.81	8.80
19.068	8.79	8.79	8.78	8.77	8.76	8.76	8.75
19.159	8.74	8.74	8.73	8.72	8.71	8.71	8.70
19.250	8.69	8.68	8.68	8.67	8.66	8.65	8.65
19.341	8.64	8.63	8.63	8.62	8.61	8.60	8.59
19.433	8.59	8.58	8.57	8.57	8.56	8.55	8.54
19.524	8.53	8.53	8.52	8.51	8.50	8.50	8.49
19.615	8.48	8.47	8.47	8.46	8.45	8.44	8.44
19.706	8.43	8.42	8.41	8.40	8.40	8.39	8.38
19.797	8.37	8.37	8.36	8.35	8.34	8.34	8.33
19.888	8.32	8.31	8.30	8.30	8.29	8.28	8.27
19.979	8.26	8.26	8.25	8.24	8.23	8.22	8.22
20.070	8.21	8.20	8.19	8.18	8.18	8.17	8.16
20.161	8.15	8.15	8.14	8.13	8.12	8.11	8.11
20.252	8.10	8.09	8.08	8.07	8.06	8.06	8.05
20.343	8.04	8.03	8.02	8.02	8.01	8.00	7.99
20.434	7.98	7.98	7.97	7.96	7.95	7.94	7.93

CCCVC

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24586	57.	.206

STREAM REACH:

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
20.525	7.93	7.92	7.91	7.90	7.89	7.88	7.88
20.616	7.87	7.86	7.85	7.84	7.83	7.83	7.82
20.708	7.81	7.80	7.79	7.78	7.78	7.77	7.76
20.799	7.75	7.74	7.73	7.73	7.72	7.71	7.70
20.890	7.69	7.68	7.67	7.67	7.66	7.65	7.64
20.981	7.63	7.62	7.61	7.61	7.60	7.59	7.58
21.072	7.57	7.56	7.56	7.55	7.54	7.53	7.52
21.163	7.51	7.50	7.50	7.49	7.48	7.47	7.46
21.254	7.45	7.44	7.43	7.43	7.42	7.41	7.40
21.345	7.39	7.38	7.37	7.36	7.36	7.35	7.34
21.436	7.33	7.32	7.31	7.30	7.29	7.29	7.28
21.527	7.27	7.26	7.25	7.24	7.23	7.22	7.21
21.618	7.21	7.20	7.19	7.18	7.17	7.16	7.15
21.709	7.14	7.13	7.13	7.12	7.11	7.10	7.09
21.800	7.08	7.07	7.06	7.05	7.05	7.04	7.03
21.892	7.02	7.01	7.00	6.99	6.98	6.97	6.96
21.983	6.95	6.95	6.94	6.93	6.92	6.91	6.90
22.074	6.89	6.88	6.87	6.86	6.86	6.85	6.84
22.165	6.83	6.82	6.81	6.80	6.79	6.78	6.77
22.256	6.76	6.75	6.74	6.74	6.73	6.72	6.71
22.347	6.70	6.69	6.68	6.67	6.66	6.65	6.64
22.438	6.63	6.63	6.62	6.61	6.60	6.59	6.58
22.529	6.57	6.56	6.55	6.54	6.53	6.52	6.51
22.620	6.50	6.49	6.48	6.48	6.47	6.46	6.45
22.711	6.44	6.43	6.42	6.41	6.40	6.39	6.38
22.802	6.37	6.36	6.35	6.34	6.33	6.32	6.32
22.893	6.31	6.30	6.29	6.28	6.27	6.26	6.25
22.984	6.24	6.23	6.22	6.21	6.20	6.19	6.18
23.075	6.17	6.16	6.15	6.14	6.13	6.12	6.11
23.167	6.11	6.10	6.09	6.08	6.07	6.06	6.05
23.258	6.04	6.03	6.02	6.01	6.00	5.99	5.98
23.349	5.97	5.96	5.95	5.94	5.93	5.92	5.91
23.440	5.90	5.89	5.88	5.87	5.86	5.85	5.84
23.531	5.83	5.82	5.81	5.80	5.79	5.78	5.77
23.622	5.77	5.76	5.75	5.74	5.73	5.72	5.71
23.713	5.70	5.69	5.68	5.67	5.66	5.65	5.64
23.804	5.63	5.62	5.61	5.60	5.59	5.58	5.57
23.895	5.56	5.55	5.54	5.53	5.52	5.51	5.50
23.986	5.49	5.48	5.46	5.41	5.33	5.20	5.00
24.077	4.73	4.40	4.02	3.62	3.21	2.81	2.43
24.168	2.08	1.76	1.48	1.25	1.06	0.90	0.77
24.259	0.65	0.55	0.47	0.40	0.34	0.28	0.24
24.351	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.442	0.06	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Basin 5	0.246	Downstream	1.067	0.15	10.05	72.46	294.74

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.597	0.08	0.14	0.23	0.36	0.54	0.77	1.06
9.688	1.42	1.84	2.35	2.95	3.66	4.49	5.48
9.779	6.64	7.98	9.50	11.25	13.28	15.66	18.46
9.870	21.79	25.69	30.13	34.97	40.03	45.16	50.21
9.961	54.95	59.24	63.00	66.22	68.83	70.76	71.98
10.052	72.46	72.07	70.67	68.45	65.67	62.55	59.28
10.143	55.91	52.65	49.56	46.67	44.10	41.96	40.19
10.234	38.66	37.33	36.16	35.10	34.14	33.29	32.54
10.325	31.85	31.23	30.65	30.10	29.57	29.06	28.58
10.416	28.13	27.69	27.26	26.84	26.41	25.97	25.53
10.507	25.10	24.70	24.31	23.92	23.55	23.19	22.82
10.598	22.48	22.16	21.87	21.60	21.35	21.12	20.91
10.689	20.71	20.53	20.37	20.23	20.09	19.97	19.85
10.781	19.74	19.62	19.52	19.42	19.32	19.23	19.14
10.872	19.05	18.95	18.85	18.76	18.67	18.59	18.50
10.963	18.41	18.31	18.22	18.12	18.03	17.94	17.85
11.054	17.77	17.68	17.60	17.51	17.44	17.37	17.30
11.145	17.24	17.19	17.13	17.08	17.03	16.99	16.96
11.236	16.93	16.90	16.87	16.84	16.81	16.78	16.75
11.327	16.73	16.71	16.68	16.66	16.64	16.61	16.59
11.418	16.56	16.54	16.52	16.49	16.47	16.44	16.42
11.509	16.39	16.37	16.34	16.32	16.30	16.27	16.24
11.600	16.21	16.19	16.16	16.13	16.11	16.08	16.05
11.691	16.02	15.99	15.96	15.93	15.90	15.87	15.84
11.782	15.81	15.78	15.75	15.72	15.68	15.65	15.62
11.873	15.59	15.55	15.52	15.48	15.45	15.42	15.39
11.964	15.35	15.32	15.28	15.24	15.21	15.17	15.14
12.056	15.10	15.07	15.04	15.00	14.97	14.94	14.91
12.147	14.89	14.86	14.83	14.80	14.78	14.76	14.73
12.238	14.71	14.69	14.67	14.65	14.63	14.61	14.59
12.329	14.57	14.55	14.53	14.51	14.49	14.46	14.44
12.420	14.42	14.40	14.38	14.36	14.34	14.32	14.30
12.511	14.28	14.26	14.24	14.22	14.19	14.17	14.15
12.602	14.13	14.10	14.08	14.06	14.04	14.02	13.99
12.693	13.97	13.94	13.92	13.90	13.88	13.85	13.83
12.784	13.80	13.78	13.75	13.73	13.71	13.68	13.66
12.875	13.63	13.61	13.58	13.55	13.53	13.50	13.48
12.966	13.45	13.43	13.40	13.37	13.35	13.32	13.30
13.057	13.27	13.24	13.21	13.19	13.16	13.13	13.11
13.148	13.08	13.05	13.02	12.99	12.97	12.94	12.91
13.240	12.88	12.86	12.83	12.80	12.77	12.74	12.71
13.331	12.68	12.65	12.62	12.59	12.56	12.53	12.50
13.422	12.47	12.44	12.41	12.38	12.35	12.32	12.29
13.513	12.26	12.23	12.20	12.17	12.14	12.11	12.07
13.604	12.04	12.01	11.98	11.95	11.92	11.89	11.85

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

13.695	11.82	11.79	11.76	11.73	11.69	11.66	11.63
13.786	11.59	11.56	11.53	11.50	11.46	11.43	11.40
13.877	11.36	11.33	11.29	11.26	11.23	11.20	11.16
13.968	11.13	11.09	11.06	11.02	10.99	10.96	10.93
14.059	10.90	10.87	10.84	10.81	10.79	10.76	10.74
14.150	10.72	10.71	10.69	10.68	10.66	10.65	10.64

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
14.241	10.64	10.63	10.62	10.62	10.61	10.61	10.60
14.332	10.60	10.59	10.59	10.59	10.58	10.58	10.58
14.423	10.58	10.57	10.57	10.57	10.57	10.56	10.56
14.515	10.56	10.55	10.55	10.55	10.55	10.55	10.54
14.606	10.54	10.54	10.53	10.53	10.53	10.53	10.52
14.697	10.52	10.52	10.52	10.51	10.51	10.51	10.51
14.788	10.50	10.50	10.50	10.50	10.49	10.49	10.49
14.879	10.48	10.48	10.48	10.48	10.47	10.47	10.47
14.970	10.46	10.46	10.46	10.45	10.45	10.45	10.45
15.061	10.44	10.44	10.44	10.43	10.43	10.43	10.42
15.152	10.42	10.42	10.41	10.41	10.41	10.40	10.40
15.243	10.40	10.39	10.39	10.39	10.38	10.38	10.38
15.334	10.37	10.37	10.37	10.36	10.36	10.36	10.35
15.425	10.35	10.34	10.34	10.34	10.33	10.33	10.33
15.516	10.32	10.32	10.32	10.31	10.31	10.30	10.30
15.607	10.30	10.29	10.29	10.29	10.28	10.28	10.27
15.699	10.27	10.27	10.26	10.26	10.25	10.25	10.25
15.790	10.24	10.24	10.23	10.23	10.23	10.22	10.22
15.881	10.21	10.21	10.20	10.20	10.20	10.19	10.19
15.972	10.18	10.18	10.18	10.17	10.17	10.16	10.16
16.063	10.15	10.15	10.14	10.14	10.14	10.13	10.13
16.154	10.12	10.12	10.11	10.11	10.10	10.10	10.10
16.245	10.09	10.09	10.08	10.08	10.07	10.07	10.06
16.336	10.06	10.05	10.05	10.05	10.04	10.04	10.03
16.427	10.03	10.02	10.02	10.01	10.01	10.00	10.00
16.518	9.99	9.99	9.98	9.98	9.97	9.97	9.96
16.609	9.96	9.95	9.95	9.94	9.94	9.93	9.93
16.700	9.92	9.92	9.91	9.91	9.90	9.90	9.89
16.791	9.89	9.88	9.88	9.87	9.87	9.86	9.86
16.882	9.85	9.84	9.84	9.83	9.83	9.82	9.82
16.974	9.81	9.81	9.80	9.80	9.79	9.79	9.78
17.065	9.78	9.77	9.76	9.76	9.75	9.75	9.74
17.156	9.74	9.73	9.73	9.72	9.71	9.71	9.70
17.247	9.70	9.69	9.69	9.68	9.68	9.67	9.66
17.338	9.66	9.65	9.65	9.64	9.64	9.63	9.62
17.429	9.62	9.61	9.61	9.60	9.59	9.59	9.58
17.520	9.58	9.57	9.57	9.56	9.55	9.55	9.54
17.611	9.54	9.53	9.52	9.52	9.51	9.51	9.50
17.702	9.49	9.49	9.48	9.48	9.47	9.46	9.46
17.793	9.45	9.44	9.44	9.43	9.43	9.42	9.41

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

17.884	9.41	9.40	9.39	9.39	9.38	9.38	9.37
17.975	9.36	9.36	9.35	9.34	9.34	9.33	9.33
18.066	9.32	9.31	9.31	9.30	9.29	9.29	9.28
18.157	9.27	9.27	9.26	9.25	9.25	9.24	9.23
18.249	9.23	9.22	9.22	9.21	9.20	9.19	9.19
18.340	9.18	9.18	9.17	9.16	9.16	9.15	9.14
18.431	9.14	9.13	9.12	9.12	9.11	9.10	9.09
18.522	9.09	9.08	9.07	9.07	9.06	9.05	9.05
18.613	9.04	9.03	9.03	9.02	9.01	9.01	9.00
18.704	8.99	8.98	8.98	8.97	8.96	8.96	8.95
18.795	8.94	8.94	8.93	8.92	8.92	8.91	8.90

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
18.886	8.89	8.89	8.88	8.87	8.87	8.86	8.85
18.977	8.84	8.84	8.83	8.82	8.82	8.81	8.80
19.068	8.79	8.79	8.78	8.77	8.76	8.76	8.75
19.159	8.74	8.74	8.73	8.72	8.71	8.71	8.70
19.250	8.69	8.68	8.68	8.67	8.66	8.65	8.65
19.341	8.64	8.63	8.63	8.62	8.61	8.60	8.59
19.433	8.59	8.58	8.57	8.57	8.56	8.55	8.54
19.524	8.53	8.53	8.52	8.51	8.50	8.50	8.49
19.615	8.48	8.47	8.47	8.46	8.45	8.44	8.44
19.706	8.43	8.42	8.41	8.40	8.40	8.39	8.38
19.797	8.37	8.37	8.36	8.35	8.34	8.34	8.33
19.888	8.32	8.31	8.30	8.30	8.29	8.28	8.27
19.979	8.26	8.26	8.25	8.24	8.23	8.22	8.22
20.070	8.21	8.20	8.19	8.18	8.18	8.17	8.16
20.161	8.15	8.15	8.14	8.13	8.12	8.11	8.11
20.252	8.10	8.09	8.08	8.07	8.06	8.06	8.05
20.343	8.04	8.03	8.02	8.02	8.01	8.00	7.99
20.434	7.98	7.98	7.97	7.96	7.95	7.94	7.93
20.525	7.93	7.92	7.91	7.90	7.89	7.88	7.88
20.616	7.87	7.86	7.85	7.84	7.83	7.83	7.82
20.708	7.81	7.80	7.79	7.78	7.78	7.77	7.76
20.799	7.75	7.74	7.73	7.73	7.72	7.71	7.70
20.890	7.69	7.68	7.67	7.67	7.66	7.65	7.64
20.981	7.63	7.62	7.61	7.61	7.60	7.59	7.58
21.072	7.57	7.56	7.56	7.55	7.54	7.53	7.52
21.163	7.51	7.50	7.50	7.49	7.48	7.47	7.46
21.254	7.45	7.44	7.43	7.43	7.42	7.41	7.40
21.345	7.39	7.38	7.37	7.36	7.36	7.35	7.34
21.436	7.33	7.32	7.31	7.30	7.29	7.29	7.28
21.527	7.27	7.26	7.25	7.24	7.23	7.22	7.21
21.618	7.21	7.20	7.19	7.18	7.17	7.16	7.15
21.709	7.14	7.13	7.13	7.12	7.11	7.10	7.09
21.800	7.08	7.07	7.06	7.05	7.05	7.04	7.03
21.892	7.02	7.01	7.00	6.99	6.98	6.97	6.96
21.983	6.96	6.95	6.94	6.93	6.92	6.91	6.90

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

22.074	6.89	6.88	6.87	6.86	6.86	6.85	6.84
22.165	6.83	6.82	6.81	6.80	6.79	6.78	6.77
22.256	6.76	6.75	6.74	6.74	6.73	6.72	6.71
22.347	6.70	6.69	6.68	6.67	6.66	6.65	6.64
22.438	6.63	6.63	6.62	6.61	6.60	6.59	6.58
22.529	6.57	6.56	6.55	6.54	6.53	6.52	6.51
22.620	6.50	6.49	6.48	6.48	6.47	6.46	6.45
22.711	6.44	6.43	6.42	6.41	6.40	6.39	6.38
22.802	6.37	6.36	6.35	6.34	6.33	6.32	6.32
22.893	6.31	6.30	6.29	6.28	6.27	6.26	6.25
22.984	6.24	6.23	6.22	6.21	6.20	6.19	6.18
23.075	6.17	6.16	6.15	6.14	6.13	6.12	6.12
23.167	6.11	6.10	6.09	6.08	6.07	6.06	6.05
23.258	6.04	6.03	6.02	6.01	6.00	5.99	5.98
23.349	5.97	5.96	5.95	5.94	5.93	5.92	5.91
23.440	5.90	5.89	5.88	5.87	5.86	5.85	5.84

CCCVC
Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
23.531	5.83	5.82	5.81	5.80	5.79	5.78	5.77
23.622	5.77	5.76	5.75	5.74	5.73	5.72	5.71
23.713	5.70	5.69	5.68	5.67	5.66	5.65	5.64
23.804	5.63	5.62	5.61	5.60	5.59	5.58	5.57
23.895	5.56	5.55	5.54	5.53	5.52	5.51	5.50
23.986	5.49	5.48	5.46	5.41	5.33	5.20	5.00
24.077	4.74	4.40	4.03	3.62	3.22	2.81	2.43
24.168	2.08	1.76	1.48	1.25	1.06	0.90	0.77
24.259	0.65	0.55	0.47	0.40	0.34	0.28	0.24
24.351	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.442	0.06	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.246		1.067		10.05	72.46	294.74

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
9.597	0.08	0.14	0.23	0.36	0.54	0.77	1.06
9.688	1.42	1.84	2.35	2.95	3.66	4.49	5.48
9.779	6.64	7.98	9.50	11.25	13.28	15.66	18.46
9.870	21.79	25.69	30.13	34.97	40.03	45.16	50.21
9.961	54.95	59.24	63.00	66.22	68.83	70.76	71.98
10.052	72.46	72.07	70.67	68.45	65.67	62.55	59.28
10.143	55.91	52.65	49.56	46.67	44.10	41.96	40.19
10.234	38.66	37.33	36.16	35.10	34.14	33.29	32.54

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206		

STREAM REACH:

10.325	31.85	31.23	30.65	30.10	29.57	29.06	28.58
10.416	28.13	27.69	27.26	26.84	26.41	25.97	25.53
10.507	25.10	24.70	24.31	23.92	23.55	23.19	22.82
10.598	22.48	22.16	21.87	21.60	21.35	21.12	20.91
10.689	20.71	20.53	20.37	20.23	20.09	19.97	19.85
10.781	19.74	19.62	19.52	19.42	19.32	19.23	19.14
10.872	19.05	18.95	18.85	18.76	18.67	18.59	18.50
10.963	18.41	18.31	18.22	18.12	18.03	17.94	17.85
11.054	17.77	17.68	17.60	17.51	17.44	17.37	17.30
11.145	17.24	17.19	17.13	17.08	17.03	16.99	16.96
11.236	16.93	16.90	16.87	16.84	16.81	16.78	16.75
11.327	16.73	16.71	16.68	16.66	16.64	16.61	16.59
11.418	16.56	16.54	16.52	16.49	16.47	16.44	16.42
11.509	16.39	16.37	16.34	16.32	16.30	16.27	16.24
11.600	16.21	16.19	16.16	16.13	16.11	16.08	16.05
11.691	16.02	15.99	15.96	15.93	15.90	15.87	15.84
11.782	15.81	15.78	15.75	15.72	15.68	15.65	15.62
11.873	15.59	15.55	15.52	15.48	15.45	15.42	15.39
11.964	15.35	15.32	15.28	15.24	15.21	15.17	15.14
12.056	15.10	15.07	15.04	15.00	14.97	14.94	14.91
12.147	14.89	14.86	14.83	14.80	14.78	14.76	14.73

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
12.238	14.71	14.69	14.67	14.65	14.63	14.61	14.59
12.329	14.57	14.55	14.53	14.51	14.49	14.46	14.44
12.420	14.42	14.40	14.38	14.36	14.34	14.32	14.30
12.511	14.28	14.26	14.24	14.22	14.19	14.17	14.15
12.602	14.13	14.10	14.08	14.06	14.04	14.02	13.99
12.693	13.97	13.94	13.92	13.90	13.88	13.85	13.83
12.784	13.80	13.78	13.75	13.73	13.71	13.68	13.66
12.875	13.63	13.61	13.58	13.55	13.53	13.50	13.48
12.966	13.45	13.43	13.40	13.37	13.35	13.32	13.30
13.057	13.27	13.24	13.21	13.19	13.16	13.13	13.11
13.148	13.08	13.05	13.02	12.99	12.97	12.94	12.91
13.240	12.88	12.86	12.83	12.80	12.77	12.74	12.71
13.331	12.68	12.65	12.62	12.59	12.56	12.53	12.50
13.422	12.47	12.44	12.41	12.38	12.35	12.32	12.29
13.513	12.26	12.23	12.20	12.17	12.14	12.11	12.07
13.604	12.04	12.01	11.98	11.95	11.92	11.89	11.85
13.695	11.82	11.79	11.76	11.73	11.69	11.66	11.63
13.786	11.59	11.56	11.53	11.50	11.46	11.43	11.40
13.877	11.36	11.33	11.29	11.26	11.23	11.20	11.16
13.968	11.13	11.09	11.06	11.02	10.99	10.96	10.93
14.059	10.90	10.87	10.84	10.81	10.79	10.76	10.74
14.150	10.72	10.71	10.69	10.68	10.66	10.65	10.64
14.241	10.64	10.63	10.62	10.62	10.61	10.61	10.60
14.332	10.60	10.59	10.59	10.59	10.58	10.58	10.58
14.423	10.58	10.57	10.57	10.57	10.57	10.56	10.56

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5 Basin 5 .24586 57. .206

STREAM REACH:

14.515	10.56	10.55	10.55	10.55	10.55	10.55	10.54
14.606	10.54	10.54	10.53	10.53	10.53	10.53	10.52
14.697	10.52	10.52	10.52	10.51	10.51	10.51	10.51
14.788	10.50	10.50	10.50	10.50	10.49	10.49	10.49
14.879	10.48	10.48	10.48	10.48	10.47	10.47	10.47
14.970	10.46	10.46	10.46	10.45	10.45	10.45	10.45
15.061	10.44	10.44	10.44	10.43	10.43	10.43	10.42
15.152	10.42	10.42	10.41	10.41	10.41	10.40	10.40
15.243	10.40	10.39	10.39	10.39	10.38	10.38	10.38
15.334	10.37	10.37	10.37	10.36	10.36	10.36	10.35
15.425	10.35	10.34	10.34	10.34	10.33	10.33	10.33
15.516	10.32	10.32	10.32	10.31	10.31	10.30	10.30
15.607	10.30	10.29	10.29	10.29	10.28	10.28	10.27
15.699	10.27	10.27	10.26	10.26	10.25	10.25	10.25
15.790	10.24	10.24	10.23	10.23	10.23	10.22	10.22
15.881	10.21	10.21	10.20	10.20	10.20	10.19	10.19
15.972	10.18	10.18	10.18	10.17	10.17	10.16	10.16
16.063	10.15	10.15	10.14	10.14	10.14	10.13	10.13
16.154	10.12	10.12	10.11	10.11	10.10	10.10	10.10
16.245	10.09	10.09	10.08	10.08	10.07	10.07	10.06
16.336	10.06	10.05	10.05	10.05	10.04	10.04	10.03
16.427	10.03	10.02	10.02	10.01	10.01	10.00	10.00
16.518	9.99	9.99	9.98	9.98	9.97	9.97	9.96
16.609	9.96	9.95	9.95	9.94	9.94	9.93	9.93
16.700	9.92	9.92	9.91	9.91	9.90	9.90	9.89
16.791	9.89	9.88	9.88	9.87	9.87	9.86	9.86

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
16.882	9.85	9.84	9.84	9.83	9.83	9.82	9.82
16.974	9.81	9.81	9.80	9.80	9.79	9.79	9.78
17.065	9.78	9.77	9.76	9.76	9.75	9.75	9.74
17.156	9.74	9.73	9.73	9.72	9.71	9.71	9.70
17.247	9.70	9.69	9.69	9.68	9.68	9.67	9.66
17.338	9.66	9.65	9.65	9.64	9.64	9.63	9.62
17.429	9.62	9.61	9.61	9.60	9.59	9.59	9.58
17.520	9.58	9.57	9.57	9.56	9.55	9.55	9.54
17.611	9.54	9.53	9.52	9.52	9.51	9.51	9.50
17.702	9.49	9.49	9.48	9.48	9.47	9.46	9.46
17.793	9.45	9.44	9.44	9.43	9.43	9.42	9.41
17.884	9.41	9.40	9.39	9.39	9.38	9.38	9.37
17.975	9.36	9.36	9.35	9.34	9.34	9.33	9.33
18.066	9.32	9.31	9.31	9.30	9.29	9.29	9.28
18.157	9.27	9.27	9.26	9.25	9.25	9.24	9.23
18.249	9.23	9.22	9.22	9.21	9.20	9.19	9.19
18.340	9.18	9.18	9.17	9.16	9.16	9.15	9.14
18.431	9.14	9.13	9.12	9.12	9.11	9.10	9.09
18.522	9.09	9.08	9.07	9.07	9.06	9.05	9.05
18.613	9.04	9.03	9.03	9.02	9.01	9.01	9.00

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(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

18.704	8.99	8.98	8.98	8.97	8.96	8.96	8.95
18.795	8.94	8.94	8.93	8.92	8.92	8.91	8.90
18.886	8.89	8.89	8.88	8.87	8.87	8.86	8.85
18.977	8.84	8.84	8.83	8.82	8.82	8.81	8.80
19.068	8.79	8.79	8.78	8.77	8.76	8.76	8.75
19.159	8.74	8.74	8.73	8.72	8.71	8.71	8.70
19.250	8.69	8.68	8.68	8.67	8.66	8.65	8.65
19.341	8.64	8.63	8.63	8.62	8.61	8.60	8.59
19.433	8.59	8.58	8.57	8.57	8.56	8.55	8.54
19.524	8.53	8.53	8.52	8.51	8.50	8.50	8.49
19.615	8.48	8.47	8.47	8.46	8.45	8.44	8.44
19.706	8.43	8.42	8.41	8.40	8.40	8.39	8.38
19.797	8.37	8.37	8.36	8.35	8.34	8.34	8.33
19.888	8.32	8.31	8.30	8.30	8.29	8.28	8.27
19.979	8.26	8.26	8.25	8.24	8.23	8.22	8.22
20.070	8.21	8.20	8.19	8.18	8.18	8.17	8.16
20.161	8.15	8.15	8.14	8.13	8.12	8.11	8.11
20.252	8.10	8.09	8.08	8.07	8.06	8.06	8.05
20.343	8.04	8.03	8.02	8.02	8.01	8.00	7.99
20.434	7.98	7.98	7.97	7.96	7.95	7.94	7.93
20.525	7.93	7.92	7.91	7.90	7.89	7.88	7.88
20.616	7.87	7.86	7.85	7.84	7.83	7.83	7.82
20.708	7.81	7.80	7.79	7.78	7.78	7.77	7.76
20.799	7.75	7.74	7.73	7.73	7.72	7.71	7.70
20.890	7.69	7.68	7.67	7.67	7.66	7.65	7.64
20.981	7.63	7.62	7.61	7.61	7.60	7.59	7.58
21.072	7.57	7.56	7.56	7.55	7.54	7.53	7.52
21.163	7.51	7.50	7.50	7.49	7.48	7.47	7.46
21.254	7.45	7.44	7.43	7.43	7.42	7.41	7.40
21.345	7.39	7.38	7.37	7.36	7.36	7.35	7.34
21.436	7.33	7.32	7.31	7.30	7.29	7.29	7.28

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Line Start Time (hr)	Flow Values @ time increment of 0.013 hr (cfs)						
21.527	7.27	7.26	7.25	7.24	7.23	7.22	7.21
21.618	7.21	7.20	7.19	7.18	7.17	7.16	7.15
21.709	7.14	7.13	7.13	7.12	7.11	7.10	7.09
21.800	7.08	7.07	7.06	7.05	7.05	7.04	7.03
21.892	7.02	7.01	7.00	6.99	6.98	6.97	6.96
21.983	6.96	6.95	6.94	6.93	6.92	6.91	6.90
22.074	6.89	6.88	6.87	6.86	6.86	6.85	6.84
22.165	6.83	6.82	6.81	6.80	6.79	6.78	6.77
22.256	6.76	6.75	6.74	6.74	6.73	6.72	6.71
22.347	6.70	6.69	6.68	6.67	6.66	6.65	6.64
22.438	6.63	6.63	6.62	6.61	6.60	6.59	6.58
22.529	6.57	6.56	6.55	6.54	6.53	6.52	6.51
22.620	6.50	6.49	6.48	6.48	6.47	6.46	6.45
22.711	6.44	6.43	6.42	6.41	6.40	6.39	6.38
22.802	6.37	6.36	6.35	6.34	6.33	6.32	6.32

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

Basin 5	Basin 5	.24586	57.	.206	

STREAM REACH:

22.893	6.31	6.30	6.29	6.28	6.27	6.26	6.25
22.984	6.24	6.23	6.22	6.21	6.20	6.19	6.18
23.075	6.17	6.16	6.15	6.14	6.13	6.12	6.12
23.167	6.11	6.10	6.09	6.08	6.07	6.06	6.05
23.258	6.04	6.03	6.02	6.01	6.00	5.99	5.98
23.349	5.97	5.96	5.95	5.94	5.93	5.92	5.91
23.440	5.90	5.89	5.88	5.87	5.86	5.85	5.84
23.531	5.83	5.82	5.81	5.80	5.79	5.78	5.77
23.622	5.77	5.76	5.75	5.74	5.73	5.72	5.71
23.713	5.70	5.69	5.68	5.67	5.66	5.65	5.64
23.804	5.63	5.62	5.61	5.60	5.59	5.58	5.57
23.895	5.56	5.55	5.54	5.53	5.52	5.51	5.50
23.986	5.49	5.48	5.46	5.41	5.33	5.20	5.00
24.077	4.74	4.40	4.03	3.62	3.22	2.81	2.43
24.168	2.08	1.76	1.48	1.25	1.06	0.90	0.77
24.259	0.65	0.55	0.47	0.40	0.34	0.28	0.24
24.351	0.20	0.17	0.14	0.12	0.10	0.09	0.07
24.442	0.06	0.05					

CCCVC

Basin 5 - Ultimate (Ph1-11) Condition

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 100-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Basin 5	0.246		72.46				
Basin 5	0.246		72.46				
DOWNSTREAM			72.46				
OUTLET	0.246		72.46				

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05

(continued)

Basin 5 - Ultimate (Ph1-11) Condition

STORM 100-Yr

SUB-AREA:

	Basin 5	Basin 5	.24586	57.	.206

STREAM REACH:

Worksheet for ULT (Ph1-11)_proposed pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02880	ft/ft
Normal Depth	1.50	ft
Diameter	2.00	ft

Results

Discharge	35.01	ft^3/s
Flow Area	2.53	ft^2
Wetted Perimeter	4.19	ft
Hydraulic Radius	0.60	ft
Top Width	1.73	ft
Critical Depth	1.92	ft
Percent Full	75.0	%
Critical Slope	0.02087	ft/ft
Velocity	13.85	ft/s
Velocity Head	2.98	ft
Specific Energy	4.48	ft
Froude Number	2.02	
Maximum Discharge	41.30	ft^3/s
Discharge Full	38.39	ft^3/s
Slope Full	0.02395	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for ULT (Ph1-11)_proposed pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.92	ft
Channel Slope	0.02880	ft/ft
Critical Slope	0.02087	ft/ft

Slope calculations

Existing condition

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
441	438	100	0.0300	Sheet flow
438	379	500	0.1180	Shallow concentrated
379	272.6	1974	0.0539	Existing channel in flowmaster

Proposed condition (Phases 1-2)

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
441	438	100	0.0300	Sheet flow
438	379	500	0.1180	Shallow concentrated
379	270	1974	0.0552	PR (Ph 1-2) channel in flowmaster

Ultimate condition (Phases 1-11)

US ELEV	DS ELEV	L (FT)	S (FT/FT)	Flow type in TR-55
416.1	410	100	0.0610	Sheet flow
410	327.1	514	0.1613	Shallow concentrated
327.1	316	408	0.0272	Shallow concentrated
310.5	266	1545	0.0288	Proposed pipe in flowmaster

CCCVC Impervious Areas

PHASE 1	Area (ac)
Total Area (ac)	10.86
ROAD	
Impervious Fraction	0.9
Area (ac)	1.93
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	7.82
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	0.00
COLUMBARIUMS/BUILDINGS/IMP.WALKWAYS	
Impervious Fraction	0.9
Area (ac)	1.11
Total Impervious Area (ac)	2.73

PHASE 2	Area (ac)
Total Area (ac)	2.97
ROAD	
Impervious Fraction	0.9
Area (ac)	0.30
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	1.34
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	1.33
COLUMBARIUMS	
Impervious Fraction	0.9
Area (ac)	0
Total Impervious Area (ac)	0.27

ULTIMATE PHASE 3-11	Area (ac)
Total Area (ac)	70.57
ROAD	
Impervious Fraction	0.9
Area (ac)	4.86
Pervious area: DG and some shrubs*	
Impervious Fraction	0
Area (ac)	49.36
Crypts - treated as pervious, bare soil (CN=77)	
Impervious Fraction	0
Area (ac)	12.47
COLUMBARIUMS	
Impervious Fraction	0.9
Area (ac)	3.88
Total Impervious Area (ac)	7.86

EXISTING ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	2.9%

Phase 1&2 ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	3.0%

ULTIMATE (Phase 1-11) ROAD - Parker Flats, Parker Flats Cuttoff	Area (ac)	
Impervious Fraction	0.90	
Area (ac)	1.87	
Total Impervious Area (ac)	1.68	8.0%

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	4.42
Oak- aspen, fair	91.77
Desert shrub, poor	50.83
Pervious development	7.65
TOTAL existing cover, undeveloped	142.60
Total Basin 5 Area (ac)	154.67

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	4.69
Crypts - treated as pervious, bare soil (CN=77)	1.33
Oak- aspen, fair	90.02
Desert shrub, poor	48.59
Pervious development	10.05
TOTAL offsite pervious area:	138.60
Total Basin 5 Area (ac)	154.67

TOTAL AREA - LANDUSE INPUTS	
Total Combined Impervious Area (ac)	12.55
Crypts - treated as pervious, bare soil (CN=77)	13.80
Oak- aspen, fair	56.85
Desert shrub, poor	46.92
Pervious development	27.23
TOTAL offsite pervious area:	103.77
Total Basin 5 Area (ac)	157.35

Ultimate (Ph 1-11) basin staged storage

Infiltration basin staged storage

Notes	Elev	Area, sf	Area, ac	Delta Vol, ac-ft	Cumulative Vol, ac-ft
Invert	266.0	11341	0.26	0.00	0.00
	267.0	13921	0.32	0.29	0.29
	268.0	16408	0.38	0.35	0.64
	269.0	18995	0.44	0.41	1.04
	270.0	21682	0.50	0.47	1.51
	271.0	24470	0.56	0.53	2.04
	272.0	27358	0.63	0.59	2.64
	273.0	30347	0.70	0.66	3.30
	274.0	33436	0.77	0.73	4.03
	275.0	36625	0.84	0.80	4.83
	276.0	40011	0.92	0.88	5.71
	277.0	43534	1.00	0.96	6.67
	278.0	47048	1.08	1.04	7.71
	279.0	50658	1.16	1.12	8.83
	280.0	54390	1.25	1.21	10.04
	281.0	58237	1.34	1.29	11.33
	282.0	62355	1.43	1.38	12.72
1ft freeboard	283.0	66750	1.53	1.48	14.20
Top	284.0	71452	1.64	1.59	15.79

Attachment 2
Exhibits

Figure 14.1 Ultimate Build-Out Condition Landuse Exhibit
Figure 14.2 Ultimate Build-Out Condition Hydrology Exhibit
Figure 14.3 Ultimate Build-Out Topographic Work Map – Area of Revision
Figure 14.4 Conceptual Basin Grading for Ultimate Build-Out (Phase 1-11)



LEGEND

- IMPERVIOUS WALKWAY, COLUMBARIA
- ROAD
- BUILDING
- CRYPTS, CREMAINS
- OAK WOODS
- DESERT SHRUB
- DEVELOPMENT LANDSCAPING/PERVIOUS
- PROPOSED WATERSHED BOUNDARY
- CEMETERY PROPERTY BOUNDARY

N

150 0 75 150 300

SCALE 1"= 150'

DGS GENERAL SERVICES

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS

CALIFORNIA CENTRAL COAST VETERANS CEMETERY PHASE 2

SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
TOM SCHANBERGER
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERV. DIV - PROJECT MGMT BRANCH
707 THIRD STREET, SUITE 3-305
WEST SACRAMENTO, CA 95605
OFFICE PHONE: (916) 320-0718
EMAIL: TOM.SCHANBERGER@DGS.CA.GOV

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DIVISION OF THE STATE ARCHITECT

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DATE _____

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APPROVED FIRE AND PANIC ONLY

REVIEWED BY: _____
FIRE AND LIFE SAFETY DIVISION- NORTH

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Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820

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LANDSCAPE ARCHITECTURE + PLANNING
225 Miller Avenue, Mill Valley, CA 94941
T 415 383 7900 F 415 383 1433 www.rhaa.com

REGISTERED PROFESSIONAL ENGINEER
CARL F. TAYLOR
No. 30924
CIVIL
STATE OF CALIFORNIA

FAI NO. CA-17-11

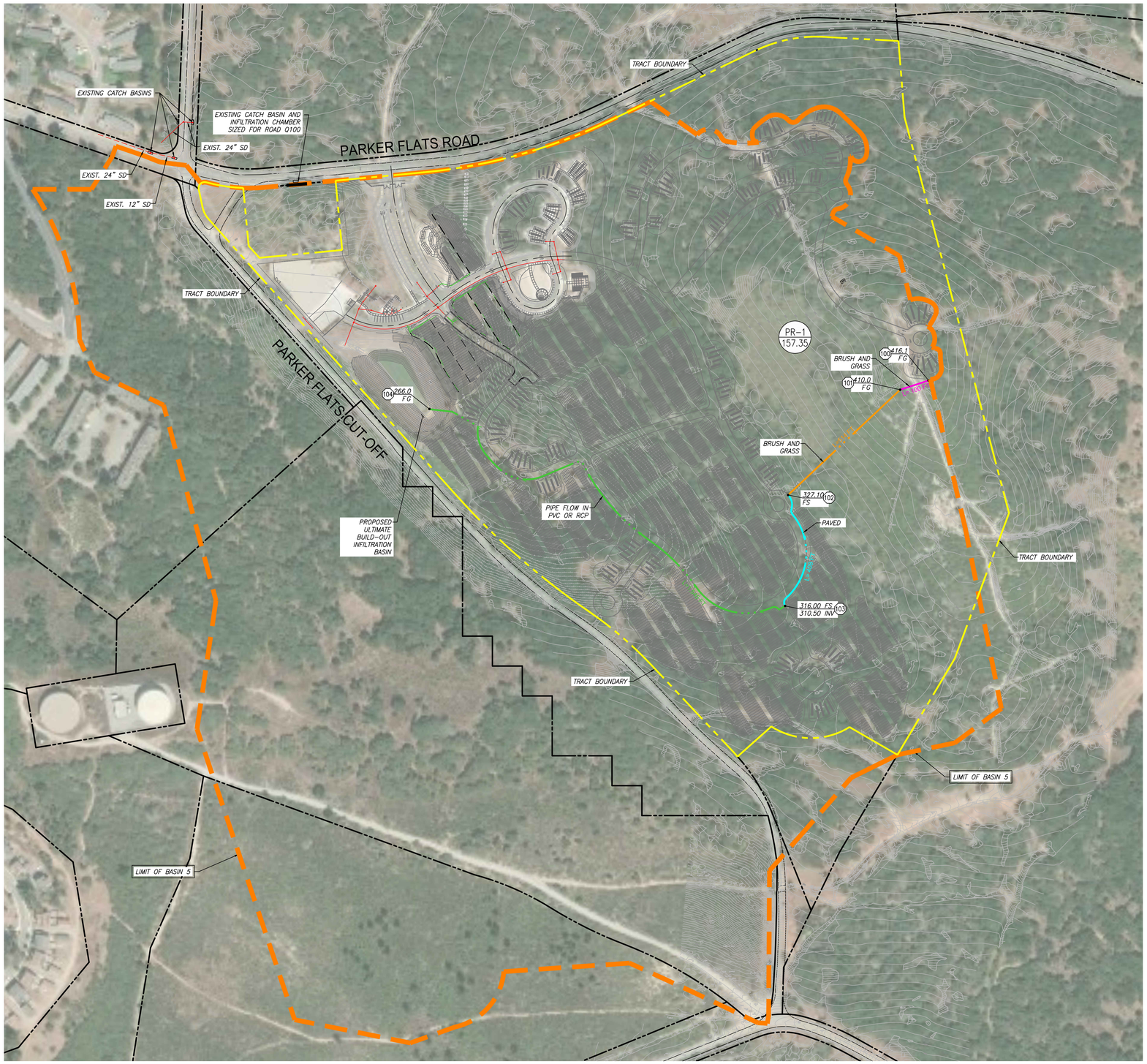
REVISIONS

SCHEMATIC DESIGN

FIGURE 14.1
ULTIMATE BUILD-OUT CONDITION LANDUSE EXHIBIT

PROJ. NO.	
SCALE	1" = 150'
DATE	JANUARY 03, 2019
DRAWN	

R:\J030029.02 - CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\Hydrology\Landuse ULT-buildout.dwg 2/18/2019 1:08 PM MTol, Jenny



LEGEND

- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- CEMETERY PROPERTY BOUNDARY
- OTHER PROPERTY BOUNDARY
- PROPOSED WATERSHED BOUNDARY

PROPOSED CONDITION FLOWPATHS

- SHEET FLOW
- CONCENTRATED FLOW
- CONCENTRATED CHANNEL FLOW
- PIPE FLOW
- SUBAREA DESTINATION – E-1
  SUBAREA ACREAGE – XX.XX
- HYDRAULIC NODES 100

N

150 0 75 150 300

SCALE 1"= 150'

DGS GENERAL SERVICES

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS

CALIFORNIA CENTRAL COAST VETERANS CEMETERY PHASE 2

SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
TOM SCHANBERGER
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERV. DIV - PROJECT MGMT BRANCH
707 THIRD STREET, SUITE 3-305
WEST SACRAMENTO, CA 95605
OFFICE PHONE: (916) 320-0718
EMAIL: TOM.SCHANBERGER@DGS.CA.GOV

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REGISTERED PROFESSIONAL ENGINEER
CARL F. TAYLOR
No. 70924
CIVIL
STATE OF CALIFORNIA

FAI NO. CA-17-11

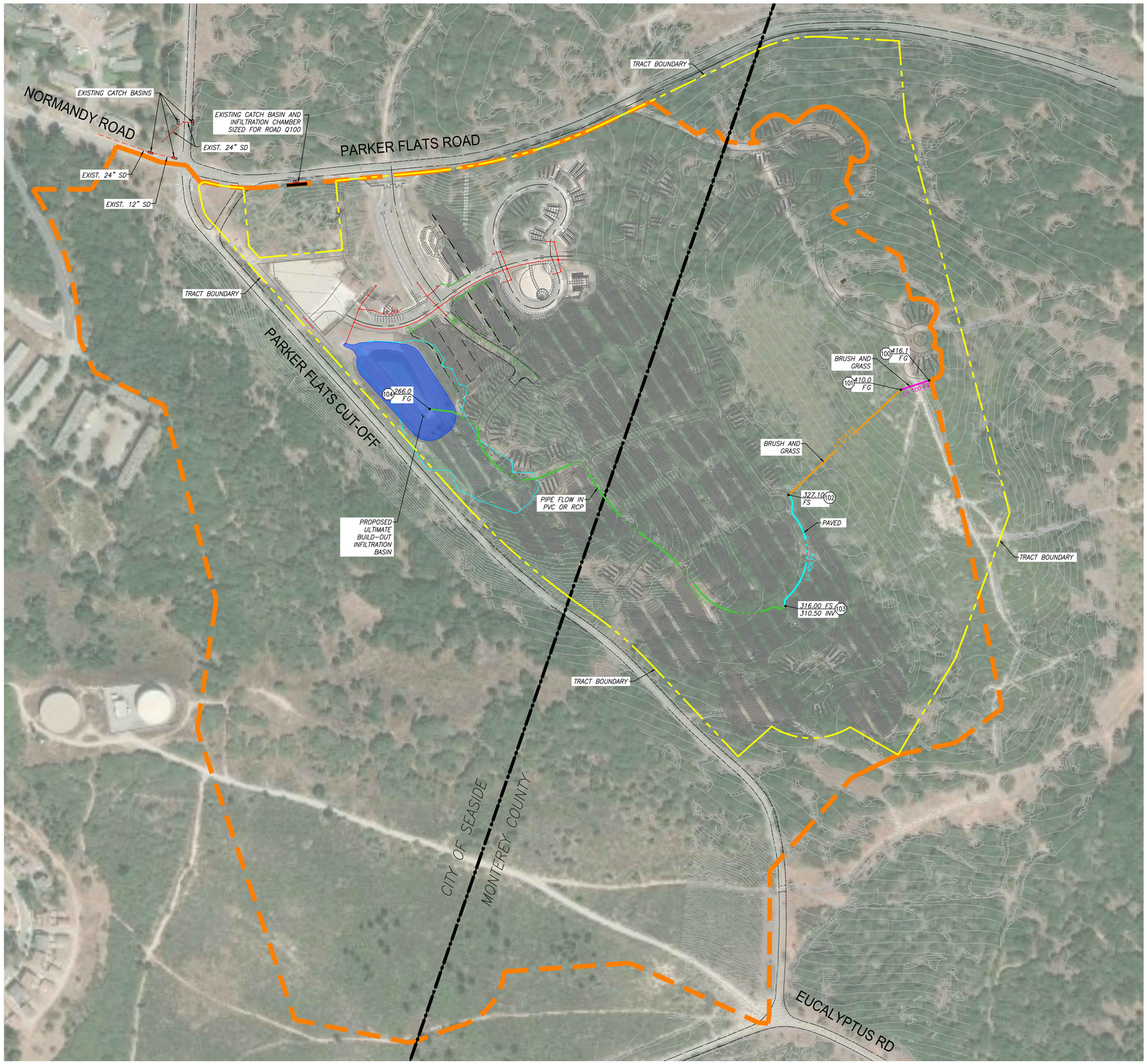
REVISIONS

SCHEMATIC DESIGN

FIGURE 14.2
ULTIMATE BUILD-OUT CONDITION HYDROLOGY EXHIBIT

PROJ. NO.
SCALE 1" = 150'
DATE JANUARY 03, 2019
DRAWN

R:\PJ005029.02 – CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\Hydrology\FEMA Exhibit-Ultimate Condition.dwg 2/18/2019 10:23 AM Mtds, Jenny



NOTES:
–VERITCAL DATUM: NAVD88
–HORIZONTAL DATUM: NAD83 CA STATE PLANE ZONE IV
–PROPOSED STORM DRAINS ALIGNMENTS FOR PHASES 3–11 WILL BE DETERMINED IN FINAL DESIGN.

DATA SOURCES:
–ESRI AERIAL
–EXISTING CONDITION TOPOGRAPHY BY AERIAL PHOTOMAPPING SERVICES PHOTOGRAPHED 7/27/2010 AND UPDATED MARCH 2014

LEGEND

- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- CEMETERY PROPERTY BOUNDARY
- PROPOSED WATERSHED BOUNDARY

PROPOSED CONDITION FLOWPATHS

- SHEET FLOW
- CONCENTRATED FLOW
- CONCENTRATED CHANNEL FLOW
- PIPE FLOW
- EFFECTIVE FLOOD ELEV (DFIRM #06053C0195H)
- PROPOSED FLOOD ELEV
- HYDRAULIC NODES (100)

N

150 0 75 150 300
SCALE 1"= 150'

DGS GENERAL SERVICES

STATE OF CALIFORNIA
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

DEPARTMENT OF VETERANS AFFAIRS
CALIFORNIA CENTRAL COAST VETERANS CEMETERY PHASE 2
SEASIDE, CALIFORNIA

PROJECT DIRECTOR:
TOM SCHANBERGER
DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERV. DIV - PROJECT MGMT BRANCH
707 THIRD STREET, SUITE 3-305
WEST SACRAMENTO, CA 95605
OFFICE PHONE: (916) 320-0718
EMAIL: TOM.SCHANBERGER@DGS.CA.GOV

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REGISTERED PROFESSIONAL ENGINEER
CARL F. TAYLOR
No. 30924
CIVIL
STATE OF CALIFORNIA

FAI NO. CA-17-11

REVISIONS

SCHEMATIC DESIGN

FIGURE 14.3
ULTIMATE BUILD-OUT TOPOGRAPHIC WORK MAP - AREA OF REVISION

PROJ. NO.
SCALE 1" = 150'
DATE JANUARY 03, 2019
DRAWN

R:\PJ005029.02 – CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\Hydrology\FEMA ULT Topo Workmap.dwg 2/18/2019 10:17 AM Mitzi, Jenny

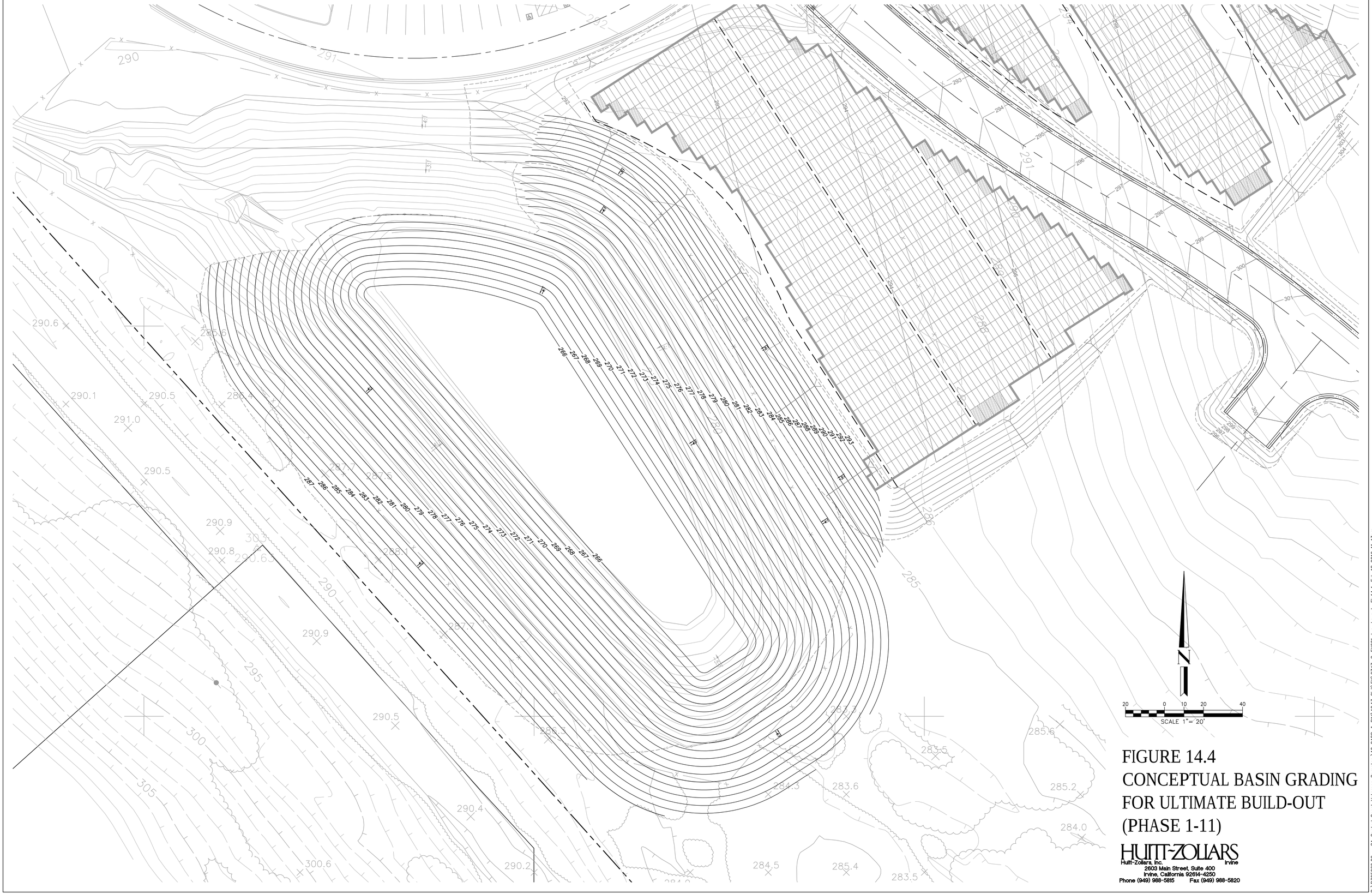


FIGURE 14.4
CONCEPTUAL BASIN GRADING
FOR ULTIMATE BUILD-OUT
(PHASE 1-11)

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Attachment 15

CLOMR Correspondence Memo

HUITT-ZOLLARS

HUITT-ZOLLARS, INC. • 2603 Main Street • Suite 400 • Irvine, CA 92614-4250 • 949.988.5815 phone • 949.988.5820 fax • huitt-zollars.com

Memorandum

DATE: February 1, 2019

TO: Tom Schanberger, Department of General Services

FROM: Carl Taylor, Huitt-Zollars

RE: Central Coast Veterans Cemetery CLOMR

HZ PROJECT NO.: R305029.02

We have prepared a drainage study/resolution plan and CLOMR application, as required by Task 1.4 of our contract. For reasons described below, we recommend that the CLOMR application not be submitted to FEMA. We request your review of our reasoning, and that you advise us of your concurrence with our recommendation, or your direction otherwise.

Huitt-Zollars has evaluated the existing basin on the California Central Coast Veterans Cemetery property for its ability to contain the 100-year flood volume for the proposed development and surrounding watershed. The existing basin was found insufficient to hold the existing 100-year volume, so the basin is proposed to be expanded as part of Phase 2 construction. The proposed expanded basin will contain the 100-year flood volume from Phase 1 and 2 and the tributary watershed, with a 100-year maximum water surface elevation of 283 feet. The existing LOMR established a base flood elevation of 286.1 feet. Therefore, the proposed development will cause a drop of 3 feet in the mapped FEMA floodplain on the property. This water surface elevation drop will benefit the project by allowing us to establish lower finished grades in the adjacent crypt burial section which can be more easily accessed from the adjacent roadways.

The current FEMA FIRM #06053C0195H shows the 100-year floodplain on the property as Zone AH. There is no designated floodway on the property. FEMA regulation 44 CFR 60.3(c) 10 and 13 state, and FEMA has confirmed through email correspondence that:

> "A CLOMR is only federally required for projects that are proposed to cause the base flood water-surface elevation (WSEL) to increase more than 1.00 foot in areas with specified BFEs but no designated floodway (44 CFR 60.3 (c) (10))."

Huitt-Zollars has demonstrated that the Phase 2 development will not raise the 100-year water surface elevation, so a CLOMR submittal to FEMA is therefore not required per their regulations. After construction of Phase 2, a FEMA Letter of Map Revision (LOMR) will be required to document the decrease in the mapped flood elevation on the FEMA FIRM.

Phase 2 of the Central Coast Veterans Cemetery is located within the city limits of Seaside. Huitt-Zollars contacted the City to request a review and was told that the City does not have jurisdiction over State projects. Huitt-Zollars then contacted the FEMA Region 9 office for California, the Monterey County Resource Management Agency, the California Department of Water Resources, and the Central Valley Flood Planning Office. All other agencies stated that

they do not have jurisdictional within city limits, and the County directed us back to the city. Huitt-Zollars called the City of Seaside again, and sent emails to request a review several more times. To date, the City has not responded to our calls or emails, so we recommend not continuing to pursue a review by the City.

Huitt-Zollars recommends not submitting the CLOMR application to FEMA. Huitt-Zollars will submit the final LOMR to FEMA after the project's construction. A record of conversations is included in Attachment 1. Emails are included in Attachment 2.

Please contact us if you have any questions and let us know if you concur with our recommendations.

Cc: Terry Ash, DGS

Jack Striegel, CalVet

Erin Harwayne, DDA

Megan Dale, RHAA

Attachment 1

Contact record for drainage review

Organization	Contact Name	Contact number	Type	Email	Date	Request/Response
City of Seaside	Scott Ottmar	831-899-6885	Email	SOttmar@ci.seaside.ca.us	1/22/2019	Request: Please review the drainage report. Response: The City of Seaside does not have jurisdictional oversight of properties owned by the State of California.
FEMA Region 9	Hornick, Michael	510-627-7260	Email	Michael.Hornick@fema.dhs.gov	1/25/2019	Request: Is there a division in the State that reviews flood assessments? Response: Provided contact names; he does not review drainage studies
FEMA Region 9	Frank Mansell	510-368-0877	Email	Frank.Mansell@fema.dhs.gov	1/25/2019	Request: Is there a division in the State that reviews flood assessments? Response: Provided contact names; he does not review drainage studies
Monterey County Public Works	Jennifer Bodensteiner	831-755-4970	Phone	-	1/28/2019	Request: Does Monterey County review drainage studies on State property within city limits? Response: Monterey County Resource Management Agency now handles drainage reviews.
Monterey County Resource Management Agency	called help line	831-755-5025	Phone	-	1/28/2019	Request: Does Monterey County review drainage studies on State property within city limits? Response: The County has no jurisdiction within city limits. We should contact the City of Seaside to review.
CA Dept of Water Resources	Raul Barba	916-574-1441	Phone	Raul.Barba@water.ca.gov	1/29/2019	Request: Is there a division in the State that reviews flood assessments? Response: Did no know of agency; agreed that City should review
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/28/2019	Request: Emailed City of Seaside requesting review Response: no response
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/29/2019	Request: Called and left message with City of Seaside requesting review Response: no response
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/30/2019	Request: Called and left message with City of Seaside requesting review Response: no response

Attachment 2: Email Correspondence

Mital, Jenny

From: FEMA Map Specialist (FMIX) <FEMAMapSpecialist@riskmapcds.com>
Sent: Thursday, January 24, 2019 8:45 AM
To: Mital, Jenny
Cc: Taylor, Carl
Subject: FMIX Inquiry #2606557 - [FMS] - CLOMR needed?

We are responding as a representative of the Department of Homeland Security, Federal Emergency Management Agency (FEMA), to your email message sent to FEMAMapSpecialist@riskmapcds.com.

A Conditional Letter of Map Revision (CLOMR) documents FEMA's assessment that a proposed project complies with the minimum criteria for National Flood Insurance Program (NFIP) floodplain management. It comments on proposed projects that will, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus modify the existing regulatory floodway, Base (1-percent-annual-chance) Flood Elevations (BFEs), or Special Flood Hazard Areas.

The NFIP regulations within Subchapter B of the Code of Federal Regulations (CFR) Title 44, do not require conditional approval for all projects in the base floodplain or in the regulatory floodway. A CLOMR is only federally required for projects that are proposed to cause the base flood water-surface elevation (WSEL) to increase more than 1.00 foot in areas with specified BFEs but no designated floodway (44 CFR 60.3 (c) (10)), or for projects anticipated to cause any base flood WSEL increase within a regulatory floodway (44 CFR 60.3 (d) (3)). However, if the State or community has adopted more restrictive or comprehensive floodplain management criteria, those take precedence over the NFIP requirements and can be enforced during the community's permitting review process.

Once a project has been completed, the community must request a revision to the Flood Insurance Rate Map to reflect the project. "As-built" certification and other data must be submitted to support the revision request. More information about CLOMRs is available on the FEMA website at https://www.fema.gov/national-flood-insurance-program-2/conditional-letter-map-revision.

One may apply for a CLOMR electronically using the Online LOMC tool at https://hazards.fema.gov/femaportal/onlinelomc/signin. Once initially registered to use the service, please select Create Revision Application to begin. Additional information about the online tool is available at https://www.fema.gov/online-lomc.

We hope this information has addressed the concerns raised in your email. If you need additional information or assistance, please reply to this message. You may also contact the FEMA Map Information eXchange (FMIX) by telephone, toll-free, at (877)336-2627, option 1, or by chat at http://www.floodmaps.fema.gov/fhm/fmx_main.html.

------ Original Message ------
From: "Mital, Jenny"
Received: 1/23/2019 12:42 PM (Eastern Standard Time)
To: "Fema Map Specialist"
CC: "Taylor, Carl"
Subject: [FMS] - CLOMR needed?

Hello,

I am trying to determine if a CLOMR is needed for a project. The project affects a current Zone AH designation that has a BFE but no floodway or coastal hazard area, so it falls under 60.3c).

The following are requirements under §60.3c):

(c) When the Federal Insurance Administrator has provided a notice of final flood elevations for one or more special flood hazard areas on the community's FIRM and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community's FIRM, but has not identified a regulatory floodway or coastal high hazard area, the community shall:

(10) Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
(13) Notwithstanding any other provisions of §60.3, a community may approve certain development in Zones Al-30, AE, and AH, on the community's FIRM which increase the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision, fulfills the requirements for such a revision as established under the provisions of §65.12, and receives the approval of the Federal Insurance Administrator.

I read this as saying that:

· Development CAN occur in the floodplain IF it does not increase the water surface elevation, in which case the local floodplain manager will have to approve the development and hydrology model.
· IF the water surface elevation is increased by more than 1 ft, a FEMA CLOMR is required.

Is this the correct interpretation? If my project causes a decrease in the BFE and is approved by the local floodplain manager, would only a post-construction LOMR be required?

Thank you for your help!

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

2603 Main Street | Suite 400 | Irvine CA 92614-4250
949.988.5815

jmital@Huitt-Zollars.com
www.huitt-zollars.com

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Mital, Jenny

From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Thursday, January 24, 2019 11:18 AM
To: Mital, Jenny; Rick Riedl
Cc: Taylor, Carl
Subject: Re: CLOMR review - CalVet Cemetery Parker Flats Road Seaside
Attachments: ATT00001; Scott Ottmar.vcf

Ms. Mital
I received your phone message this morning. City of Seaside does not have jurisdictional oversight of properties owned by the State of California. Please review with your contacts with the State to determine how to proceed. Thank you.

Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside
831-899-6885 (office)
831-899-6311 (fax)

Office Hours: Monday - Friday 8:00 am to 5:00 pm



Please consider the environment before printing
and remember to print double-sided whenever possible.
> > >

From: "Mital, Jenny" <jmital@Huitt-Zollars.com>
To: "'SOttmar@ci.seaside.ca.us'" <SOttmar@ci.seaside.ca.us>, "'RRiedl@ci.seaside.ca.us'" <RRiedl@ci.seaside.ca.us>
CC: "Taylor, Carl" <Ctaylor@Huitt-Zollars.com>
Date: 1/22/2019 10:43 AM
Subject: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Good morning Scott and Rick,

I am working on a CLOMR for the Phase 2 expansion of the California Central Coast Veteran's Cemetery Project on Parker Flats Road in former Fort Ord. The owner is CalVet (state of California). The CLOMR is required because the Phase 2 expansion will require development within the existing flood storage area, and the existing on-site retention/infiltration basin will be expanded to hold the 100-year flood volume for the Phase 2 expansion in the watershed. The basin infiltrates the entire volume, so there is no offsite runoff, and no other property owners are affected.

We are looking to submit to FEMA for review as soon as possible and need the City to sign off on the CLOMR application first. What can we do to make the review as easy as possible for you?

Questions:

- What are submittal requirements? (Number of hard copies, electronic submittal, data CD, etc)
- Is there a submittal fee? Can the fee be waived since this is a public (state) project?
- What is approximate turnaround time for your review?

Thank you! Please give us a call.

- Jenny Mital

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

HUITT-ZOLLARS
2603 Main Street | Suite 400 | Irvine CA 92614-4250
949.988.5815
jmital@Huitt-Zollars.com
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Mital, Jenny

From: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:16 PM
To: Mital, Jenny
Cc: Hornick, Michael; Barba, Raul@DWR
Subject: RE: FEMA process for State of CA projects
Attachments: 44CFR 02.pdf

Hello Jenny,
Attached, as promised is a pdf (searchable) copy of the code of Federal Regulations (44CFR). It references the National Flood insurance Program and floodplain mapping. Part 70 is related to floodplain mapping.

I am also copying a representative from the CA Dept of Water Resources, Raul Barba.

I'll reach out after I have additional information.

Respectfully
Frank Mansell
510-368-0877

From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 11:34 AM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: FEMA process for State of CA projects

Hi Frank,

I am a civil engineering consultant working on a floodplain assessment for a State project on property owned by the State of California. What is the review process for State projects located on State property? The piece of state property is technically within the City of Seaside, but the city has said that they don't have jurisdiction to review state projects. Is there a division in the State that reviews flood assessments?

Our analysis showed that the proposed development would decrease the elevation of the mapped floodplain on the site, and there is no designated floodway. The project will not create any outflow to other properties. This combination means that a CLOMR is not required to be submitted to FEMA, but we need to determine the proper local authority to review it.

Thanks for your help! Please call me back at the number below, or call Carl Taylor (cc'd) at (949) 988-5815 ex11116 if I am unavailable. I will try to call you back this afternoon – your voicemail is full.

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

HUITT-ZOLLARS

Mital, Jenny

From: Mital, Jenny
Sent: Monday, January 28, 2019 9:36 AM
To: 'Hornick, Michael'
Subject: RE: FEMA process for State of CA projects

Thanks Michael! I'll reach out to Jennifer.

From: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Sent: Monday, January 28, 2019 9:23 AM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Subject: RE: FEMA process for State of CA projects



Jennifer may be able to assist, in as much as relating how the county handles state sponsored projects. Frank Mansell mentioned that the BFE may be lowered, and if that's the case, mapping or zone boundaries may change, which would require a LOMR to reflect changes. Zone delineation may have the effect of removing parcels, or of lowering flood insurance premiums.

Michael Hornick
FEMA RIX.Mitigation.Risk Analysis
Building Science|EQ Program|NFIP
1111 Oakland, CA 94607
510.627.7260 (o)
510.207.8013 (c)



From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 3:52 PM
To: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Subject: RE: FEMA process for State of CA projects

Hi Michael,

I've reached out to Raul and awaiting a response, but getting the names of the Monterey County staff that have previously handled State agency projects would be helpful.

Thank you for your help!

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

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From: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:31 PM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Subject: RE: FEMA process for State of CA projects

Hi Jenny, your concerns were copied to me. I'm the FEMA RIX Flood Planner that works directly with Monterey Co and communities, and can probably assist. Raul Barba, CA DWR, may have a sufficient response for you. If not, please contact me, and I'll direct you to Monterey Co staff that have worked these issues previously with CALTRANS, and other state agencies.

Michael Hornick
FEMA RIX.Mitigation.Risk Analysis
Building Science|EQ Program|NFIP
1111 Oakland, CA 94607
510.627.7260 (o)
510.207.8013 (c)



From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 3:20 PM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Hornick, Michael <Michael.Hornick@fema.dhs.gov>; 'Barba, Raul@DWR' <Raul.Barba@water.ca.gov>
Subject: RE: FEMA process for State of CA projects

Thank you, Frank! We really appreciate your help.

Jenny Mital, PE
Civil Engineer

949-988-5815 ex. 11136

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From: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:16 PM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Cc: Hornick, Michael <Michael.Hornick@fema.dhs.gov>; Barba, Raul@DWR <Raul.Barba@water.ca.gov>
Subject: RE: FEMA process for State of CA projects

Hello Jenny,
Attached, as promised is a pdf (searchable) copy of the code of Federal Regulations (44CFR). It references the National Flood insurance Program and floodplain mapping. Part 70 is related to floodplain mapping.

I am also copying a representative from the CA Dept of Water Resources, Raul Barba.

I'll reach out after I have additional information.

Respectfully
Frank Mansell
510-368-0877

From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 11:34 AM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: FEMA process for State of CA projects

Hi Frank,

I am a civil engineering consultant working on a floodplain assessment for a State project on property owned by the State of California. What is the review process for State projects located on State property? The piece of state property is technically within the City of Seaside, but the city has said that they don't have jurisdiction to review state projects. Is there a division in the State that reviews flood assessments?

Our analysis showed that the proposed development would decrease the elevation of the mapped floodplain on the site, and there is no designated floodway. The project will not create any outflow to other properties. This combination means that a CLOMR is not required to be submitted to FEMA, but we need to determine the proper local authority to review it.

Thanks for your help! Please call me back at the number below, or call Carl Taylor (cc'd) at (949) 988-5815 ex11116 if I am unavailable. I will try to call you back this afternoon – your voicemail is full.

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

Mital, Jenny

From: Taylor, Carl
Sent: Monday, January 28, 2019 3:35 PM
To: 'RRiedl@ci.seaside.ca.us'
Cc: 'SOttmar@ci.seaside.ca.us'; Mital, Jenny
Subject: Calif Central Coast Veterans Cemetery, Former Fort Ord, Seaside - LOMR

Importance: High

Hello Mr. Riedl,

I just called and left you a voice message about this.

We are civil engineers working for California Dept. of General Services/Cal Vet on the Phase 2 expansion of their Central Coast Veterans Cemetery. Our work includes preparation of a LOMR for FEMA approval after the completion of construction, since we will be developing in the currently mapped Flood Zone AH on the property.

We have prepared a drainage study for Phase 2, and have determined that by enlarging the existing infiltration basin we will lower the mapped flood elevation with the proposed construction. The FEMA regulations state, and FEMA confirmed that, since we are not proposing to raise the flood elevation, submittal of a CLOMR to FEMA is not necessary unless required by the flood plain manager. FEMA told us your city is the local flood plain manager. When we asked Scott Ottmar about this, he sent us the reply shown below. We then contacted Monterey County who said that they have no jurisdiction inside city limits, and they directed us to contact your city who they said is the local flood plain manager.

Please let us know if you will review the drainage study, and confirm that the City will not require submittal of a CLOMR to FEMA.

Thank you for your assistance, and please contact us if you have any questions.

Carl

Carl F. Taylor, PE, LEED AP
Vice President
HUITT-ZOLLARS, INC.
2603 Main Street, Suite 400
Irvine, CA 92614
949-988-5815 ext 11116 office
949-463-7400 mobile
www.huitt-zollars.com
NAICS Codes 541310, 541320, 541330, 541370

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From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Thursday, January 24, 2019 11:18 AM
To: Mital, Jenny <jmital@Huitt-Zollars.com>; Rick Riedl < >
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: Re: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Ms. Mital
I received your phone message this morning. City of Seaside does not have jurisdictional oversight of properties owned by the State of California. Please review with your contacts with the State to determine how to proceed. Thank you.

Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside
831-899-6885 (office)
831-899-6311 (fax)

Office Hours: Monday - Friday 8:00 am to 5:00 pm



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and remember to print double-sided whenever possible.
> > >

From: "Mital, Jenny" <jmital@Huitt-Zollars.com>
To: "'SOttmar@ci.seaside.ca.us'" <SOttmar@ci.seaside.ca.us>, "'RRiedl@ci.seaside.ca.us'" <RRiedl@ci.seaside.ca.us>
CC: "Taylor, Carl" <Ctaylor@Huitt-Zollars.com>
Date: 1/22/2019 10:43 AM
Subject: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Good morning Scott and Rick,

I am working on a CLOMR for the Phase 2 expansion of the California Central Coast Veteran's Cemetery Project on Parker Flats Road in former Fort Ord. The owner is CalVet (state of California). The CLOMR is required because the Phase 2 expansion will require development within the existing flood storage area, and the existing on-site retention/infiltration basin will be expanded to hold the 100-year flood volume for the Phase 2 expansion in the watershed. The basin infiltrates the entire volume, so there is no offsite runoff, and no other property owners are affected.

We are looking to submit to FEMA for review as soon as possible and need the City to sign off on the CLOMR application first. What can we do to make the review as easy as possible for you?

Questions:

- What are submittal requirements? (Number of hard copies, electronic submittal, data CD, etc)
- Is there a submittal fee? Can the fee be waived since this is a public (state) project?
- What is approximate turnaround time for your review?

Thank you! Please give us a call.

- Jenny Mital

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

HUITT-ZOLLARS
2603 Main Street | Suite 400 | Irvine CA 92614-4250
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jmital@Huitt-Zollars.com
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Memorandum

DATE: January 28, 2019

TO: Tom Schanberger, Department of General Services

FROM: Carl Taylor, Huitt-Zollars

RE: Drainage Basin Design

HZ PROJECT NO.: R305029.02

In compliance with our scope of work, Huitt-Zollars has evaluated the existing basin on the California Central Coast Veterans Cemetery property for its ability to contain the 100-year flood volume for the proposed development and surrounding watershed. The existing basin was constructed as an earth borrow site for Phase 1 and was not designed as a flood control basin for any specific event (Drainage Report for California Central Coast Veterans Cemetery – Phase 1 by Wood Rodgers, Inc. 2014). The previous flood control study for the 2014 LOMR and FEMA FIRM #06053C0195G, which was reviewed, used the following criteria:

- The model considered the existing condition of the watershed with an assumption of 1% impervious area, prior to the construction of any phases of the development. Full built-out condition was not modeled.
- The existing borrow site/basin was not considered in the analysis.
- The 72-hr storm rainfall distribution used in the report is no longer the standard for Monterey County.
- The soil loss rates used in the model were much higher than the recommended range by the technical manual for the modeling program, HEC-HMS. This could cause the calculated flood volume to be too low.
- The model was not calibrated against measured data, which is typically required for models submitted to FEMA to validate the study results.

Huitt-Zollars modeled the existing condition, in which Phase 1 is existing (2.9% total impervious area); the proposed condition, in which Phase 2 is constructed (3.0% total impervious area); and the proposed ultimate build-out condition (8.0% total impervious area), in which all future phases (1-11) are constructed. Current County and FEMA hydrology criteria were used to obtain the results in Table 1.

Table 1. 100-year storm analysis results

Model	Flood volume, ac-ft
Existing - Phase 1 constructed	10.7
Proposed - Phase 1-2 constructed	10.7*
Ultimate - Phase 1-11 constructed	14.0
2014 LOMR and FIRM #06053C0195G - no phases constructed	4.9

*Note: Phase 2 adds little impervious area, so very little additional runoff is produced.

The existing LOMR established a flood elevation at an elevation of 286.1 feet. For schematic design, we established the lowest finished grade elevation for Burial Section 3 to be Elevation 294 so that the crypt subdrains, which will be at 8 feet below finished grade (elevation 286), would freely outlet above the flood water surface. However, for improved access, and to reduce soil import requirements, we proposed to lower Burial Section 3 by 2 feet (lowest finished grade elevation 292 feet and subdrain outlet at elevation 284). We therefore propose that the flood storage basin be designed for a 100-year maximum water surface elevation of 283 feet, which will allow for 1-foot of freeboard between the subdrain outlet and the flood water surface elevation.

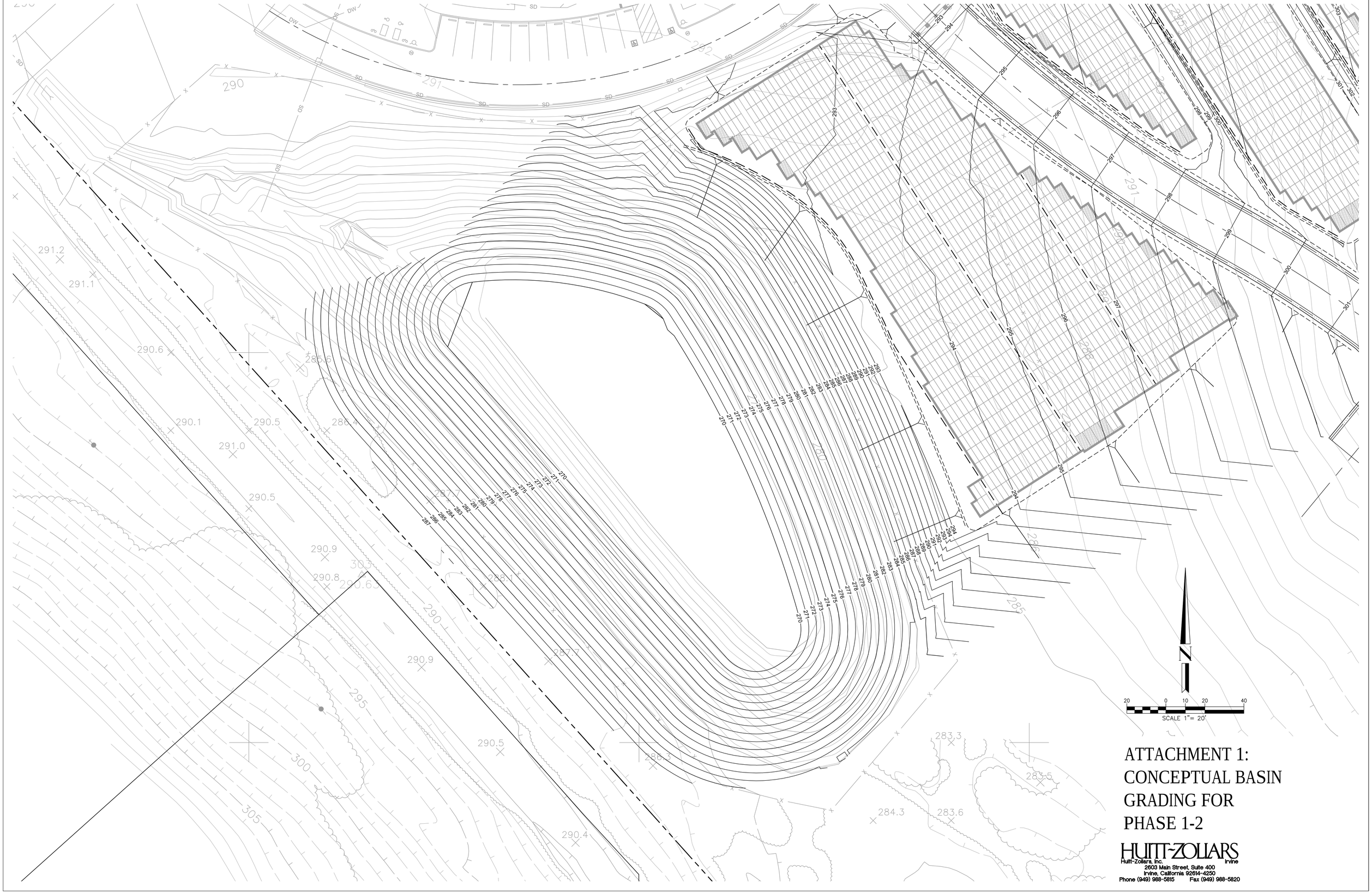
The existing basin has a capacity of 7.2 ac-ft at the water surface elevation of 283, which is less than what is required for the existing condition. Due to budgetary constraints, CalVet has instructed Huitt-Zollars on January 17, 2019 to enlarge the basin for Phase 2 only - not for ultimate build-out of the cemetery. The conceptual basin grading for Phase 2 is shown in Attachment 1. This grading will be refined as our 50% Design Development Plans are prepared. The basin will need to be enlarged again in the future to contain the flood volume produced by the addition of impervious surfaces in later phases, and another CLOMR/LOMR will have to be submitted to document the change in the 100-year floodplain. Basin grading which could accommodate ultimate build-out is shown in Attachment 2.

Please contact us if you have any questions.

Cc: Jack Striegel, CalVet

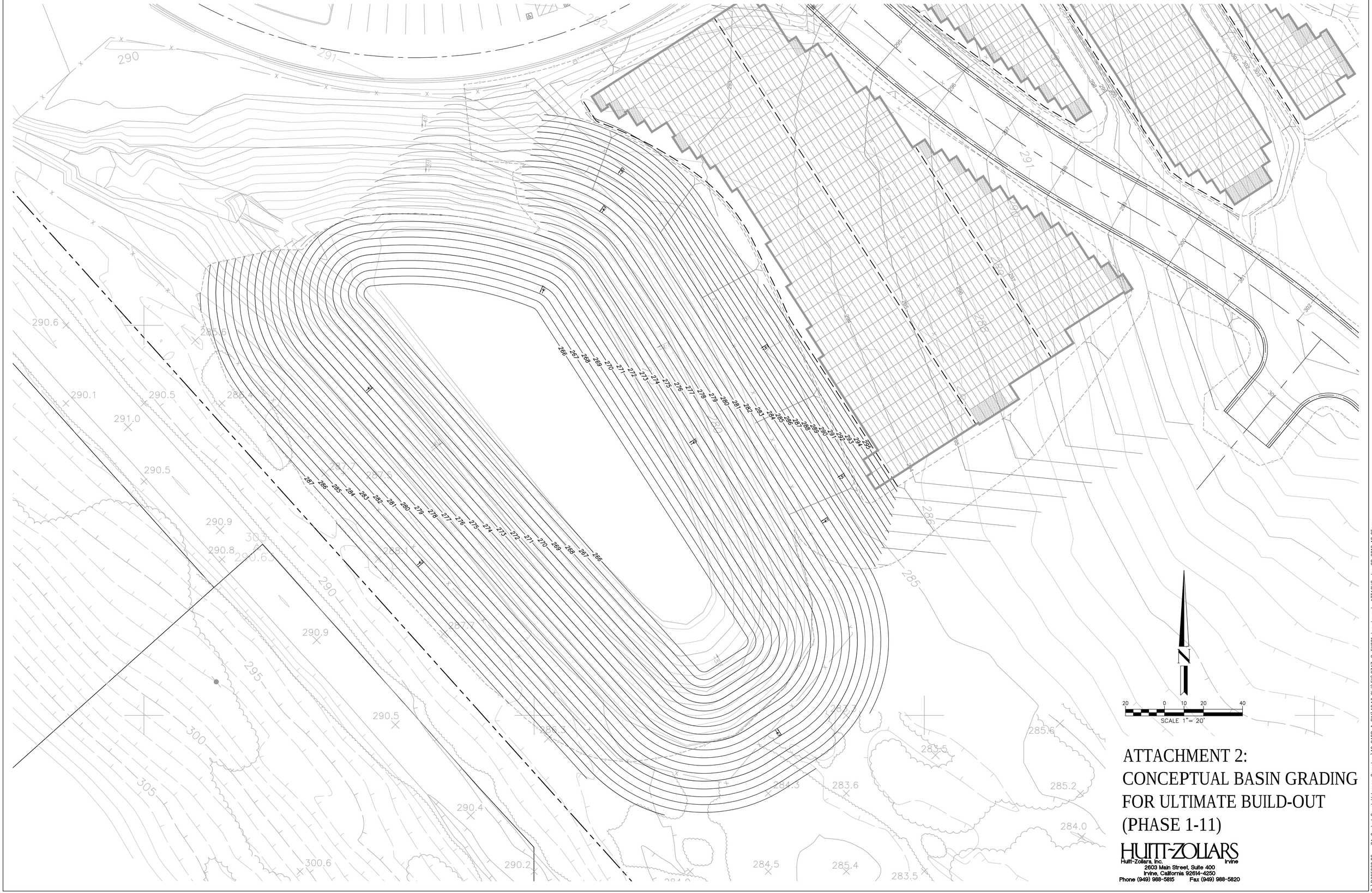
Erin Harwayne, DDA

Megan Dale, RHAA



ATTACHMENT 1: CONCEPTUAL BASIN GRADING FOR PHASE 1-2

HUITT-ZOLLARS
Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820



ATTACHMENT 2:
CONCEPTUAL BASIN GRADING FOR ULTIMATE BUILD-OUT (PHASE 1-11)

HUITT-ZOLLARS
Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820

R:\R3050229.02 - CA Central Coast Veterans Cemetery\10 CADD & BIM\10.13 Civil\EX\2747-C-EX001.dwg, Layout: ATTACH2, Jan 28 2019 10:25am

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Memorandum

DATE: February 1, 2019

TO: Tom Schanberger, Department of General Services

FROM: Carl Taylor, Huitt-Zollars

RE: Central Coast Veterans Cemetery CLOMR

HZ PROJECT NO.: R305029.02

We have prepared a drainage study/resolution plan and CLOMR application, as required by Task 1.4 of our contract. For reasons described below, we recommend that the CLOMR application not be submitted to FEMA. We request your review of our reasoning, and that you advise us of your concurrence with our recommendation, or your direction otherwise.

Huitt-Zollars has evaluated the existing basin on the California Central Coast Veterans Cemetery property for its ability to contain the 100-year flood volume for the proposed development and surrounding watershed. The existing basin was found insufficient to hold the existing 100-year volume, so the basin is proposed to be expanded as part of Phase 2 construction. The proposed expanded basin will contain the 100-year flood volume from Phase 1 and 2 and the tributary watershed, with a 100-year maximum water surface elevation of 283 feet. The existing LOMR established a base flood elevation of 286.1 feet. Therefore, the proposed development will cause a drop of 3 feet in the mapped FEMA floodplain on the property. This water surface elevation drop will benefit the project by allowing us to establish lower finished grades in the adjacent crypt burial section which can be more easily accessed from the adjacent roadways.

The current FEMA FIRM #06053C0195H shows the 100-year floodplain on the property as Zone AH. There is no designated floodway on the property. FEMA regulation 44 CFR 60.3(c) 10 and 13 state, and FEMA has confirmed through email correspondence that:

> "A CLOMR is only federally required for projects that are proposed to cause the base flood water-surface elevation (WSEL) to increase more than 1.00 foot in areas with specified BFEs but no designated floodway (44 CFR 60.3 (c) (10))."

Huitt-Zollars has demonstrated that the Phase 2 development will not raise the 100-year water surface elevation, so a CLOMR submittal to FEMA is therefore not required per their regulations. After construction of Phase 2, a FEMA Letter of Map Revision (LOMR) will be required to document the decrease in the mapped flood elevation on the FEMA FIRM.

Phase 2 of the Central Coast Veterans Cemetery is located within the city limits of Seaside. Huitt-Zollars contacted the City to request a review and was told that the City does not have jurisdiction over State projects. Huitt-Zollars then contacted the FEMA Region 9 office for California, the Monterey County Resource Management Agency, the California Department of Water Resources, and the Central Valley Flood Planning Office. All other agencies stated that

they do not have jurisdictional within city limits, and the County directed us back to the city. Huitt-Zollars called the City of Seaside again, and sent emails to request a review several more times. To date, the City has not responded to our calls or emails, so we recommend not continuing to pursue a review by the City.

Huitt-Zollars recommends not submitting the CLOMR application to FEMA. Huitt-Zollars will submit the final LOMR to FEMA after the project's construction. A record of conversations is included in Attachment 1. Emails are included in Attachment 2.

Please contact us if you have any questions and let us know if you concur with our recommendations.

Cc: Terry Ash, DGS

Jack Striegel, CalVet

Erin Harwayne, DDA

Megan Dale, RHAA

Attachment 1

Contact record for drainage review

Organization	Contact Name	Contact number	Type	Email	Date	Request/Response
City of Seaside	Scott Ottmar	831-899-6885	Email	SOttmar@ci.seaside.ca.us	1/22/2019	Request: Please review the drainage report. Response: The City of Seaside does not have jurisdictional oversight of properties owned by the State of California.
FEMA Region 9	Hornick, Michael	510-627-7260	Email	Michael.Hornick@fema.dhs.gov	1/25/2019	Request: Is there a division in the State that reviews flood assessments? Response: Provided contact names; he does not review drainage studies
FEMA Region 9	Frank Mansell	510-368-0877	Email	Frank.Mansell@fema.dhs.gov	1/25/2019	Request: Is there a division in the State that reviews flood assessments? Response: Provided contact names; he does not review drainage studies
Monterey County Public Works	Jennifer Bodensteiner	831-755-4970	Phone	-	1/28/2019	Request: Does Monterey County review drainage studies on State property within city limits? Response: Monterey County Resource Management Agency now handles drainage reviews.
Monterey County Resource Management Agency	called help line	831-755-5025	Phone	-	1/28/2019	Request: Does Monterey County review drainage studies on State property within city limits? Response: The County has no jurisdiction within city limits. We should contact the City of Seaside to review.
CA Dept of Water Resources	Raul Barba	916-574-1441	Phone	Raul.Barba@water.ca.gov	1/29/2019	Request: Is there a division in the State that reviews flood assessments? Response: Did no know of agency; agreed that City should review
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/28/2019	Request: Emailed City of Seaside requesting review Response: no response
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/29/2019	Request: Called and left message with City of Seaside requesting review Response: no response
City of Seaside	Rick Rield, chief engineer	831-899-6884	Phone	RRiedl@ci.seaside.ca.us	1/30/2019	Request: Called and left message with City of Seaside requesting review Response: no response

Attachment 2: Email Correspondence

Mital, Jenny

From: FEMA Map Specialist (FMIX) <FEMAMapSpecialist@riskmapcds.com>
Sent: Thursday, January 24, 2019 8:45 AM
To: Mital, Jenny
Cc: Taylor, Carl
Subject: FMIX Inquiry #2606557 - [FMS] - CLOMR needed?

We are responding as a representative of the Department of Homeland Security, Federal Emergency Management Agency (FEMA), to your email message sent to FEMAMapSpecialist@riskmapcds.com.

A Conditional Letter of Map Revision (CLOMR) documents FEMA's assessment that a proposed project complies with the minimum criteria for National Flood Insurance Program (NFIP) floodplain management. It comments on proposed projects that will, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus modify the existing regulatory floodway, Base (1-percent-annual-chance) Flood Elevations (BFEs), or Special Flood Hazard Areas.

The NFIP regulations within Subchapter B of the Code of Federal Regulations (CFR) Title 44, do not require conditional approval for all projects in the base floodplain or in the regulatory floodway. A CLOMR is only federally required for projects that are proposed to cause the base flood water-surface elevation (WSEL) to increase more than 1.00 foot in areas with specified BFEs but no designated floodway (44 CFR 60.3 (c) (10)), or for projects anticipated to cause any base flood WSEL increase within a regulatory floodway (44 CFR 60.3 (d) (3)). However, if the State or community has adopted more restrictive or comprehensive floodplain management criteria, those take precedence over the NFIP requirements and can be enforced during the community's permitting review process.

Once a project has been completed, the community must request a revision to the Flood Insurance Rate Map to reflect the project. "As-built" certification and other data must be submitted to support the revision request. More information about CLOMRs is available on the FEMA website at https://www.fema.gov/national-flood-insurance-program-2/conditional-letter-map-revision.

One may apply for a CLOMR electronically using the Online LOMC tool at https://hazards.fema.gov/femaportal/onlinelomc/signin. Once initially registered to use the service, please select Create Revision Application to begin. Additional information about the online tool is available at https://www.fema.gov/online-lomc.

We hope this information has addressed the concerns raised in your email. If you need additional information or assistance, please reply to this message. You may also contact the FEMA Map Information eXchange (FMIX) by telephone, toll-free, at (877)336-2627, option 1, or by chat at http://www.floodmaps.fema.gov/fhm/fmx_main.html.

------ Original Message ------
From: "Mital, Jenny"
Received: 1/23/2019 12:42 PM (Eastern Standard Time)
To: "Fema Map Specialist"
CC: "Taylor, Carl"
Subject: [FMS] - CLOMR needed?

Hello,

I am trying to determine if a CLOMR is needed for a project. The project affects a current Zone AH designation that has a BFE but no floodway or coastal hazard area, so it falls under 60.3c).

The following are requirements under §60.3c):

(c) When the Federal Insurance Administrator has provided a notice of final flood elevations for one or more special flood hazard areas on the community's FIRM and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community's FIRM, but has not identified a regulatory floodway or coastal high hazard area, the community shall:

(10) Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
(13) Notwithstanding any other provisions of §60.3, a community may approve certain development in Zones Al-30, AE, and AH, on the community's FIRM which increase the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision, fulfills the requirements for such a revision as established under the provisions of §65.12, and receives the approval of the Federal Insurance Administrator.

I read this as saying that:

· Development CAN occur in the floodplain IF it does not increase the water surface elevation, in which case the local floodplain manager will have to approve the development and hydrology model.
· IF the water surface elevation is increased by more than 1 ft, a FEMA CLOMR is required.

Is this the correct interpretation? If my project causes a decrease in the BFE and is approved by the local floodplain manager, would only a post-construction LOMR be required?

Thank you for your help!

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

2603 Main Street | Suite 400 | Irvine CA 92614-4250
949.988.5815

jmital@Huitt-Zollars.com
www.huitt-zollars.com

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Mital, Jenny

From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Thursday, January 24, 2019 11:18 AM
To: Mital, Jenny; Rick Riedl
Cc: Taylor, Carl
Subject: Re: CLOMR review - CalVet Cemetery Parker Flats Road Seaside
Attachments: ATT00001; Scott Ottmar.vcf

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Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside
831-899-6885 (office)
831-899-6311 (fax)

Office Hours: Monday - Friday 8:00 am to 5:00 pm



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From: "Mital, Jenny" <jmital@Huitt-Zollars.com>
To: "'SOttmar@ci.seaside.ca.us'" <SOttmar@ci.seaside.ca.us>, "'RRiedl@ci.seaside.ca.us'" <RRiedl@ci.seaside.ca.us>
CC: "Taylor, Carl" <Ctaylor@Huitt-Zollars.com>
Date: 1/22/2019 10:43 AM
Subject: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Good morning Scott and Rick,

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- What is approximate turnaround time for your review?

Thank you! Please give us a call.

- Jenny Mital

Jenny Mital, PE
Civil Engineer
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Mital, Jenny

From: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:16 PM
To: Mital, Jenny
Cc: Hornick, Michael; Barba, Raul@DWR
Subject: RE: FEMA process for State of CA projects
Attachments: 44CFR 02.pdf

Hello Jenny,
Attached, as promised is a pdf (searchable) copy of the code of Federal Regulations (44CFR). It references the National Flood insurance Program and floodplain mapping. Part 70 is related to floodplain mapping.

I am also copying a representative from the CA Dept of Water Resources, Raul Barba.

I'll reach out after I have additional information.

Respectfully
Frank Mansell
510-368-0877

From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 11:34 AM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: FEMA process for State of CA projects

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Thanks for your help! Please call me back at the number below, or call Carl Taylor (cc'd) at (949) 988-5815 ex11116 if I am unavailable. I will try to call you back this afternoon – your voicemail is full.

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

HUITT-ZOLLARS

Mital, Jenny

From: Mital, Jenny
Sent: Monday, January 28, 2019 9:36 AM
To: 'Hornick, Michael'
Subject: RE: FEMA process for State of CA projects

Thanks Michael! I'll reach out to Jennifer.

From: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Sent: Monday, January 28, 2019 9:23 AM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Subject: RE: FEMA process for State of CA projects



Jennifer may be able to assist, in as much as relating how the county handles state sponsored projects. Frank Mansell mentioned that the BFE may be lowered, and if that's the case, mapping or zone boundaries may change, which would require a LOMR to reflect changes. Zone delineation may have the effect of removing parcels, or of lowering flood insurance premiums.

Michael Hornick
FEMA RIX.Mitigation.Risk Analysis
Building Science|EQ Program|NFIP
1111 Oakland, CA 94607
510.627.7260 (o)
510.207.8013 (c)



From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 3:52 PM
To: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Subject: RE: FEMA process for State of CA projects

Hi Michael,

I've reached out to Raul and awaiting a response, but getting the names of the Monterey County staff that have previously handled State agency projects would be helpful.

Thank you for your help!

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

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From: Hornick, Michael <Michael.Hornick@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:31 PM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Subject: RE: FEMA process for State of CA projects

Hi Jenny, your concerns were copied to me. I'm the FEMA RIX Flood Planner that works directly with Monterey Co and communities, and can probably assist. Raul Barba, CA DWR, may have a sufficient response for you. If not, please contact me, and I'll direct you to Monterey Co staff that have worked these issues previously with CALTRANS, and other state agencies.

Michael Hornick
FEMA RIX.Mitigation.Risk Analysis
Building Science|EQ Program|NFIP
1111 Oakland, CA 94607
510.627.7260 (o)
510.207.8013 (c)



From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 3:20 PM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Hornick, Michael <Michael.Hornick@fema.dhs.gov>; 'Barba, Raul@DWR' <Raul.Barba@water.ca.gov>
Subject: RE: FEMA process for State of CA projects

Thank you, Frank! We really appreciate your help.

Jenny Mital, PE
Civil Engineer

949-988-5815 ex. 11136

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From: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Sent: Friday, January 25, 2019 3:16 PM
To: Mital, Jenny <jmital@Huitt-Zollars.com>
Cc: Hornick, Michael <Michael.Hornick@fema.dhs.gov>; Barba, Raul@DWR <Raul.Barba@water.ca.gov>
Subject: RE: FEMA process for State of CA projects

Hello Jenny,
Attached, as promised is a pdf (searchable) copy of the code of Federal Regulations (44CFR). It references the National Flood insurance Program and floodplain mapping. Part 70 is related to floodplain mapping.

I am also copying a representative from the CA Dept of Water Resources, Raul Barba.

I'll reach out after I have additional information.

Respectfully
Frank Mansell
510-368-0877

From: Mital, Jenny <jmital@Huitt-Zollars.com>
Sent: Friday, January 25, 2019 11:34 AM
To: Mansell, Frank <Frank.Mansell@fema.dhs.gov>
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: FEMA process for State of CA projects

Hi Frank,

I am a civil engineering consultant working on a floodplain assessment for a State project on property owned by the State of California. What is the review process for State projects located on State property? The piece of state property is technically within the City of Seaside, but the city has said that they don't have jurisdiction to review state projects. Is there a division in the State that reviews flood assessments?

Our analysis showed that the proposed development would decrease the elevation of the mapped floodplain on the site, and there is no designated floodway. The project will not create any outflow to other properties. This combination means that a CLOMR is not required to be submitted to FEMA, but we need to determine the proper local authority to review it.

Thanks for your help! Please call me back at the number below, or call Carl Taylor (cc'd) at (949) 988-5815 ex11116 if I am unavailable. I will try to call you back this afternoon – your voicemail is full.

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

Mital, Jenny

From: Taylor, Carl
Sent: Monday, January 28, 2019 3:35 PM
To: 'RRiedl@ci.seaside.ca.us'
Cc: 'SOttmar@ci.seaside.ca.us'; Mital, Jenny
Subject: Calif Central Coast Veterans Cemetery, Former Fort Ord, Seaside - LOMR

Importance: High

Hello Mr. Riedl,

I just called and left you a voice message about this.

We are civil engineers working for California Dept. of General Services/Cal Vet on the Phase 2 expansion of their Central Coast Veterans Cemetery. Our work includes preparation of a LOMR for FEMA approval after the completion of construction, since we will be developing in the currently mapped Flood Zone AH on the property.

We have prepared a drainage study for Phase 2, and have determined that by enlarging the existing infiltration basin we will lower the mapped flood elevation with the proposed construction. The FEMA regulations state, and FEMA confirmed that, since we are not proposing to raise the flood elevation, submittal of a CLOMR to FEMA is not necessary unless required by the flood plain manager. FEMA told us your city is the local flood plain manager. When we asked Scott Ottmar about this, he sent us the reply shown below. We then contacted Monterey County who said that they have no jurisdiction inside city limits, and they directed us to contact your city who they said is the local flood plain manager.

Please let us know if you will review the drainage study, and confirm that the City will not require submittal of a CLOMR to FEMA.

Thank you for your assistance, and please contact us if you have any questions.

Carl

Carl F. Taylor, PE, LEED AP
Vice President
HUITT-ZOLLARS, INC.
2603 Main Street, Suite 400
Irvine, CA 92614
949-988-5815 ext 11116 office
949-463-7400 mobile
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NAICS Codes 541310, 541320, 541330, 541370

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From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Thursday, January 24, 2019 11:18 AM
To: Mital, Jenny <jmital@Huitt-Zollars.com>; Rick Riedl < >
Cc: Taylor, Carl <Ctaylor@Huitt-Zollars.com>
Subject: Re: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Ms. Mital
I received your phone message this morning. City of Seaside does not have jurisdictional oversight of properties owned by the State of California. Please review with your contacts with the State to determine how to proceed. Thank you.

Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside
831-899-6885 (office)
831-899-6311 (fax)

Office Hours: Monday - Friday 8:00 am to 5:00 pm



Please consider the environment before printing
and remember to print double-sided whenever possible.
> > >

From: "Mital, Jenny" <jmital@Huitt-Zollars.com>
To: "'SOttmar@ci.seaside.ca.us'" <SOttmar@ci.seaside.ca.us>, "'RRiedl@ci.seaside.ca.us'" <RRiedl@ci.seaside.ca.us>
CC: "Taylor, Carl" <Ctaylor@Huitt-Zollars.com>
Date: 1/22/2019 10:43 AM
Subject: CLOMR review - CalVet Cemetery Parker Flats Road Seaside

Good morning Scott and Rick,

I am working on a CLOMR for the Phase 2 expansion of the California Central Coast Veteran's Cemetery Project on Parker Flats Road in former Fort Ord. The owner is CalVet (state of California). The CLOMR is required because the Phase 2 expansion will require development within the existing flood storage area, and the existing on-site retention/infiltration basin will be expanded to hold the 100-year flood volume for the Phase 2 expansion in the watershed. The basin infiltrates the entire volume, so there is no offsite runoff, and no other property owners are affected.

We are looking to submit to FEMA for review as soon as possible and need the City to sign off on the CLOMR application first. What can we do to make the review as easy as possible for you?

Questions:

- What are submittal requirements? (Number of hard copies, electronic submittal, data CD, etc)
- Is there a submittal fee? Can the fee be waived since this is a public (state) project?
- What is approximate turnaround time for your review?

Thank you! Please give us a call.

- Jenny Mital

Jenny Mital, PE
Civil Engineer
949-988-5815 ex. 11136

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HUITT-ZOLLARS

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Memorandum

DATE: January 28, 2019

TO: Tom Schanberger, Department of General Services

FROM: Carl Taylor, Huitt-Zollars

RE: Drainage Basin Design

HZ PROJECT NO.: R305029.02

In compliance with our scope of work, Huitt-Zollars has evaluated the existing basin on the California Central Coast Veterans Cemetery property for its ability to contain the 100-year flood volume for the proposed development and surrounding watershed. The existing basin was constructed as an earth borrow site for Phase 1 and was not designed as a flood control basin for any specific event (Drainage Report for California Central Coast Veterans Cemetery – Phase 1 by Wood Rodgers, Inc. 2014). The previous flood control study for the 2014 LOMR and FEMA FIRM #06053C0195G, which was reviewed, used the following criteria:

- The model considered the existing condition of the watershed with an assumption of 1% impervious area, prior to the construction of any phases of the development. Full built-out condition was not modeled.
- The existing borrow site/basin was not considered in the analysis.
- The 72-hr storm rainfall distribution used in the report is no longer the standard for Monterey County.
- The soil loss rates used in the model were much higher than the recommended range by the technical manual for the modeling program, HEC-HMS. This could cause the calculated flood volume to be too low.
- The model was not calibrated against measured data, which is typically required for models submitted to FEMA to validate the study results.

Huitt-Zollars modeled the existing condition, in which Phase 1 is existing (2.9% total impervious area); the proposed condition, in which Phase 2 is constructed (3.0% total impervious area); and the proposed ultimate build-out condition (8.0% total impervious area), in which all future phases (1-11) are constructed. Current County and FEMA hydrology criteria were used to obtain the results in Table 1.

Table 1. 100-year storm analysis results

Model	Flood volume, ac-ft
Existing - Phase 1 constructed	10.7
Proposed - Phase 1-2 constructed	10.7*
Ultimate - Phase 1-11 constructed	14.0
2014 LOMR and FIRM #06053C0195G - no phases constructed	4.9

*Note: Phase 2 adds little impervious area, so very little additional runoff is produced.

The existing LOMR established a flood elevation at an elevation of 286.1 feet. For schematic design, we established the lowest finished grade elevation for Burial Section 3 to be Elevation 294 so that the crypt subdrains, which will be at 8 feet below finished grade (elevation 286), would freely outlet above the flood water surface. However, for improved access, and to reduce soil import requirements, we proposed to lower Burial Section 3 by 2 feet (lowest finished grade elevation 292 feet and subdrain outlet at elevation 284). We therefore propose that the flood storage basin be designed for a 100-year maximum water surface elevation of 283 feet, which will allow for 1-foot of freeboard between the subdrain outlet and the flood water surface elevation.

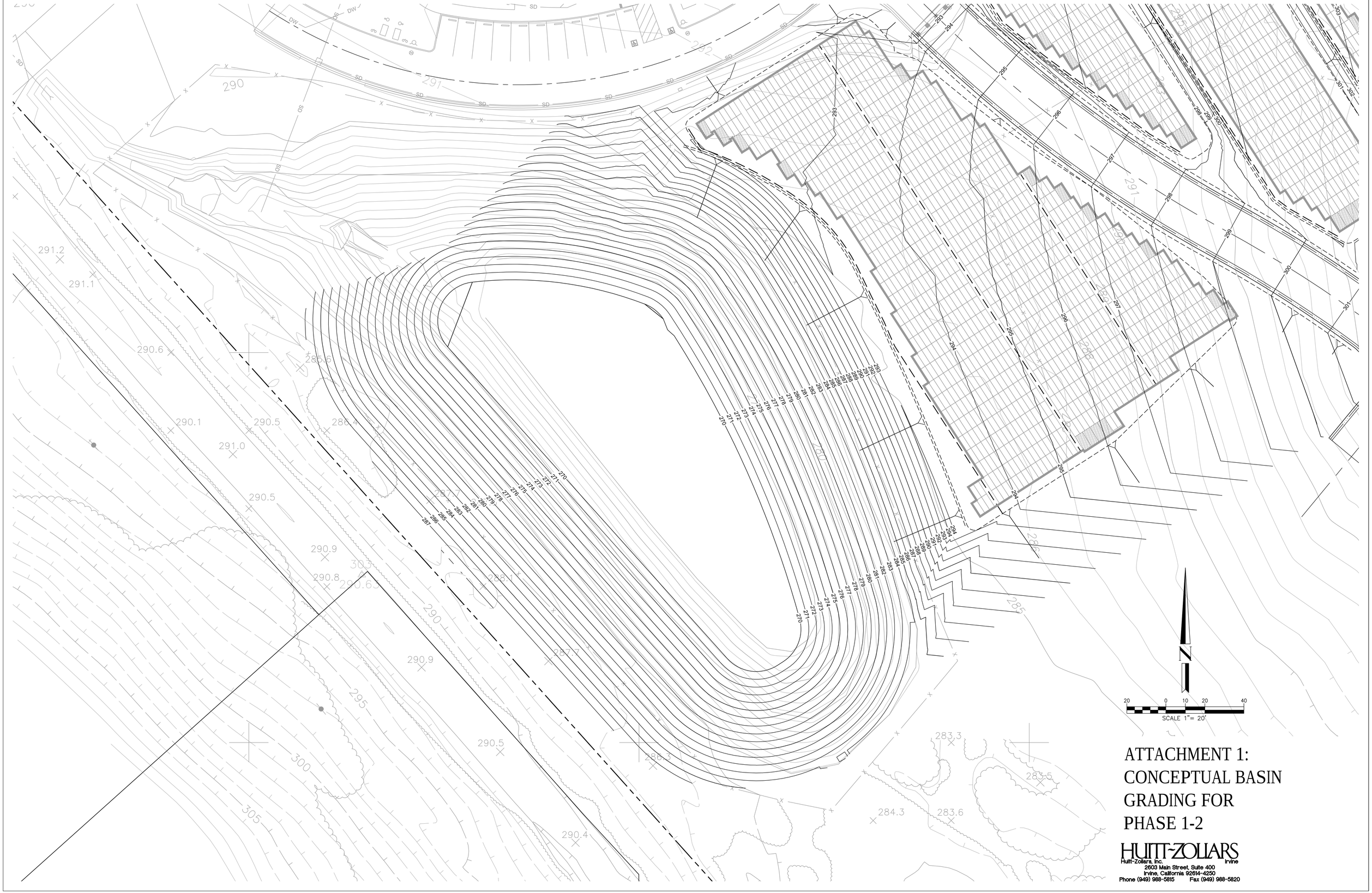
The existing basin has a capacity of 7.2 ac-ft at the water surface elevation of 283, which is less than what is required for the existing condition. Due to budgetary constraints, CalVet has instructed Huitt-Zollars on January 17, 2019 to enlarge the basin for Phase 2 only - not for ultimate build-out of the cemetery. The conceptual basin grading for Phase 2 is shown in Attachment 1. This grading will be refined as our 50% Design Development Plans are prepared. The basin will need to be enlarged again in the future to contain the flood volume produced by the addition of impervious surfaces in later phases, and another CLOMR/LOMR will have to be submitted to document the change in the 100-year floodplain. Basin grading which could accommodate ultimate build-out is shown in Attachment 2.

Please contact us if you have any questions.

Cc: Jack Striegel, CalVet

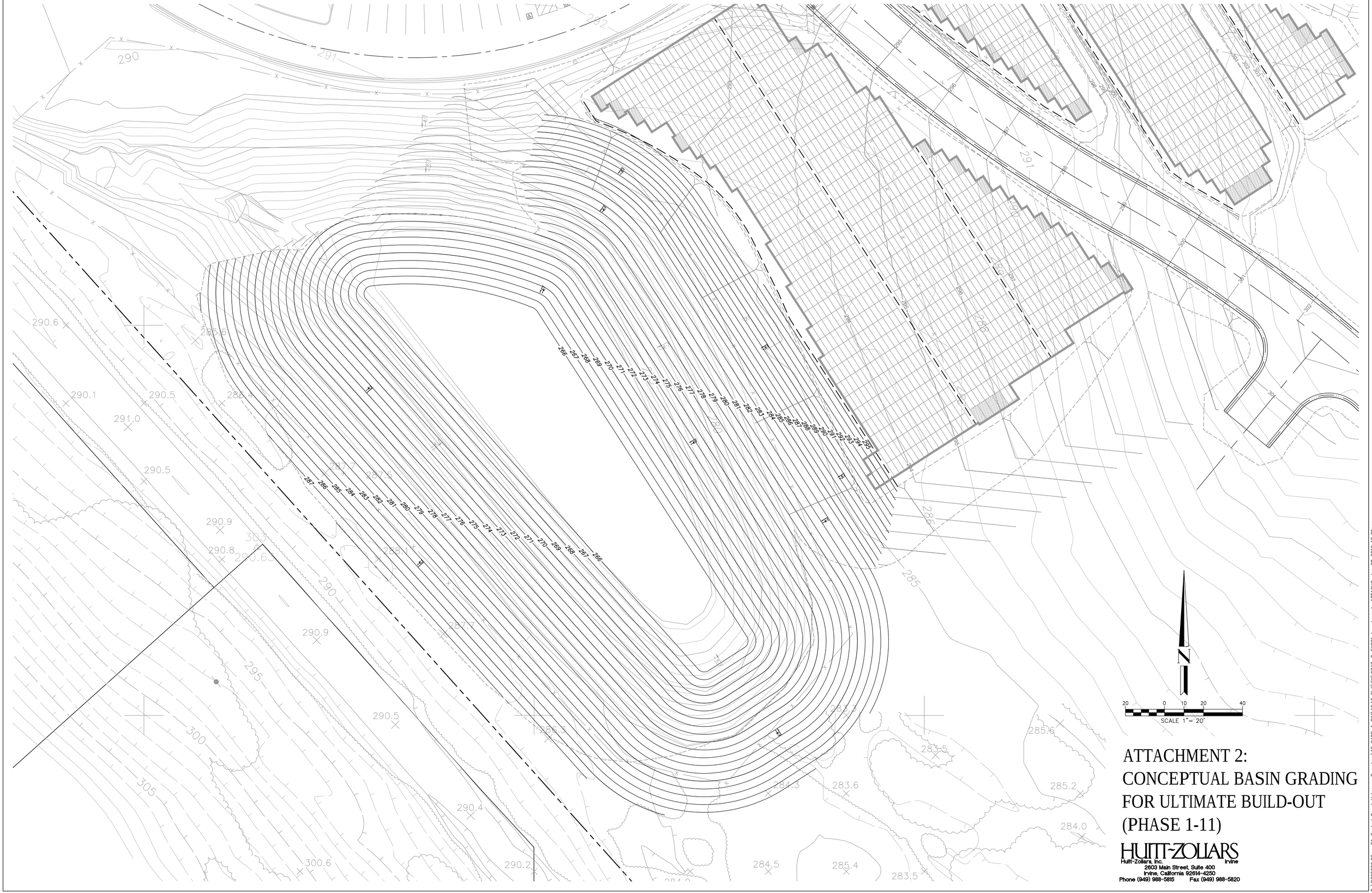
Erin Harwayne, DDA

Megan Dale, RHAA



ATTACHMENT 1: CONCEPTUAL BASIN GRADING FOR PHASE 1-2

HUITT-ZOLLARS
Huitt-Zollars, Inc. Irvine
2603 Main Street, Suite 400
Irvine, California 92614-4250
Phone (949) 988-5815 Fax (949) 988-5820



ATTACHMENT 2:
CONCEPTUAL BASIN GRADING FOR ULTIMATE BUILD-OUT (PHASE 1-11)

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Irvine, California 92614-4250
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Appendix H

Noise Report

NOISE & GROUNDBORNE VIBRATION IMPACT ANALYSIS

FOR

CENTRAL COAST VETERANS CEMETERY PROJECT
SEASIDE, CA

MARCH 2019

PREPARED FOR:

DENISE DUFFY & ASSOCIATES, INC.
947 CASS STREET, SUITE 5
MONTEREY, CA 93940

PREPARED BY:

AMBIENT
AIR QUALITY & NOISE CONSULTING
612 12th Street, Suite 201
Paso Robles, CA 93446

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APPENDICES

A. Noise Monitoring

LIST OF COMMON TERMS AND ACRONYMS

ANSI	Acoustical National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-Weighted Decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
in/sec	Inches per Second
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
ppv	Peak Particle Velocity
U.S. EPA	United States Environmental Protection Agency

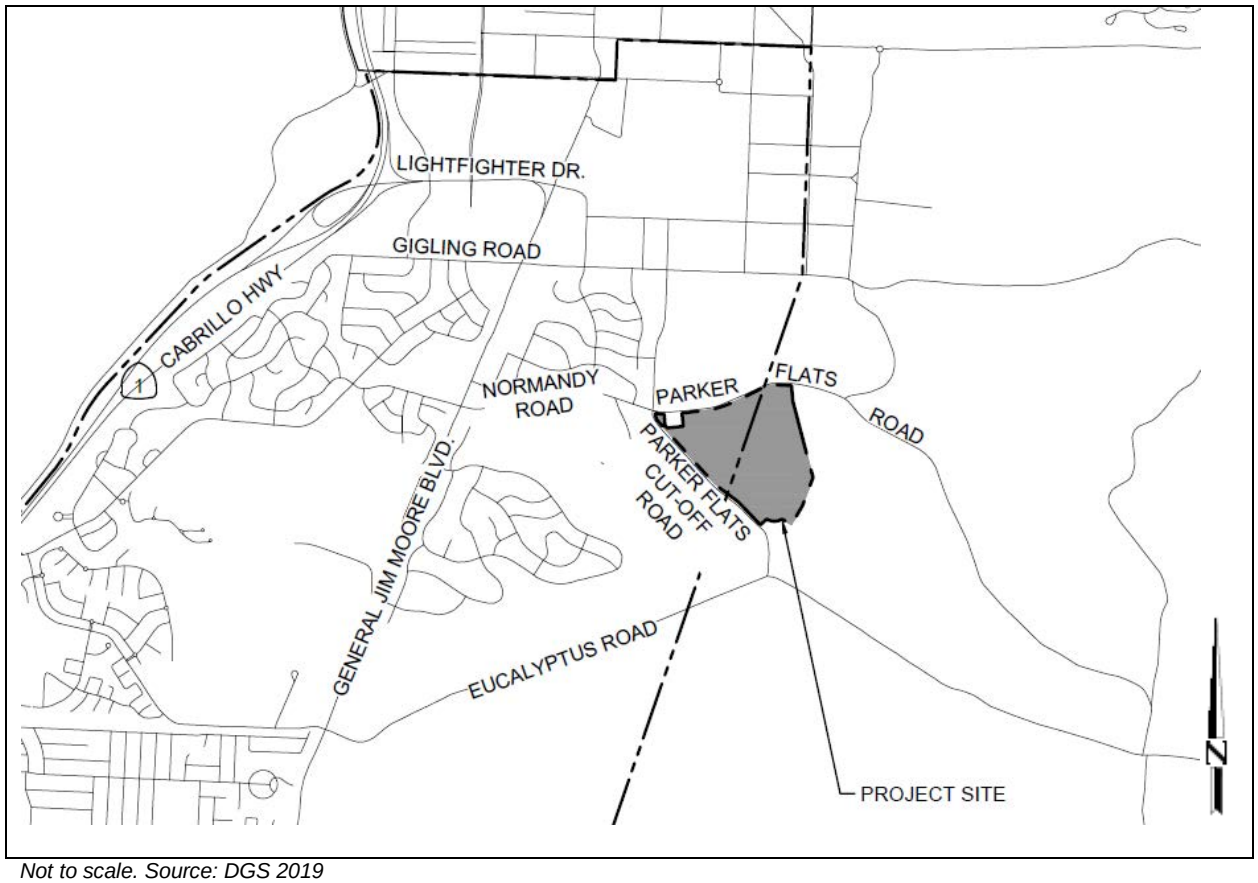
INTRODUCTION

This report discusses the existing setting, identifies potential noise impacts associated with implementation of the proposed California Central Coast Veterans Cemetery (CCCVC) 2015 Master Plan (2015 Master Plan), including Phase 2. Phase 1 of the CCCVC was previously evaluated in 2014 and is not included in this analysis. Noise mitigation measures are recommended where the predicted noise levels would exceed applicable noise thresholds of significance.

PROPOSED PROJECT SUMMARY

The purpose of the 2015 Master Plan is to create a comprehensive, long-term development plan that identifies and addresses any issues remaining following the construction and completion of Phase 1 for the development of the cemetery. The 2015 Master Plan lays out the process and strategy for the implementation of the entire CCCVC over the next 100 years, including Phase 2. The location of the CCCVC is depicted in Figure 1. Phase 2 of the 2015 Master Plan would accommodate burials over the next 10 years and includes burial facilities of both in-ground cremains and crypts, as well as supporting roads and infrastructure. Phase 2 of the CCCVC is depicted in Figure 2.

Figure 1
CCCVC Location



Not to scale. Source: DGS 2019

Figure 2
CCCVC Phase 2



Source: DGS 2019

EXISTING SETTING

CONCEPTS AND TERMINOLOGY

ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

Amplitude

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3-dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (U.S. EPA 1971). Common community noise sources and associated noise levels, in dBA, are depicted in Figure 2.

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from the source.

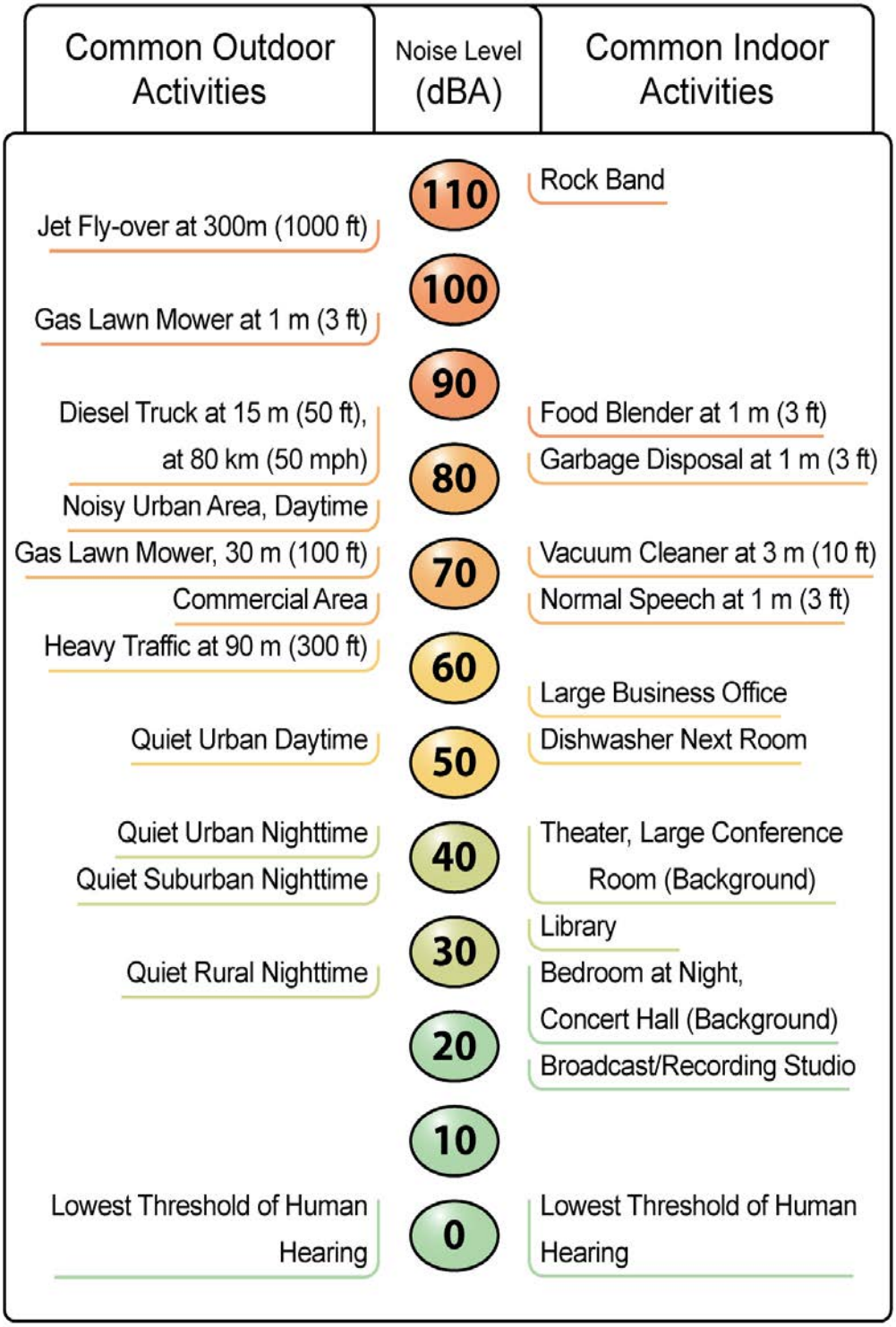
Atmospheric Effects

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

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Figure 3
Common Noise Levels



Source: Caltrans 2018

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-30 dBA, with windows closed. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

NOISE DESCRIPTORS

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the "A-weighted" sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, CNEL and SEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 1.

HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged.

Table 1
Common Acoustical Descriptors

Descriptor	Definition
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The DNL was first recommended by the U.S. EPA in 1974 as a "simple, uniform and appropriate way" of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA "penalty" for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Sound Exposure Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on Human Activities

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. In terms of land use compatibility, environmental noise is often evaluated in terms of the potential for noise events to result in increased levels of annoyance, sleep disruption, or interference with speech communication, activities, and learning. Noise-related effects on human activities are discussed in more detail, as follows:

Speech Communication

For most noise-sensitive land uses, an interior noise level of 45 dB L_{eq} is typically identified for the protection of speech communication in order to provide for 100-percent intelligibility of speech sounds. Assuming a minimum 20-dB reduction in sound level between outdoors and indoors, with windows closed, this interior noise level of 45 dB L_{eq} would equate to an exterior noise level of 65 dBA L_{eq}. For outdoor voice

communication, an exterior noise level of 60 dBA L_{eq} allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility (U.S. EPA 1974.) Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA.

Annoyance & Sleep Disruption

With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or L_{dn}). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for L_{dn} as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA L_{dn}. It also indicates that the percent of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA L_{dn}. A noise level of 65 dBA L_{dn} is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed.

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level of 65 dBA CNEL/L_{dn} as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration (FAA) and the State of California have identified a noise level of 65 dBA L_{dn} as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/L_{dn} are typically considered to result in a potentially significant increase in levels of annoyance.

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference (U.S. EPA 1974.)

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train passbys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of other noise metrics, such as the L_{eq} or L_{max} descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact.

AFFECTED ENVIRONMENT

NOISE-SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The nearest noise-sensitive land uses include residential land uses to the northwest, across Normandy Road, and Chartwell School to the west, along Numa Watson Road.

AMBIENT NOISE ENVIRONMENT

To document existing ambient noise levels in the project area, short-term ambient noise measurements were conducted on December 12, 2018 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter. The meter was calibrated before use and is certified to be in compliance with ANSI specifications. Measured ambient daytime noise levels are summarized in Table 2.

Table 2
Summary of Measured Ambient Noise Levels

Location	Monitoring Period	Measured Daytime Noise Levels (dBA)	
		L_{eq}	L_{max}
Southeast corner of Parker Flats Road and Parker Flats Cut-off Road, approximately 45 feet from the roadway centerlines.	11:40 – 11:50	38.4	46.5
Normandy Road, approximately 150 feet west of Parker Flats Cut-off Road, 21 feet from the roadway centerline.	11:55 – 12:05	40.2	56.7
Numa Watson Road at Chartwell School entrance, approximately 750 feet south of Normandy Road.	12:20 – 12:30	36.6	51.2
Ambient noise measurements were conducted on December 12, 2018 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter placed at a height of 4.5 feet.			

Based on the measurements conducted, daytime average-hourly noise levels in the project vicinity ranged from the upper 30's to low 40's (in dBA L_{eq}). Ambient noise levels within the project area are predominantly influenced by vehicle traffic on area roadways. Ambient noise levels during the evening and nighttime hours are generally 5-10 dB lower than daytime noise levels.

REGULATORY FRAMEWORK

NOISE

City of Seaside General Plan

The City of Seaside has established policies in the Noise Element of the General Plan to guide the development of new land uses with respect to noise exposure. Table 3 summarizes the City's noise standards for various types of new land uses. These noise standards are the basis for the development of the land use compatibility guidelines presented in Table 4. As depicted, cemetery land uses are considered "normally acceptable" within noise environments up to 70 dBA CNEL.

City of Seaside Municipal Code

The City of Seaside municipal code, Chapter 9.12, includes standards, prohibitions, exemptions for noise generated by non-transportation noise sources. Accordingly, construction noise is prohibited before 7:00 a.m. or after 7:00 p.m. daily except Saturday, Sunday, and holidays when the prohibited time is before 9:00 a.m. and after 7:00 p.m. Noise sources considered exempt from the City's noise ordinance includes excessive, unnecessary, or unusually loud noise generated by the following (Seaside 2018):

- Cries for emergency assistance and warning calls;
- Radios, sirens, horns and bells on police, fire and other emergency response vehicles;
- Parades, fireworks displays and other special events for which a permit has been obtained from the city are exempted provided there is compliance with all conditions that have been noted in writing on the permit. Excessive, unnecessary or unusually loud noise produced as a result of

noncompliance with any condition specified on the permit is not exempt from the requirements of this chapter;

- Activities on or in publicly owned property and facilities, or by public employees or their franchisees, while in the authorized discharge of their responsibilities, are exempt provided that such activities have been authorized by the owner of such property or facilities or its agent or by the employing authority; or
- Religious worship activities, including but not limited to, bells, organs, singing, and preaching.

Table 3
City of Seaside Interior and Exterior Noise Standards for New Development

Land Use	Noise Standards (dBA CNEL)[1]	
	Exterior	Interior
Residential	65	45
Mixed Use Residential	70	45
Commercial	70	-
Office	70	50
Industrial	75	55
Public Facilities	70	50
Schools	50	50
City of Seaside 2004		

Table 4
City of Seaside Noise Standards for Land Use Compatibility

Land Use	Community Noise Exposure (Exterior L_{dn}, dBA)			
	Normally Acceptable	Conditionally Acceptable	Generally Unacceptable	Land Use Discouraged
Residential: Single Family, Multifamily, Duplex	<60	60 – 70	70 – 75	--
Residential: Mobile Homes	<60	60 – 65	65 – 75	--
Transient Lodging – Motels, Hotels	<60	60 – 70	70 – 80	--
Schools, Libraries, Churches, Hospitals, Nursing Homes	<60	60 – 65	65 – 75	--
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	<60	60 – 70	--	--
Sports Arena, Outdoor Spectator Sports, Amusement Parks	<65	65 – 75	--	--
Playgrounds, Neighborhood Parks	<65	65 – 70	70 – 75	--
Golf Course, Riding Stable, Cemeteries	<70	70 – 75	75 – 85	--
Office and Professional Buildings	<65	65 – 75	75 – 80	--
Commercial Retail, Banks, Restaurants, Theaters	<70	70 – 80	80 – 85	--
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	<70	70 – 85	--	--
Agriculture	<85	--	--	--

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Generally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Land Use Discouraged: New construction or development should generally not be undertaken.
Source: City of Seaside 2004

GROUNDBORNE VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement.

The effects of groundborne vibration levels, with regard to human annoyance and structural damage, is influenced by various factors, including ground type, distance between source and receptor, and duration. Overall effects are also influenced by the type of the vibration event, defined as either continuous or transient. Continuous vibration events would include most construction equipment, including pile drivers, and compactors; whereas, transient sources of vibration create single isolated vibration events, such as demolition ball drops and blasting. Threshold criteria for continuous and transient events are summarized in Table 5 and Table 6, respectively.

Table 5
Damage Potential to Buildings at Various Groundborne Vibration Levels

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans 2013

Table 6
Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10
Annoying to People in Buildings	--	0.2
Severe	2.0	0.4

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

-- Not Available

Source: Caltrans 2013

As indicated in Table 5, the threshold at which there is a risk to normal structures from continuous events is 0.3 in/sec ppv for older residential structures and 0.5 in/sec ppv for newer building construction. A threshold of 0.5 in/sec ppv also represents the structural damage threshold applied to older structures for transient vibration sources. With regard to human perception (Table 6), vibration levels would begin to become distinctly perceptible at levels of 0.04 in/sec ppv for continuous events and 0.25 in/sec ppv for transient events. Continuous vibration levels are considered annoying for people in buildings at levels of 0.2 in/sec ppv.

PROJECT IMPACTS

THRESHOLDS OF SIGNIFICANCE

Criteria for determining the significance of air quality impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
3. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
4. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would expose people residing or working in the project area to excessive noise levels.
6. For a project within the vicinity of a private airstrip, the project would expose people residing or working in the project area to excessive noise levels.

METHODOLOGY

Short-Term Construction

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on representative off-road equipment noise levels derived from the Federal Highway Administration's (FHWA) *Road Construction Noise Model* based on average equipment usage rates and assuming a noise-attenuation rate of 6 dB per doubling of distance from the source.

Long-term Operation

Noise levels were calculated based on a combination of data obtained from existing literature, noise level measurements, and application of accepted noise prediction and sound propagation algorithms. based Predicted noise levels for noise sources were calculated based on noise levels associated with similar sources derived from existing documentation and assuming a noise-attenuation rate of 6 dB per doubling of distance from the source.

Predicted noise levels were compared to applicable City noise standards for non- determination of impact significance. The *CEQA Guidelines* do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. For purposes of this analysis, a significant increase in ambient noise levels would be defined as an increase of 3 dBA, or greater.

Groundborne Vibration

The *CEQA Guidelines* also do not define the levels at which groundborne vibration levels would be considered excessive. For this reason, Caltrans' recommended groundborne vibration thresholds were used for the evaluation of impacts based on increased potential for structural damage and human annoyance, as identified in Table 5 and Table 6, respectively. For purposes of this analysis, risks of architectural damage (i.e., minor cracking of plaster walls and ceilings) would be considered potentially significant if construction-

generated ground vibration levels at nearby structures would exceed 0.5 in/sec ppv. Ground vibration in excess of 0.2 in/sec ppv would be expected to result in a potential for significant short-term increases in levels of annoyance.

IMPACT 1:	*Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?*

Long-term, permanent increases in ambient noise levels would be primarily associated with potential increases in vehicle traffic on nearby roadways; as well as, noise generated by on-site vehicle activity, burial events, and maintenance activities. Noise levels commonly associated with these sources and potential impacts to nearby land uses are discussed as follows:

Vehicular Roadway Traffic

Operational vehicle trips for Phase 2 are anticipated to be similar to existing Phase 1 operational activities. Typical vehicle trips per days including employees, visitors, and maintenance and services are expected to be approximately 80 vehicles per day with an additional 20 vehicles per day on weekends. This is based on an average of two burial events per day with an average of 30 vehicles per burial. The worst case scenario for typical operations would involve four burial events on a weekend day with a total of 200 vehicles per day, including worker vehicles.

As noted earlier in this report, changes in ambient noise levels of approximately 3 dBA, or less, are typically not discernible to the human ear. Typically, a doubling of vehicle traffic would be required before a significant increase (i.e., 3 dBA, or greater) in traffic noise levels would occur. Implementation of Phase 2 and subsequent phases would not result in a doubling of vehicle traffic on area roadways. In comparison to existing conditions, the proposed project would not result in a significant increase in traffic noise levels along area roadways. Project-generated increases in traffic noise levels would be considered to have a less-than-significant impact.

On-site Vehicle Parking Areas

Noise levels commonly associated with parking lots are generated by the starting of vehicles, the opening and closing of vehicle doors, playing of amplified music, and the occasional sound of vehicle alarms and horns. Intermittent noise levels associated with such noise events can generate sound levels of up to approximately 92 dBA at 50 feet. Overall, average-hourly noise levels associated with parking lots are largely dependent on vehicle activity and, thus, would likely be greatest during the hours preceding or upon conclusion of onsite events.

Assuming a maximum of 40 vehicles per burial event, average-hourly noise levels associated with on-site vehicle parking areas would be 26 dBA L_{eq}, or less, at 25 feet. Predicted noise levels at nearby residential land uses would be masked by existing ambient noise levels. In comparison to existing conditions, onsite operational activities associated with Phase 2 and subsequent phases would occur at increased distance from nearby noise-sensitive land uses. For these reasons, onsite vehicle activities would not result in a significant increase in ambient noise levels at nearby noise-sensitive land uses. This impact is considered less than significant.

On-site Event and Maintenance Activities

Exterior noise events associated with ground maintenance activities would be predominantly associated with the operation of landscape maintenance equipment. Based on measurements conducted at similar facilities, landscape maintenance equipment, such as commercial lawn mowers, can generate noise levels of approximately 90 dBA at 3 feet. Noise levels associated with the sounding of bugles and rifle volleys, such as a 21-gun salute, can generate peak instantaneous noise levels of approximately 100 to 165 dBA.

Assuming a maximum noise level of 90 dBA at 3 feet, predicted noise levels associated with ground-maintenance activities would be approximately 40 dBA, or less, at the nearest noise-sensitive land uses.

Predicted instantaneous noise levels associated with burial events involving the sounding of bugles or firing of rifle volleys would range from approximately 44 to 95 dBA. However, these events would be of short duration (i.e., seconds or minutes) and would be limited to the daytime hours of operation. As a result, significant increases in average-hourly or average-daily noise levels at nearby land uses would not occur. Furthermore, in comparison to existing operations, onsite operational activities associated with Phase 2 and subsequent phases would occur at increased distance from nearby noise-sensitive land uses. It is also important to note that the City of Seaside's Municipal Code (Section 9.12.040) provides exemptions for noise associated with religious activities, as well as, noise occurring on publicly owned property. As a result, noise generated by the proposed project would be exempt from compliance with the City's noise ordinance. For these reasons, noise generated by onsite activities would be considered less than significant.

IMPACT 2:	*Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of the activity. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Noise levels commonly associated with off-road equipment anticipated to be required during project construction are summarized in Table 7.

Table 7
Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	
	L_{max}	L_{eq}
Backhoe/Front-End Loader	80	76
Compactor	80	73
Concrete Mixer Truck	85	81
Concrete Vibratory Mixer	80	73
Dozer	85	81
Excavator	85	81
Grader	85	81
Paver	85	82
Roller	85	78
Sources: FTA 2006		

As noted in Table 7, instantaneous noise levels generated by individual pieces of off-road equipment typically range from approximately 70 dBA to 85 dBA L_{max} at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Based on typical off-road equipment usage rates, average-hourly noise levels would be approximately 82 dBA L_{eq}, or less, at 50 feet.

The City has not adopted noise standards that apply to short-term construction activities. However, based on screening noise criteria commonly recommended by federal agencies, construction activities would generally be considered to have a potentially significant impact if average-hourly daytime noise levels would exceed 80 dBA L_{eq} at noise-sensitive land uses, such as residential land uses (FTA 2006). Assuming an average-hourly construction noise level of 82 dBA L_{eq}, predicted noise levels at the nearest residential land uses would be approximately 56 dBA L_{eq} or less, when construction activities occur within approximately 50

feet of the site boundary. Based on these same assumptions, predicted construction noise levels at Chartwell School would be 51 dBA L_{eq}, or less. Assuming an average exterior-to-interior noise reduction of 25 dBA, with windows closed, predicted interior noise levels within Chartwell School would be approximately 26 dBA L_{eq}, or less. Construction-generated noise levels would not exceed the commonly applied daytime noise standard of 80 dBA L_{eq}. However, because exterior ambient noise levels typically decrease during the late evening and nighttime hours as community activities (e.g., vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day could result in substantial increases in ambient noise levels, which may result in increased levels of annoyance and potential sleep disruption for occupants of nearby residential dwellings. For these reasons, this impact would be considered potentially significant.

Mitigation Measure 2: The following measures shall be implemented to reduce construction-generated noise levels:

a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between the hours of 9:00 a.m. and 7:00 p.m. on weekends and legal holidays.
b. Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
c. When not in use, all construction equipment shall be turned off and shall not be allowed to idle. Provide clear signage that posts this requirement for workers at the entrances to the site.
d. Construction equipment and haul trucks shall be turned off when not in use.
e. Construction equipment and material staging areas shall be located at the furthest distance possible from nearby residential land uses.
f. To the extent possible, heavy-duty haul truck trips required for project construction should be scheduled during the non-peak hours of the day.

Significance After Mitigation

Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. The use of mufflers would reduce construction equipment noise levels by approximately 10 dBA. Additional measures have also been included to further minimize potential noise impacts to nearby noise-sensitive land uses. With implementation of the above mitigation measures, this impact would be considered less than significant.

IMPACT 3:	*Would the project result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

The City of Seaside General Plan includes noise criteria that can be relied upon to determine the compatibility of noise-sensitive land uses within noise environments. Based on these noise standards, cemeteries are considered "normally acceptable" within exterior noise environments up to 70 dBA CNEL and "conditionally acceptable" between 70 and 75 dBA CNEL. The proposed project is not located in the vicinity of a major roadway. The nearest major roadways are General Jim Moore Boulevard, which is located approximately 3,600 feet west of the project site, and Gigling Road, located approximately 2,400 feet north of the project site. Existing traffic volumes for these roadways average approximately 6,500 and 5,600 vehicles per day, respectively (TAMC 2019). Based on these traffic volumes, the projected 70 dBA CNEL noise contours for these roadways would not extend beyond the roadway right of ways. In general, roadway traffic volumes need to exceed approximately 15,000 average-daily trips (ADT) before predicted traffic noise levels outside of the roadway right-of-way would exceed 70 dBA CNEL. Other roadways in the project area, including Parker Flats Road, Normandy Road, and Parker Flats Cut-off Road do not exceed 15,000 ADT. For these reasons, predicted onsite noise levels at the project site would not be projected to

exceed the City's "normally acceptable" noise standard of 70 dBA CNEL. This impact would be less than significant.

IMPACT 4:	***Would the project result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?***

Long-term operational activities associated with the proposed project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction activities. Groundborne vibration levels associated with representative construction equipment likely to be required during project construction are summarized in Table 8. As depicted, construction-generated peak particle velocity (ppv) levels would range from approximately 0.003 to 0.21 inches per second ppv (in/sec ppv) at 25 feet. The highest vibration levels would be associated with the use of vibratory rollers. The nearest existing structures would be located in excess of 900 feet from the project site. Because groundborne vibration levels generally decrease with increased distance from the source, predicted construction vibration levels at nearby structures would not be projected to exceed the minimum recommended criteria for structural damage and human annoyance (0.5 and 0.2 in/sec ppv, respectively). As a result, this impact would be considered less than significant.

Table 8
Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (In/Sec)
Vibratory Roller	0.21
Large tractors	0.089
Loaded Trucks	0.076
Small Bulldozers/Tractors	0.003
Source: FTA 2006, Caltrans 2013	

IMPACT 5 & 6:	*For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? and For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

The proposed project is not located within two miles of an airport land use plan. The nearest airports include the Marina Municipal Airport, which is located approximately 3.3 miles northeast of the project site, and the Monterey Regional Airport, located approximately 3.9 miles to the southwest. The proposed project is not located within the planning areas of these airports, nor would implementation of the proposed project affect airport operations. No impact.

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APPENDIX A
Noise Monitoring

NOISE MEASUREMENT SURVEY FORM

DATE:	12-Dec-18
PROJECT:	VETERANS CEMETERY

NOISE MONITORING LOCATION	SEASIDE



LOCATIONS ARE APPROXIMATE

MET CONDITIONS:	TEMP: 57 F. HUMIDITY: 76 % WIND SPEED: 0-5 MPH SKY: CLEAR GROUND: DRY
NOISE MONITORING EQUIPMENT:	LARSON DAVIS MODEL 820, TYPE I SLM
CALIBRATED PRIOR TO AND UPON COMPLETION OF MEASUREMENTS: YES	

LOCATION	MONITORING PERIOD	NOISE SOURCES NOTED	NOISE LEVEL			NOTES
			LEQ	LMAX		
1	1140-1150	PARKER FLATS AND PF CUTOFF, ~45 FEET FROM ROAD CENTERLINE	38.4	46.5		VEHICLE PASSBYS, PEOPLE TALKING IN DISTANCE, CONST. IN DISTANCE
2	1155-1205	RESIDENCE ON NORMANDY RD, ~21 FEET FROM ROAD CENTERLINE	40.2	56.7		VEHICLE PASSBYS, PEOPLE TALKING IN DISTANCE, CONST. IN DISTANCE
3	1220-1230	NUMA WATSON RD	35.6	44.2		VEHICLE PASSBYS, CONST. IN DISTANCE

Appendix I

Transportation Impact Analysis

TRANSPORTATION IMPACT ANALYSIS - FINAL

CALIFORNIA CENTRAL COAST VETERAN'S CEMETERY

SEASIDE, CALIFORNIA

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April 2019
097811004
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TRANSPORTATION IMPACT ANALYSIS - FINAL

FOR

CALIFORNIA CENTRAL COAST VETERAN'S CEMETERY

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EXECUTIVE SUMMARY

This report represents the results of the Transportation Impact Analysis (TIA) for the proposed Central Coast Veterans Cemetery located within the City of Seaside and Monterey County, California.

Project Description

The Project site is located at the southeast corner of the intersection of Normandy Road & Parker Flatts Road located in the City of Seaside and Monterey County.

Phase 1 (existing site) of the Central Coast Veterans Cemetery has already been constructed and currently operates on 9.10 acres of land. The existing cemetery's main access point is located at the north end of the Project site from Normandy Road. A secondary existing access point is located at the west side of the cemetery site, from Parker Flats Road. The secondary gated access serves as Emergency Vehicle Access and is utilized for large delivery vehicles. It is not open to the public.

The cemetery's Master Plan includes the planned buildout of the cemetery along with Phase 1 through Phase 11 facilities. It is estimated that each phase will be constructed every 10 years. This analysis studies different development scenarios, based on a reasonable foreseeable future. Near term for the addition of Phase 2 is analyzed. For cumulative conditions, a combination of Phase 2, 3, and 4 is analyzed. Master Plan conditions, which extends well beyond 2040 conditions is qualitatively assessed.

Potential impacts associated with the Project were evaluated for the weekday AM and PM peak one-hour periods consistent with adopted City of Seaside and Monterey County guidelines and criteria. State lands are considered sovereign entities and are not subject to the requirements of local plans and policies. In most situations, the State is not subject to local policies and ordinances, and, therefore, is not required to obtain permits from the County or Seaside. However, the State will comply with local ordinances when feasible. As a result, traffic impacts were evaluated in accordance with local plans and policies in the effort to comply with local ordinances.

Study Intersections

The Project trip assignments (Phase 2, Phase 3, and Phase 4) were developed based on the estimated trip generation for each phase and the assumed trip distribution. The trip distribution estimates were developed based on traffic patterns in the study area, knowledge of the study area, and the AMBAG travel demand model developed for the AMBAG 2040 MTP/SCS.

The study intersections identified below were selected based on the proposed trip assignment.

#	Intersection
1	General Jim Moore Blvd & Gigling Rd
2	Gigling Rd & Parker Flats Cut Off Rd
3	General Jim Moore Blvd & Normandy Rd

4	Project Driveway & Parker Flats Cut Off Rd
5	Parker Flats Cut Off Rd / Eucalyptus Rd & Northeast Southwest Arterial Connector Roadway
6	General Jim Moore Blvd & Coe Ave / Eucalyptus Rd

**All traffic count data collected on 1/24/2019*

Trip Generation Estimates

This trip generation estimates are based on an evaluation of Institute of Transportation Engineers (ITE) Trip Generation 10th Edition data and methodologies and existing traffic counts collected at the cemetery on January 24, 2019.

Development of the Project would result in the following trip generation:

Phase 2 (4.29 acres): Approximately 2 AM peak hour, 4 PM peak hour, and 26 gross daily trips on average weekdays.

Phase 3 (2.07 acres): Approximately 1 AM peak hour, 2 PM peak hour, and 14 gross daily trips on average weekdays.

Phase 4 (2.51 acres): Approximately 1 AM peak hour, 2 PM peak hour, and 16 gross daily trips on average weekdays.

Master Plan Buildout: The Project will generate approximately 11 AM peak hour, 29 PM peak hour, and 196 gross daily trips on average weekdays.

Special Events: The site is anticipated to host special events on Veterans Day, July 4th, Flag Day, and other days in the year. During these events the project may generate approximately 800 daily trips (400 inbound and 400 outbound). Since these events will be held on holidays, peak hour analysis is not applicable. The event planners should coordinate with the local agencies regarding traffic management during these events. Most events will be hosted on web sites. Traffic management programs and routing details will be posted on the web site, which includes routing, parking, and ways to decrease event peaks. Shuttle or bus services may also be implemented during these events. Based on the estimate of up to 400 vehicle trips per special event, on-site parking should also be provided for 400 vehicles per event.

Impacts and Mitigation Measures

Potential traffic impacts due to the proposed development were evaluated consistent with California Environmental Quality Act (CEQA) requirements, which includes SB 743 or VMT analysis. The following sections summarize the findings for Existing Plus Phase 2, Cumulative Plus Phase 2, 3, & 4, and Master Plan Buildout conditions.

Existing Plus Phase 2 Conditions

Based on the level of service analysis and governing agency thresholds of significance, the following deficient LOS would occur:

Existing Plus Phase 2 Conditions

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)

- The AM peak hour intersection continues to operate at LOS D with the Project and delay decreases by 0.3 seconds due to relatively low Project trip assignment (see table footnote for details on how intersection delay can decrease with Project). Therefore, the intersection is not significantly impacted by the Project.*

Cumulative Plus Phase 2, Phase 3, and Phase 4 Conditions

Based on the level of service analysis and maintaining agency thresholds of significance, the following deficient LOS would occur:

Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM & PM peak hour)
  - The intersection operates at LOS E in the AM and LOS D in PM with the Project. Delay decreases by 0.1 seconds in the AM and increases by 0.1 seconds in the PM due to relatively low Project trip assignment (see table footnote for details on how intersection delay can decrease with Project). Therefore, the intersection is not significantly impacted by the Project.
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
  - The intersection would continue to operate at LOS F in the AM and PM peak hours with the Project. Delay increases would not change in the AM with the Project, but delay would increase by 4.8 seconds during the PM with the Project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). Therefore, this intersection is not significantly impacted by the Project.
- General Jim Moore Boulevard & Coe Avenue (Intersection #6) (AM peak hour)
  - The intersection would continue to operate at LOS E in the AM with the Project. Delay increases by 2.1 seconds in the AM with the Project. Therefore, this intersection is significantly impacted by the Project. Adjusting and optimizing signal phasing would partially mitigate the impact, resulting in an intersection delay of 72.2 seconds per vehicle in the AM peak. The intersection would continue to operate at unacceptable LOS E.

Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
  - The intersection continues to operate at LOS F in the AM with the Project. Delay does not change in the AM. Therefore, the intersection is not significantly impacted by the Project.
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
  - The intersection would continue to operate at LOS E in the AM and LOS F in the PM peak hours with the Project. Delay would increase by 2.8 in the AM with the Project and delay would increase by 6.0 seconds during the PM with the Project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). Therefore, it is not a significant impact.

Master Plan Buildout Conditions

The 100-year buildout of the Master Plan proposes to develop a total of 41.65 acres of cemetery uses on the Project site at a rate of one phase every 10 years.

It is anticipated that full buildout of the remaining phases (Phase 2 through Phase 11) would generate approximately 11 AM peak hour, 29 PM peak hour, and 196 gross daily trips on average weekdays. This trip generation represents roughly one vehicle to or from the cemetery every five minutes during the AM peak hour and roughly three vehicles to or from the cemetery during the PM peak hour. These are relatively low rates and are not anticipated to have a noticeable effect on the future local transportation network.

Traffic Impact Fee Programs

Traffic impact fee programs in the study area were evaluated and are summarized in the following sections.

Fort Ord Reuse Authority (FORA)

The project will pay FORA traffic impact fees.

City of Seaside

Any necessary monetary contributions towards impacts in the City of Seaside would involve fair-share payments towards the implementation of necessary improvements.

Site Access and Internal Site Circulation

Internal site circulation and access to the Project site was evaluated for vehicles, bikes, and pedestrians. The findings are summarized in the following sections.

Vehicle Access

The main Project driveway exists as a side-street stop controlled, t-intersection and is located along Parker Flats Cut Off Road / Normandy Road (north edge of the Project site). Eastbound and westbound approaches are single lanes free movements. The main Project driveway. A secondary, gated driveway also exists along the west Project boundary on Parker Flats Cut Off Road.

Both driveways were constructed as part of Phase 1 development. Regular on-site traffic operations and trip generation is anticipated to be relatively low. Therefore, the existing side-street stop control is anticipated to adequately serve regular traffic demand. Special events are anticipated to generate heavy traffic to/from the Project site and it is anticipated that a traffic management plan would be prepared to safely and efficiently serve the high vehicular and pedestrian demand.

Bike and Pedestrian Access

It is recommended that the Project construct ADA compliant sidewalks and crosswalks and bicycle parking as part of Phase 3 development. The improvements would be constructed in

compliance with adopted County standards. The Project would be consistent with local policies once the recommended sidewalk, crosswalks, and bicycle parking are constructed and would not cause significant impacts to pedestrian, bicycle, or transit facilities.

Concept layouts were prepared for potential bicycle and pedestrian improvements along the Project frontage on Normandy Road.

According to the City of Seaside Draft General Plan 2040, a FORTAG multi-use path is proposed along the north edge boundary of the Project site. It continues south of the intersection of Parker Flats Cut Off Road and Normandy Road, west of the Project site. In addition, a Class II bicycle pathway is proposed along north-south oriented Parker Flats Cut Off Road and on Normandy Road. Due to these proposed bike/multi-use lanes, bicycle striping improvements at the Project access points were not evaluated.

Internal Site Circulation

Phase 2 will construct an extension of entry road (Street A). It is anticipated that Phase 2 parking and circulation will be similar to existing conditions (Phase 1) and the new roadway will provide access to Phase 2 crypts. See **Appendix** for Phase 2 site layout.

Vehicle Miles Traveled

GIS based tools were used to calculate the population located within 75-miles of the Project site. As shown below, Phase 2 is estimated to produce approximately 1,290 daily VMT. The combination of Phases 2, 3, and 4 is estimated to produce 2,770 daily VMT. Buildout of the remaining phases (Phases 2 through 11) is estimated to generate 9,710 daily VMT. Due to the assumed population locations being consistent for all analysis scenarios, the average trip length is estimated to be 49.5 miles for all scenarios.

Scenario	Daily Trips	Daily VMT
Phase 2	26	1,290
Phase 2, 3, & 4	56	2,770
Phases 2 thru 11	196	9,710

1. INTRODUCTION

This TIA presents the traffic analysis findings for the proposed construction of the Central Coast Veterans Cemetery (the "Project") 2015 Master Plan. The site development will occur over several years and the various phases are analyzed based on foreseeable future conditions (2040 for up to Phase 4 buildout). The full Master Plan Buildout is evaluated qualitatively. Overall this traffic analysis assesses the development of the remaining acres of the approximately 79-acre site for 100-year build-out.

The Project site is located at the southeast corner of the intersection of Normandy Road & Parker Flatts Road located in the City of Seaside and Monterey County.

Phase 1 (existing site) of the Central Coast Veterans Cemetery has already been constructed and currently operates on 9.10 acres of land. The existing cemetery's main access point is located at the north end of the Project site along Normandy Road. A secondary access point is located at the west side of the cemetery site, from Parker Flats Road. The secondary access is gated and is not open to the public. **Figure 1** shows the Project location map and study area. Existing conditions include Phase 1, with 9.10 acres of developed land, and includes burial facilities, administration and maintenance facilities, a committal shelter for burial services, and additional elements to honor veterans, including a memorial walk, flag plaza, and ceremonial entry.

The cemetery's Master Plan map is shown in **Figure 2** and graphically illustrates the planned buildout of the cemetery with Phase 1 through Phase 11 facilities. It is estimated that each phase will be constructed approximately every 10 years.

This TIA complies with transportation impact study guidelines and criteria set forth by the City of Seaside, Monterey County, and the Fort Ord Reuse Authority (FORA). The *Traffic Impact Assessment for California Central Coast Veterans Cemetery (CCCVC Phase 1 Project, Seaside, CA)* prepared by KD Anderson & Associates was prepared for Phase 1 development of the cemetery and is referenced throughout this document. The KD Anderson & Associates study is included for reference purposes in the **Appendix**.

Analysis Methodology

Development Conditions

This transportation impact analysis is based on the following development conditions:

1. **Scenario 1: Existing (2019) Conditions**
   Scenario 1 is based on current traffic count data collected in January 2019, as well as existing roadway geometry and traffic control.
2. **Scenario 2: Existing (2019) Plus Phase 2 Conditions**
   Scenario 2 is based on existing January 2019 traffic volumes, existing roadway geometry, and traffic control and traffic generated by Phase 2 of the Project.
3. **Scenario 3: Cumulative (2040) Conditions**

Scenario 3 is based on future traffic forecasted for developments anticipated to occur through 2040 for 2 roadway buildout alternatives. “Off the shelf” AMBAG model runs were used to estimate Alternative 1 future volumes. This model includes the assumption that the Northeast Southwest Arterial Connector Roadway Project (also known as “Eastside Parkway” in the RTP) is constructed by the year 2040. Alternative 2 was also run using the AMBAG model with the assumptions that the Northeast Southwest Arterial Connector Roadway is not constructed by the year 2040.

4. **Scenario 4: Cumulative (2040) Plus Phase 4 Conditions**
   Scenario 4 is based on Cumulative alternatives 1 & 2, along with Project traffic generated by Phases 2, 3, & 4 in the year 2040.
5. **Scenario 5: Master Plan Buildout Condition**
   This scenario qualitatively evaluates buildout of the cemetery’s 100-year master plan (construction of all 11 proposed phases) and the potential effects the development would have on the transportation network within the study area.



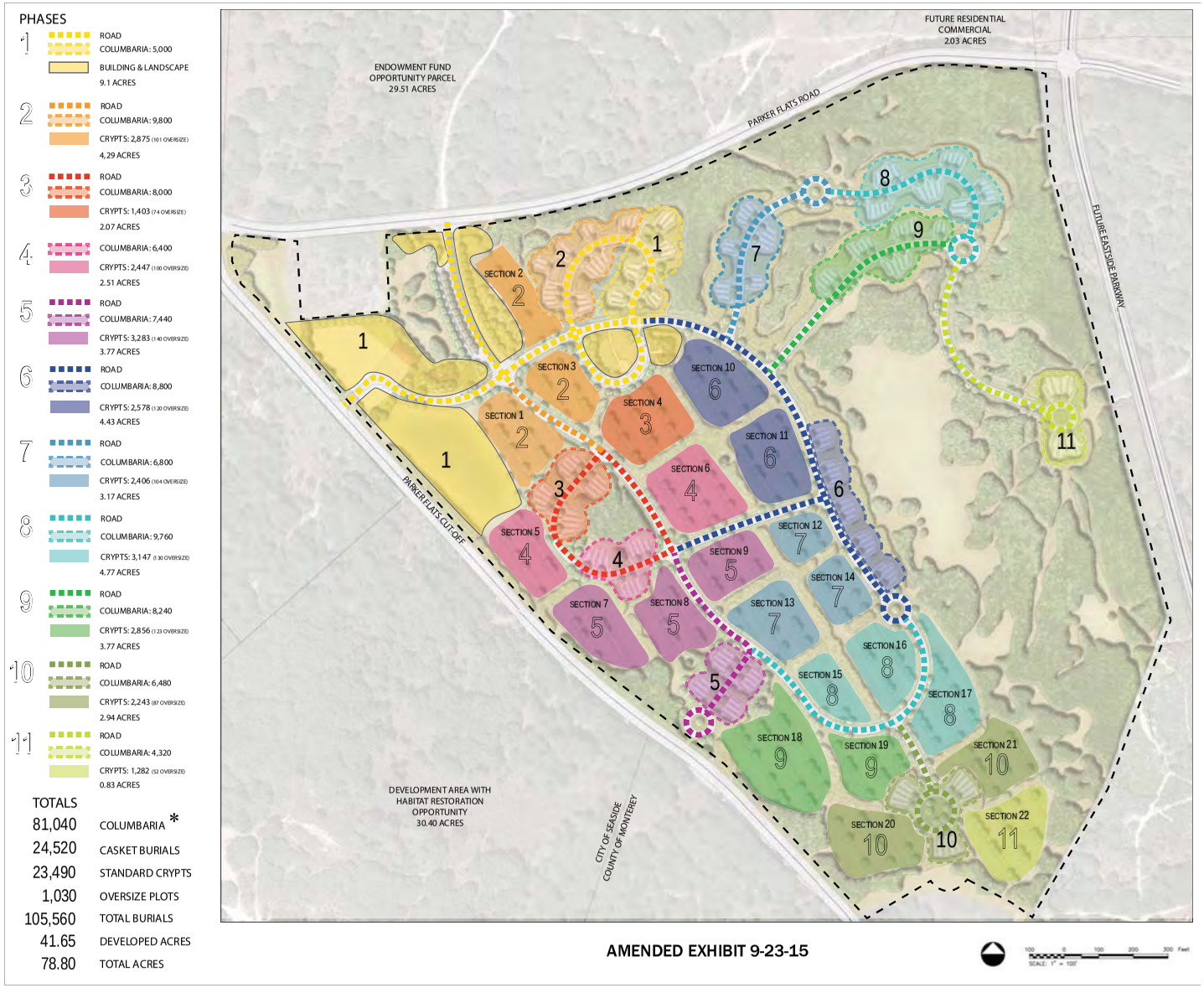
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Central Coast Veterans Cemetery

Figure 1

Project Location Map



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Central Coast Veterans Cemetery
Figure 2
Project Site Plan

Operating Conditions and Criteria for Intersections

Analysis of potential operational impacts at roadway intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the *Highway Capacity Manual (HCM)* and *Synchro 10* traffic analysis software.

HCM methodologies include procedures for analyzing side-street stop-controlled (SSSC), two-way stop-controlled (SSSC), all-way stop-controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement. The AWSC and signalized intersection procedures define LOS as a function of average control delay for the overall intersection. HCM 2010 does not provide methodology to analyze u-turns. Therefore, u-turns are analyzed (and illustrated in volume figures) as left-turns in this study.

Table 1 provides operational descriptions and characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1 – Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	Less than 10	less than 10
B	Stable traffic. Traffic flows smoothly with few delays.	less than or equal to 10 to 20	less than or equal to 10 to 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	less than or equal to 20 to 35	less than or equal to 15 to 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	less than or equal to 35 to 55	less than or equal to 25 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	less than or equal to 55 to 80	less than or equal to 35 to 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	greater than or equal to 80	greater than or equal to 50
Sources: Transportation Research Board, *Highway Capacity Manual 2010*, National Research Council.			

Project impacts are determined by comparing conditions without the proposed Project to those with the proposed Project. Significant impacts for intersections are created when traffic from the proposed Project causes the LOS to fall below the maintaining agency's LOS threshold or causes deficient intersections to deteriorate further, per the criteria indicated below.

City of Seaside

The City of Seaside is currently in the process of updating their general plan. The Public Draft General Plan (Seaside 2040) is available for review and comment, however, it has not yet been adopted. Therefore, significant impact criteria and LOS standards at City of Seaside study intersections are based upon the most recent City of Seaside General Plan (2004).

Signalized Intersections

The level of service standard for signalized intersections is LOS C. A significant impact would occur if an intersection operating at unacceptable LOS A, B, or C degrades to LOS D, E, or F. For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the Project results in an increase of more than 1.0 second in average delay.

Unsignalized Intersections

The level of service standard for unsignalized intersections is LOS C for the average delay of all entering traffic at most locations. In addition to average delay for all entering traffic (overall intersection delay), the standard for side street operations is LOS E or F, in conjunction with peak hour signal warrants described in the most recent version of the Caltrans Traffic Manual.

Monterey County

The Monterey County General Plan 2010 has established LOS D as the level of service standard for County roads and intersections, except as follows:

- Acceptable level of service for County roads in Community Areas may be reduced below LOS D through the Community Plan process.
- County roads operating at LOS D or below at the time of adopting this General Plan shall not be allowed to be degraded further except in Community Areas where a lower LOS may be approved through the Community Plan process.
- Area Plans prepared for County Planning Areas may establish an acceptable level of service for County roads other than LOS D. The benefits which justify less than LOS D shall be identified in the Area Plan. Where an Area Plan does not establish a separate LOS, the standard LOS D shall apply.

SB 743

- Senate Bill 743 requires lead agencies to evaluate the project's VMT impacts. Full implementation of this requirement is anticipated to occur by the middle of 2020. This

study determined VMT for the project development. No regional or local VMT threshold has been determined by the governing agencies and only the project VMT is calculated.

Study Intersections

The proposed Project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions, the intersections listed in **Table 2** were selected for evaluation based on the assumed Project trip assignment and knowledge of the study area.

Table 2 – Study Intersections

#	Intersection
1	General Jim Moore Blvd & Gigling Rd
2	Gigling Rd & Parker Flats Cut Off Rd
3	General Jim Moore Blvd & Normandy Rd
4	Project Driveway & Parker Flats Cut Off Rd
5	Parker Flats Cut Off Rd & Northeast Southwest Arterial Connector Roadway
6	General Jim Moore Blvd & Coe Ave

**All traffic count data collected on 1/24/2019*

These study intersections are illustrated in **Figure 1**.

Report Organization

This transportation impact analysis is organized into the following chapters:

Chapter 2 describes the existing transportation system in the Project vicinity as well as current operating conditions at study intersections.

Chapter 3 presents the Project description, as well as trip generation and assignment that would be added to Project roadways. Project Site Access, Parking, and Circulation are also discussed.

Chapter 4 describes Existing Plus Phase 2 Conditions and analysis.

Chapter 5 discusses Cumulative Conditions and Cumulative Plus Phase 2, 3, and 4 Conditions.

Chapter 6 evaluates buildout of the Central Coast Veterans Cemetery 100-year Master Plan.

Chapter 7 presents an evaluation of on-site parking supply, demand, and traffic management.

Chapter 8 analyzes Vehicle Miles Traveled (VMT) for the proposed Project.

Chapter 9 presents the Project's potential effects on pedestrian, bicycle, and transit mobility. Driveway conceptual layouts are also presented.

Chapter 10 evaluates special event traffic as well as traffic generated due to construction activities.

Chapter 11 presents the summary of impacts and mitigation measures. Traffic impact fees applicable to the proposed Project are also presented.

A technical appendix is also attached containing traffic count data, intersection level of service analysis outputs, the Traffic Impact Assessment by KD Anderson & Associates (referenced in this TIA), MST Route Maps and Schedules, TAMC 2011 Bicycle and Pedestrian Master Plan Proposed Bikeway Map, Signal Warrant Evaluations.

2. EXISTING CONDITIONS

Existing Roadway Network

The following provides descriptions of principal roadways that are located within the study area:

Lightfighter Drive

Lightfighter Drive is a four-lane, divided arterial that originates at an interchange on SR 1 and continues easterly across General Jim Moore Blvd to Colonel Durham Street. The roadway is less than one-mile long. No bike facilities are provided along Lightfighter Drive; however, sidewalk is provided on both sides of the roadway. The posted speed limit is 40 mph.

General Jim Moore Boulevard

General Jim Moore Boulevard is a two-lane, undivided roadway, running north-south from Divarty Street south to Lightfighter Road. South of Lightfighter Road the roadway widens to a four-lane, divided arterial, which extends to SR-218. Class I bike facilities are provided along the east side of the roadway from Normandy Road to Coe Avenue / Eucalyptus Road. Southbound Class II bike facilities are provided north of Coe Avenue / Eucalyptus Road. The posted speed limit is 35 mph southbound and 40 mph northbound.

Gigling Road

Gigling Road is a two-lane, undivided arterial, extending east and west from Noumea Road west of General Jim Moore Boulevard to 8th Avenue east of General Jim Moore Boulevard. No bike facilities are provided along Gigling Road. Sidewalk exists along both sides of the road in the study area. The posted speed limit is 35 mph.

Normandy Road

Normandy Road is a two-lane, local roadway that extends from Monterey Road west of General Jim Moore Blvd to where it becomes Parker Flats Cut-Off Road east of the Project site. Sidewalk is provided on the north side of Normandy Road from General Jim Moore Blvd to a point just west of Park Flats Cut Off Road. Bicycle facilities are not provided.

Normandy Road provides access to George C. Marshall Elementary School, which is located along the south side of the street just east of General Jim Moore Blvd. Roughly 12 on-street parking spaces exist along the south side of Normandy Road.

Chartwell Elementary School, which is a charter school, is located south of Normandy Road along Numa Watson Road. Porter Youth Center is located in the northeast corner of the intersection of General Jim Moore Boulevard & Normandy Road.

A drop off zone exists along the north side of Normandy Road, west of General Jim Moore Boulevard. This zone provides an area for student drop offs to the Dual Language Academy of the Monterey Peninsula that exists at the northwest corner of the intersection of General Jim Moore Boulevard & Normandy Road.

All-way stop controls and school zone crosswalks have been installed at four intersections along Normandy Road between General Jim Moore Blvd and Parker Flats Cut Off Road, including three locations within ¼ mile of the George C. Marshall Elementary School frontage. The posted speed limit is 25 mph along Normandy Road.

Parker Flats Cut Off Road

Parker Flats Cut Off Road is a local two-lane undivided roadway that intersects at Coe Avenue / Eucalyptus Road south of the Project site and extends north where it intersects with Colonel Durham Street. Parker Flats Cut Off Road also extends from Normandy Road, west of the Project site to the east and southeast, where it intersects with Eucalyptus Road. Barriers currently exist on Parker Flats Cut Off Road, south of the Project site near the intersection with Eucalyptus Road.

Coe Avenue / Eucalyptus Road

Coe Avenue / Eucalyptus Road is an east-west facility south of the Project site that extends from Monterey Road in the west through the southern Fort Ord area in the east. West of General Jim Moore Boulevard, the roadway exists as "Coe Avenue" and provides access to Seaside Middle School (in the northwest corner of the General Jim Moore Boulevard intersection) and residential land uses. East of General Jim Moore Boulevard, the roadway is called "Eucalyptus Road" and is a little used rural road.

A barrier exists along Eucalyptus Road, east of General Jim Moore Boulevard, which restricts local access. Roughly 1½ miles of Eucalyptus Road has been improved with sidewalk along both sides of the road, new curb & gutter, and Class II bike facilities.

Northeast Southwest Arterial Connector Roadway (formerly Eastside Parkway)

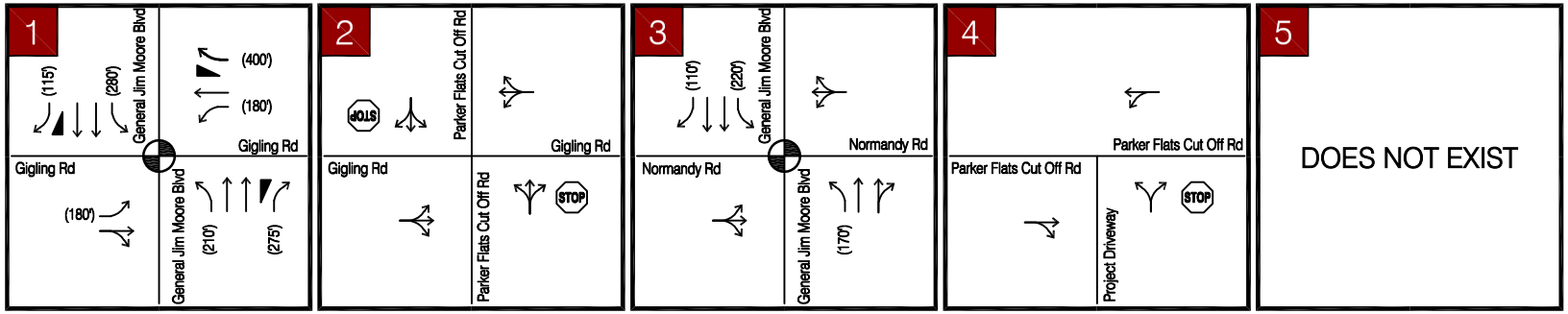
Eastside Parkway is included in the AMBAG 2040 MTP/SCS and the FORA Master Plan. It is a new two to four-lane roadway that will connect Parker Flats Cut-off / Coe Avenue to Inter-Garrison Road. FORA is currently evaluating the feasibility of constructing this roadway, which includes alternative alignments and a no-build option. Access from this road will be provided to Gigling Road.

Existing study intersection geometries and traffic control are shown in **Figure 3.**

Existing Peak-Hour Turning Movement Volumes

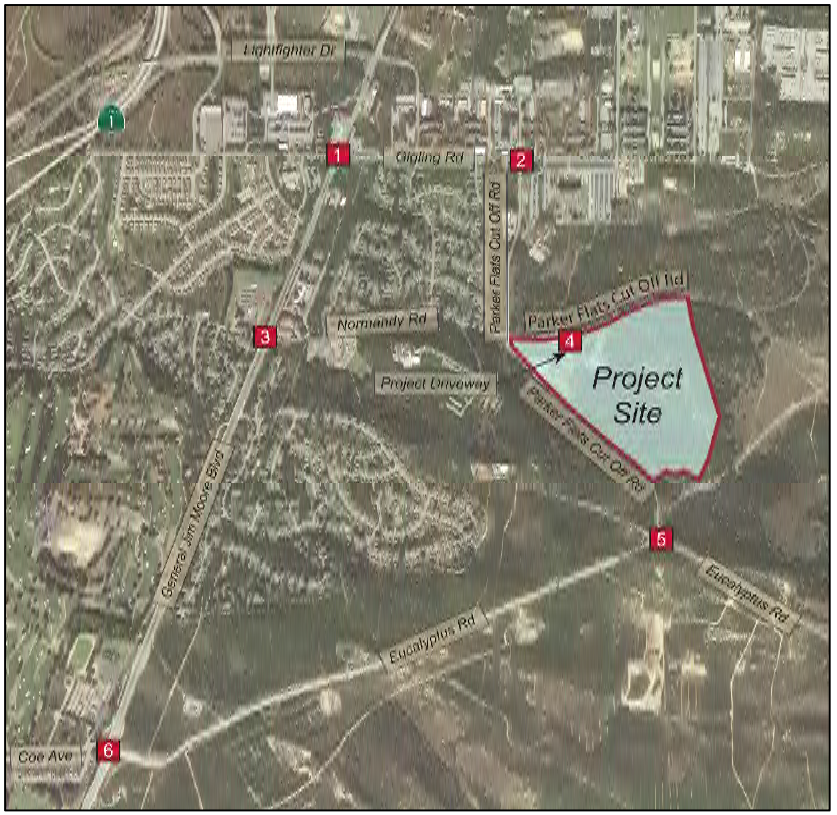
Existing conditions traffic volume data was collected on January 24th, 2019 during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. The data includes vehicles, bicycles, and pedestrians. The data collection was conducted when local schools were in session and the weather was fair. Peak hour volumes at each intersection's respective peak were conservatively used in this analysis, therefore, some volume imbalances were observed between study intersections. Where imbalances occurred, volumes were conservatively increased above what was counted in the field where applicable. Existing peak hour turning movement volumes are shown in **Figure 4.**

The General Jim Moore Boulevard and Coe Avenue intersection currently operates as a T-intersection. The east leg (Eucalyptus Road) is not publicly accessible in existing conditions. Intersection volume data sheets for all traffic counts are provided in the **Appendix**.



6

NOT ANALYZED (EUCALYPTUS ROAD CLOSED)



LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- (XXX') TURN POCKET LENGTH (FT)
- CHANNELIZED RIGHT TURN

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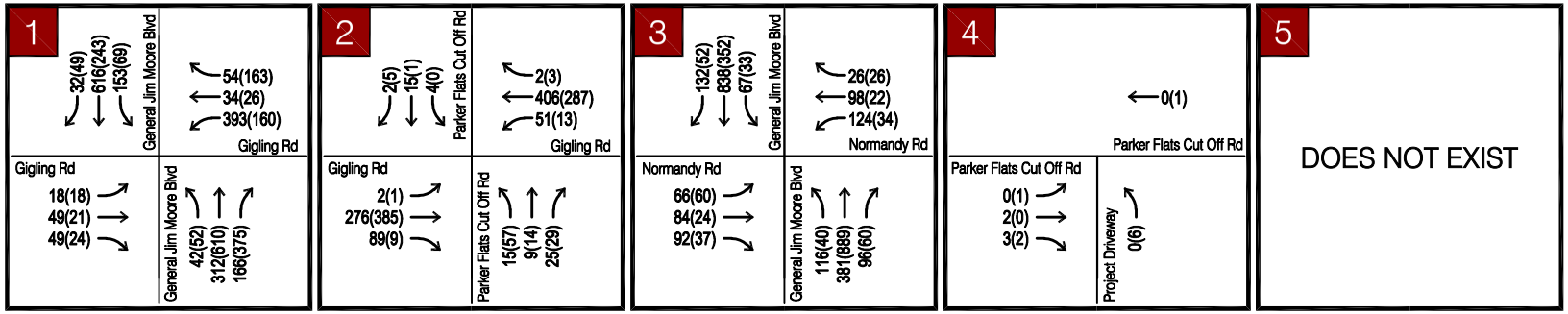
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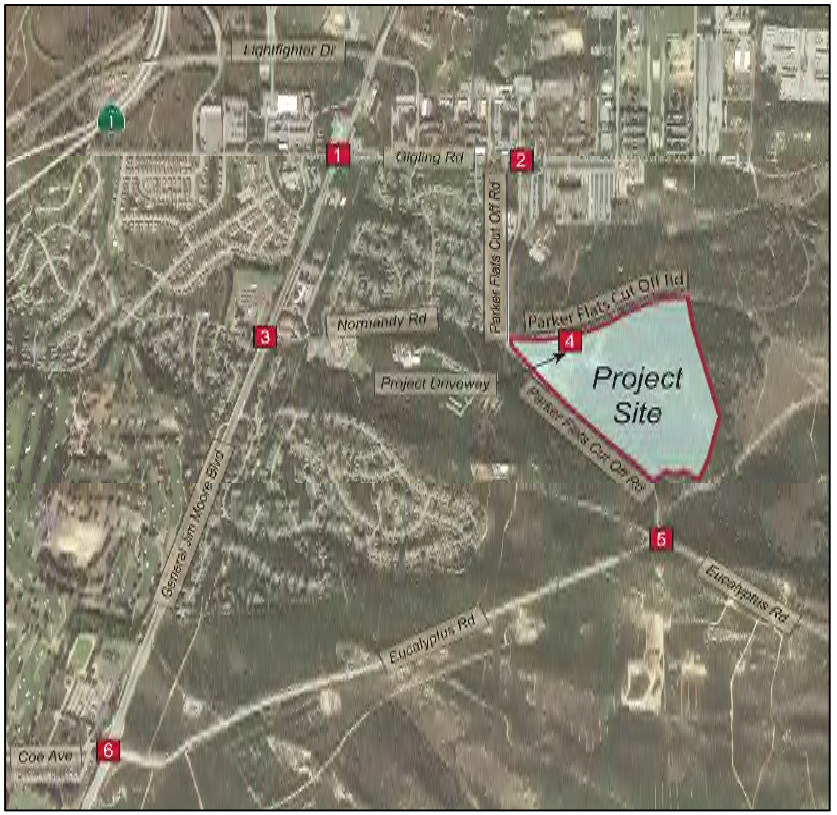
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Central Coast Veterans Cemetery

Figure 3

Existing Conditions Lane Geometry and Traffic Control





LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- XX(XX) AM PEAK (PM PEAK)

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Expect More. Experience Better.

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Central Coast Veterans Cemetery

Figure 4

Existing Conditions Peak Hour Volumes

Existing Transit Facilities

Transit Service

The Monterey-Salinas Transit (MST) agency currently provides regular transit service throughout Monterey County and in the general vicinity of the Project site. Additionally, MST offers ADA Paratransit (RIDES) pick-up and drop-off service to eligible passengers as a ride-share program. MST RIDES ADA service is provided within a service corridor that extends ¾ of a mile from any of MST's regular bus routes. The Project site is within the ¾ of a mile service area (via a regular stop along Normandy Road, approximately 1,900 feet west of the Project site) and eligible visitors going to the proposed Project would be able to travel to the site using the MST RIDES ADA service.

Existing bus stops for regular MST service along roadways in the study area are as follows:

Normandy Road

The closest MST bus stop to the Project site is located roughly 1,900 feet west of the site along Normandy Road, serving MST route 75. This is farther than a typical ¼ mile walking distance, or 1,320 feet, assumed for transit access to a facility.

General Jim Moore Boulevard

Existing MST stops are located along General Jim Moore Boulevard, west of the Project site, which provide transit service to routes 12, 16, and 75. Route 12 operates on weekdays only and includes seven runs (from The Dunes) and eight runs (from NPS) between 6:45 AM to 5:45 PM. Route 16 operates daily and includes sixteen runs between 6:45 AM to 11:00 PM. Route 75 operates on weekdays only and includes fifteen runs (from Presidio Express) and nine runs (from Marshall Park Express) between 5:45 AM to 10:15 PM.

Gigling Road

Existing MST stops are located along Gigling Road, north of the Project site, which provide transit service to routes 12, 16, 74, 75, and 76. Route 12 operates on weekdays only and includes seven runs (from The Dunes) and eight runs (from NPS) between 6:45 AM to 5:45 PM. Route 16 operates daily and includes sixteen runs between 6:45 AM to 11:00 PM. Route 74 operates on weekdays only and includes one run (from Presidio) and two runs (from Toro Park) between 6:15 AM to 6:00 PM. Route 75 operates on weekdays only and includes fifteen runs (from Presidio Express) and nine runs (from Marshall Park Express) between 5:45 AM to 10:15 PM. Route 76 operates on weekdays only and includes five runs (from Presidio Express) and six runs (from Stilwell Park Express) between 4:00 AM to 5:15 PM.

Note that a gap in the City's sidewalk network currently exists along Normandy Road between the closest MST bus stop and the Project site (west of the Project site). Therefore, potential transit users would not have sidewalk to walk upon between the existing MST bus stop and the proposed Project site. MST route map and schedules are included in the **Appendix**.

Existing Pedestrian and Bicycle Facilities

Pedestrians

Sidewalk exists along the north side of Normandy Road roughly 800 feet west of the proposed Project site. Sidewalk does not currently exist along Parker Flats Cut Off Road along the Project frontage and a roughly 90-foot gap in sidewalk exists along the north side of Normandy Road, west of Parker Flats Cut Off Road. Additionally, crosswalks do not currently exist at the all-way stop-controlled intersection of Normandy Road & Parker Flats Cut Off Road. This represents a gap in the City's pedestrian network that would present a challenge for potential pedestrians or transit users to access the Project site.

Bicycles

There are no existing Class I, II, or III bikeway facilities within ½ mile of the Project. A Class I bike path exists along the east side of General Jim Moore Boulevard approximately ¾ of a mile west of the Project site at the intersection of General Jim Moore Boulevard & Normandy Road.

Class I facilities are paved bicycle paths that are physically separated from the vehicular travel lane. Class I facilities currently exist along General Jim Moore Boulevard between Normandy Road and Eucalyptus Road, and is approximately 6,000 feet long.

Class II facilities are striped bike lanes along the street. Class II facilities currently exist on Eucalyptus Road between General Jim Moore Boulevard and Parker Flats Cut Off Road and just north of Coe Avenue / Eucalyptus Road along the General Jim Moore Boulevard southbound approach.

Class III bicycle facilities are bike routes denoted by signs that are shared with vehicles along the roadway. No Class III bicycle facilities exist within the study area.

The *Figure 4: Existing and Proposed Bikeways*, which is part of the TAMC *2011 Bicycle and Pedestrian Master Plan* is included in the **Appendix**.

Existing Level of Service at Study Intersections

Traffic operations were evaluated at the study intersections based on Existing Conditions lane geometry, traffic control, and AM and PM peak hour traffic volumes.

Study Intersection #5 is a future intersection that will be constructed as part of the Northeast Southwest Arterial Connector Road Project and is therefore not analyzed in existing conditions.

All study intersections operate at an acceptable LOS during Existing Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)

Results of the analysis are presented in **Table 3** and Synchro output sheets are provided in the **Appendix**.

Note that study intersection #6 (General Jim Moore Boulevard & Coe Avenue / Eucalyptus Road) is currently an all way stop controlled T-intersection in existing conditions. Based upon Manual of Uniform Traffic Control Devices (MUTCD 2014) peak hour signal warrant #3 is satisfied and a signal is warranted at this study intersection. Peak hour signal warrant worksheets and a brief writeup of assumptions are included in the **Appendix**.

Table 3 – Existing Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Existing Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**48.2**	**D**	Overall	18.5	B
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	1.9	-	Overall	2.6	-
				Worst Approach	20.7	C (SB)	*Worst Approach*	19.0	C (NB)
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	24.6	C	Overall	14.6	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	5.3	-
				Worst Approach	0.0	A (NB)	*Worst Approach*	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Arterial Connector Roadway	MC	DOES NOT EXIST						
6	General Jim Moore Blvd & Coe Ave	CS	NOT ANALYZED (EUCALYPTUS ROAD CLOSED)						

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

Note that no vehicles exit the Project driveway during the existing AM peak hour at study intersection #4. Additionally, no vehicles enter the site via the westbound left-turn movement. Therefore, the overall and approach delays are 0.0 seconds.

3. PROPOSED PROJECT

The Project site is located at the southeast corner of the intersection of Normandy Road & Parker Flatts Road, located in the City of Seaside and Monterey County.

Phase 1 (existing site) of the Central Coast Veterans Cemetery has already been constructed and currently operates on 9.10 acres of land. The existing cemetery's main access point is located at the north end of the Project site along Normandy Road. A secondary access point is located at the west side of the cemetery site, along Parker Flats Road. The secondary access is gated and is not open to the public. **Figure 1** shows the Project location map and study area. Existing Phase 1 includes 9.10 acres of developed land, which includes burial facilities, administration and maintenance facilities, a committal shelter for burial services, and additional elements to honor veterans, including a memorial walk, flag plaza, and ceremonial entry.

The cemetery's Master Plan map is shown in **Figure 2** and graphically illustrates the planned buildout of the cemetery along with Phase 1 through Phase 11 facilities. It is estimated that 1 phase will be constructed every 10 years.

Trip Generation Estimates

The Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition (2017)* was considered to estimate the trip generation potential for the existing uses and the proposed Project. A trip is defined in *ITE Trip Generation* as a single or one-directional vehicle movement with either the origin or destination at the Project site. In other words, a trip can be either "to" or "from" the site. For example, a single customer visit to a site is counted as two trips (i.e., one to and one from the site).

For the purposes of determining the worst-case impacts of traffic on the surrounding street network, Project peak hour trips were estimated between the hours of 7:00-9:00 AM and 4:00-6:00 PM on a weekday, which is when the street network in the Project vicinity is anticipated to peak. While the Project itself may generate more traffic during other times of the day, the peak of "adjacent street traffic" represents the time period when the uses contribute to the greatest amount of congestion, and consequently potential impacts.

Existing driveway count data was collected on January 24th, 2019 during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. This existing data represents the trip generation for Phase 1 of the existing cemetery. A comparison of driveway count data and ITE estimates indicates that Phase 1 AM and PM peak hour trip generation rates are slightly higher than ITE trip generation rates for cemetery land uses (ITE land use code 566). Therefore, the site-specific AM and PM peak hour trip generation rates (based on the driveway count data) were used to estimate the trip generation of each proposed phase of the Project. Daily data for the existing site is not available, therefore, ITE land use code 566 (Cemetery) is used for estimation of daily trips generated by each phase of the Project. This ITE land use was also used in the Fort Rosecrans National Cemetery TIA (August 2006).

Construction of Phase 2 is anticipated to occur in the near term and construction of Phases 3 and 4 are anticipated to occur by the year 2040. Following 2040, the remaining 7 phases (Phase 5 through Phase 11) are anticipated to occur within the 100-year master plan buildout.

The following sections identify/estimate the trip generation of Phases 1 through 4.

Phase 1

As indicated in **Table 4**, the existing cemetery (Phase 1) currently generates 3 AM peak hour trips (3 in, 0 out) and 8 PM peak hour trips (2 in, 6 out). Based on ITE data, Phase 1 generates 56 daily trips. Based on the Phase 1 trip generation data and the developed size of Phase 1 (9.10 acres), it is estimated that the site-specific AM peak hour trip generation rate is 0.33 trips per 1,000 square feet of cemetery land uses. Similarly, it is estimated that the site-specific PM peak hour trip generation rate is 0.88 trips per 1,000 square feet of cemetery land uses. This compares to ITE AM and PM peak hour trip generation rates of 0.17 AM peak hour trips per 1,000 square feet and 0.46 PM peak hour trips per 1,000 square feet (from cemetery land use code 566).

Phase 2

Phase 2 proposes to develop approximately 4.29 square feet of additional cemetery land uses. As indicated in **Table 4** and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 26 daily trips, 2 AM peak hour trips (1 in, 1 out), and 4 PM peak hour trips (1 in, 3 out).

Phase 3

Phase 3 proposes to develop approximately 2.07 square feet of additional cemetery land uses. As indicated in **Table 4** and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 14 daily trips, 1 AM peak hour trips (1 in, 0 out), and 2 PM peak hour trips (1 in, 1 out).

Phase 4

Phase 4 proposes to develop approximately 2.51 square feet of additional cemetery land uses. As indicated in **Table 4** and based on ITE daily data and site-specific peak hour trip generation rates, this phase would generate an additional 16 daily trips, 1 AM peak hour trips (1 in, 0 out), and 2 PM peak hour trips (1 in, 1 out).

In summary, it is anticipated that Phase 2 will be generated in the near term and is therefore analyzed in later sections of this report under Existing Plus Phase 2 conditions. It is also anticipated that Phase 3 and Phase 4 development will follow Phase 2, with one phase being developed every 10 years. Consequently, construction of Phases 2, 3, and 4 is expected to be completed by Cumulative year 2040, which is analyzed later in this report under Cumulative (2040) Plus Phase 2, 3, & 4 Conditions.

Special Events

The Project is expected to host special events several times during the year, and these events would attract appreciable numbers of people to the site. Events would be expected to occur on Memorial Day, Veterans Day, and Independence Day, and an average of approximately 1,000 visitors per event are expected. Special events would generate an appreciable number of vehicle

trips, and assuming typical vehicle occupancy rates achieved for public events (i.e., 2.5 persons per vehicle) 800 daily trips (400 inbound and 400 outbound) could occur. The Project description notes that these special events would be organized by the local community, and off-site parking with shuttle service would be required. During major events, off-site parking within the former Fort Ord property would be utilized to accommodate the increased parking demand. Shuttle service would be provided to the Project site.

Based on the estimate of up to 400 vehicle trips per special event, on-site parking should also be provided for 400 vehicles per event.

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Table 4 - Proposed Existing Plus Phase 2 Weekday Trip Generation

Land Use	ITE Land Use Code	Phase	Size		Daily Rate[1]	Daily Trips	AM Peak Hour[2]				PM Peak Hour[2]			
							Rate	In	Out	Total	Rate	In	Out	Total
Existing Conditions														
Cemetery	566	1	9.10	acres	6.02	56	0.33	3	0	3	0.88	2	6	8
Proposed for LOS Analysis														
Cemetery	566	2	4.29	acres	6.02	26	0.33	1	1	2	0.88	1	3	4
Cemetery		3	2.07			14		1	0	1		1	1	2
Cemetery		4	2.51			16		1	0	1		1	1	2
New Project Trips (Phases 2, 3, & 4)					-	56	-	3	1	4	-	3	5	8
Existing + New Project Trips (Phases 1, 2, 3, & 4)					-	112	-	6	1	7	-	5	11	16

Notes:

1. ITE Code 566 (Cemetery); Based on ITE average rate.

2. Based on traffic counts collected on 1/24/2019

3. Note that trips generated by each phase of the Project are rounded when appropriate. Daily trips are rounded to the nearest even number to represent in and out trips.

**ITE = Institute of Transportation Engineers, Trip Generation 10th Edition (2010)*

Trip Distribution and Assignment

Trip distribution estimates were developed based on knowledge of the study area, as well as existing and future traffic patterns. The cemetery is expected to primarily attract visitors from counties within a 75- mile radius, ranging from the San Francisco Bay Area to San Luis Obispo. As a result, State Route 1 and its interchange at Lightfighter Drive, General Jim Moore Road, Gigling Road, Parker Flats Cut Off Road, and Normandy Road are the likely routes to the site in the near term. The estimated Project trip distribution reflects these characteristics and is assumed as follows:

Existing Network Trip Distribution

- 100%/100% (IN/OUT) of Project trips are estimated to travel west on Parker Flats Cut Off Road
- 20%/20% (IN/OUT) of Project trips are estimated to travel west on Normandy Road
- 80%/80% (IN/OUT) of Project trips are estimated to travel north on Parker Flats Cut Off Road
- 20%/20% (IN/OUT) of Project trips are estimated to travel east on Gigling Rd
- 60%/60% (IN/OUT) of Project trips are estimated to travel west on Gigling Rd, continuing north on General Jim Moore Boulevard
- 20%/20% (IN/OUT) of Project trips are estimated to travel south on General Jim Moore Boulevard

Figure 5 illustrates the assumed existing network Project trip distribution. **Figure 6** shows the assumed Phase 2 trip assignment upon the existing network.

Cumulative Alternative 1 Network Trip Distribution

- 100%/100% (IN/OUT) of Project trips are estimated to travel west on Parker Flats Cut Off Road
- 10%/10% (IN/OUT) of Project trips are estimated to travel west on Normandy Road, continuing south on General Jim Moore Boulevard
- 60%/60% (IN/OUT) of Project trips are estimated to travel north on Parker Flats Cut Off Road
- 10%/10% (IN/OUT) of Project trips are estimated to travel south on Parker Flats Cut Off Road, continuing west on Eucalyptus Road
- 20%/20% (IN/OUT) of Project trips are estimated to travel east on Northeast Southwest Arterial Connector Roadway
- 60%/60% (IN/OUT) of Project trips are estimated to travel north on General Jim Moore Boulevard
- 20%/20% (IN/OUT) of Project trips are estimated to travel south on General Jim Moore Boulevard

Figure 7 illustrates the assumed Cumulative Alternative 1 network Project trip distribution. **Figure 8** shows the assumed Phase 2, 3, and 4 trip assignment upon the Cumulative Alternative 1 network.

Cumulative Alternative 2 Network Trip Distribution

- 100%/100% (IN/OUT) of Project trips are estimated to travel west on Parker Flats Cut Off Road
- 20%/20% (IN/OUT) of Project trips are estimated to travel west on Normandy Road
- 80%/80% (IN/OUT) of Project trips are estimated to travel north on Parker Flats Cut Off Road
- 20%/20% (IN/OUT) of Project trips are estimated to travel east on Gigling Rd
- 60%/60% (IN/OUT) of Project trips are estimated to travel west on Gigling Rd, continuing north on General Jim Moore Boulevard
- 20%/20% (IN/OUT) of Project trips are estimated to travel south on General Jim Moore Boulevard

Figure 9 illustrates the assumed Cumulative Alternative 2 network Project trip distribution. **Figure 10** shows the assumed Phase 2, 3, and 4 trip assignment upon the Cumulative Alternative 2 network.

Project Site Access, Parking, and Circulation

The main Project driveway exists as a side-street stop controlled, t-intersection and is located along Parker Flats Cut Off Road / Normandy Road (north edge of the Project site). Eastbound and westbound approaches are single lanes free movements. The main Project driveway. A secondary, gated driveway also exists along the west Project boundary on Parker Flats Cut Off Road.

Both driveways were constructed as part of Phase 1 development. Regular on-site traffic operations and trip generation is anticipated to be relatively low. Therefore, the existing side-street stop control is anticipated to adequately serve regular traffic demand. Special events are anticipated to generate heavy traffic to/from the Project site and it is anticipated that a traffic management plan would be prepared to safely and efficiently serve the high vehicular and pedestrian demand.

As noted in **Figure 2** the existing internal roadways will be extended to accommodate traffic to Phase 2, Phase 3, and Phase 4 developments.

Existing Site (Phase 1)

The main entry street from Parker Flats Cut Off Road, was constructed as a one-lane (18-foot-wide) roadway in each direction with a center median. The west side of the roadway includes a two-lane cortege assembly, which could accommodate up to 30 vehicles (assuming 25 feet per vehicle). The west access road leads to the columbarium, committal shelter, and flag/assembly areas and consists of an approximately 28-foot wide-two lane roadway with parking allowed on the north side. The northeastern existing roadway is a loop road that serves the columbarium

area and consists of a 28-foot wide-one lane (one-way) roadway which could accommodate up to 60 vehicles on one side. The existing southeastern roadway is another loop road that serves the committal shelter and flag/assembly areas. It consists of a 30-foot-wide one-lane (one way) roadway, which can accommodate up to 30 vehicles (15 vehicles on each side).

The visitor/employee parking area for the administration and maintenance complex includes 10 standard parking spaces and two accessible parking spaces, in addition to providing access to the maintenance yard.

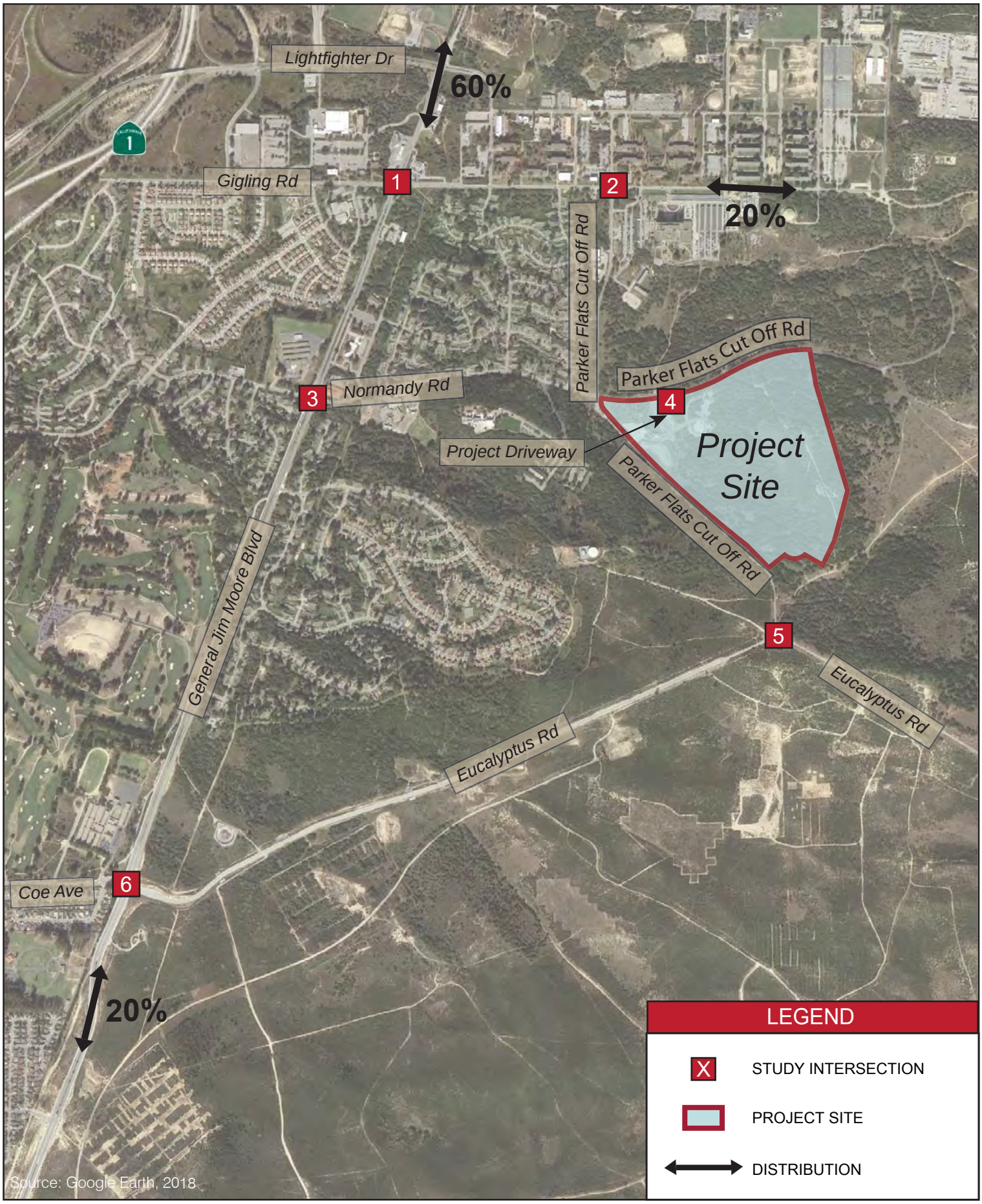
The total number of existing parking spaces available on-site along planned streets and in designated parking areas totals 132 spaces for existing conditions.

The secondary access via Parker Flats Cut Off provides access to the maintenance yard, which is normally utilized for large delivery vehicles only. The secondary access also serves as an Emergency Vehicle Access for the Project site.

Sidewalks are provided between the visitor/employee parking and cortege assembly areas and the administration and maintenance buildings. Sidewalks also connect the administration building to the memorial walk, flag/assembly area, and committal shelter areas.

Proposed Phase 2 Circulation

Phase 2 will construct an extension of entry road (Street A). It is anticipated that phase 2 parking and circulation will be similar to existing conditions (Phase 1) and the new roadway will provide access to Phase 2 crypts. See **Appendix** for Phase 2 site layout.



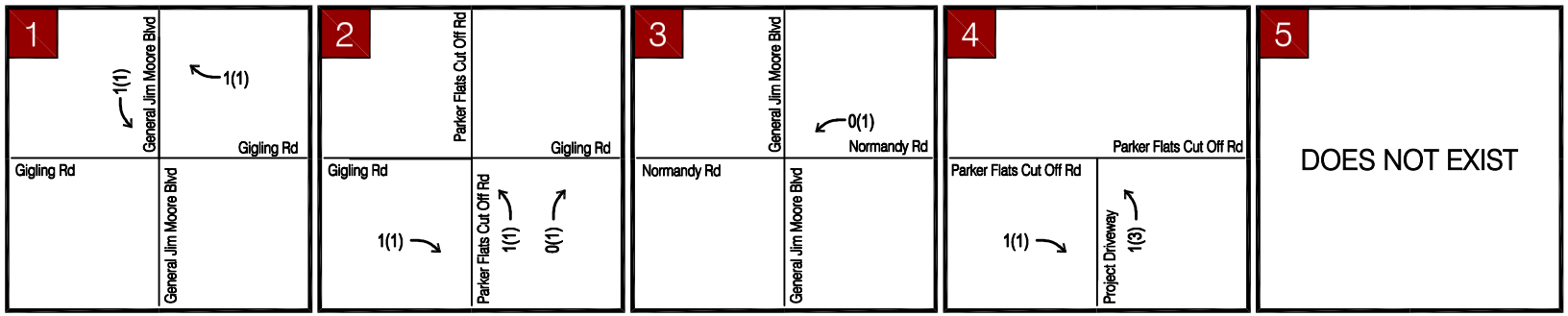
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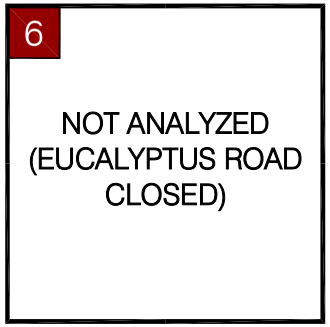
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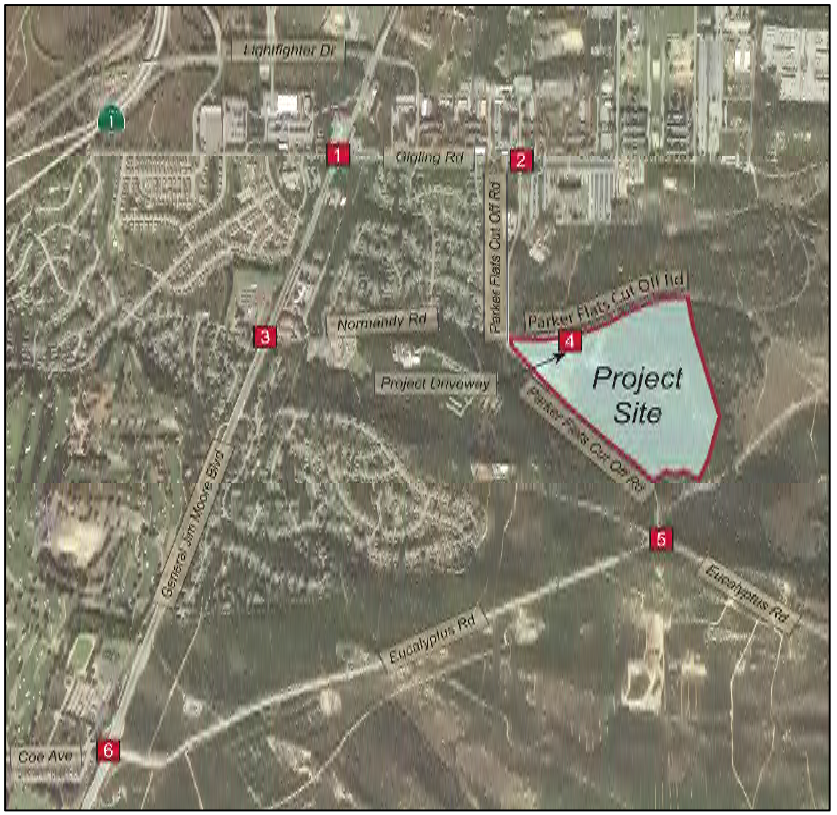
Central Coast Veterans Cemetery

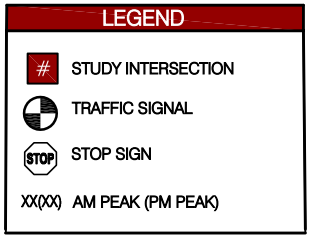
Figure 5

Existing Network Trip Distribution (Phase 2)









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NOT TO SCALE

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Figure 6

Existing Network Trip Assignment (Phase 2)



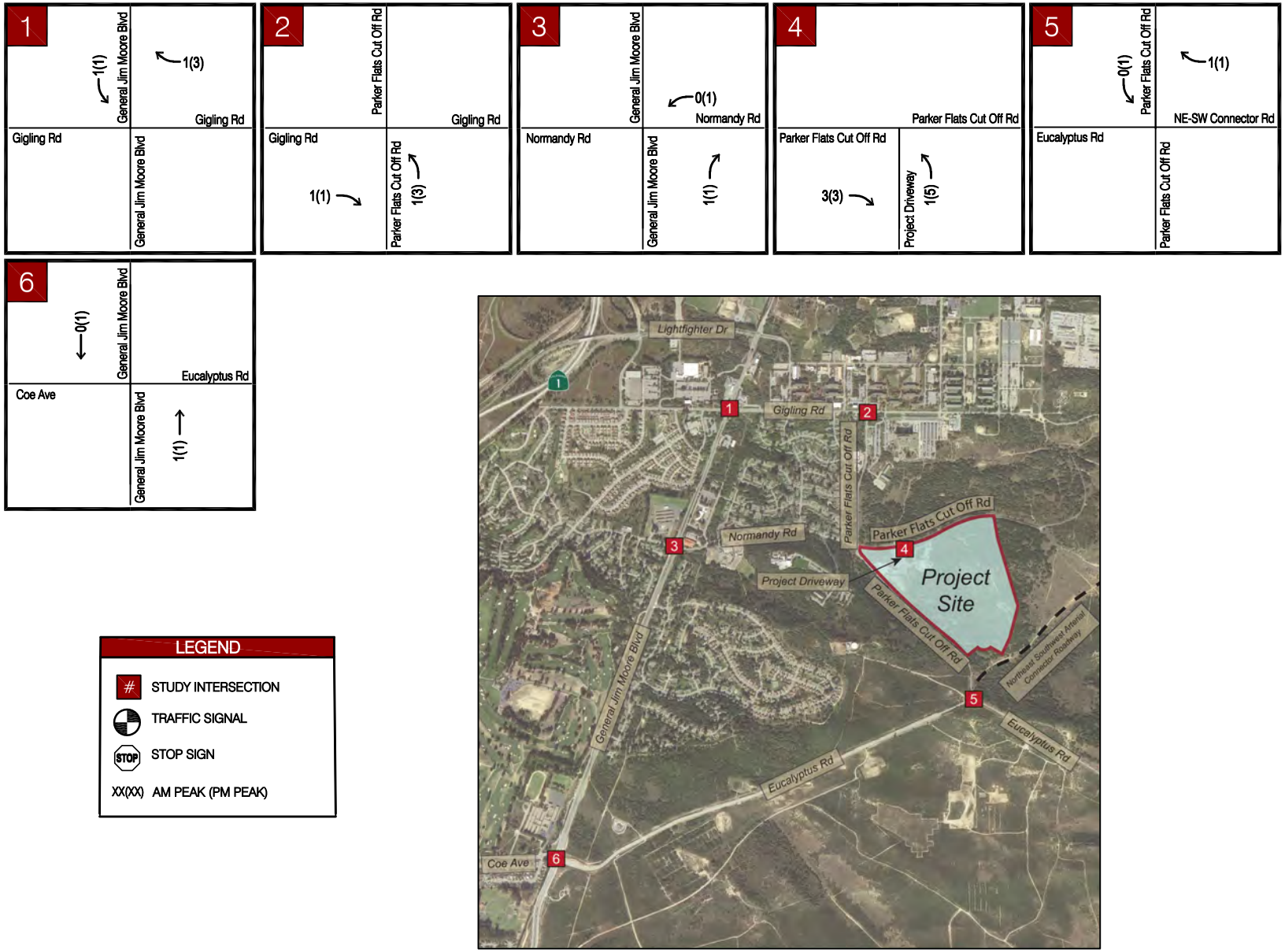
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Figure 7

Cumulative Alternative 1 Network Trip Distribution (Phase 2, 3, & 4)



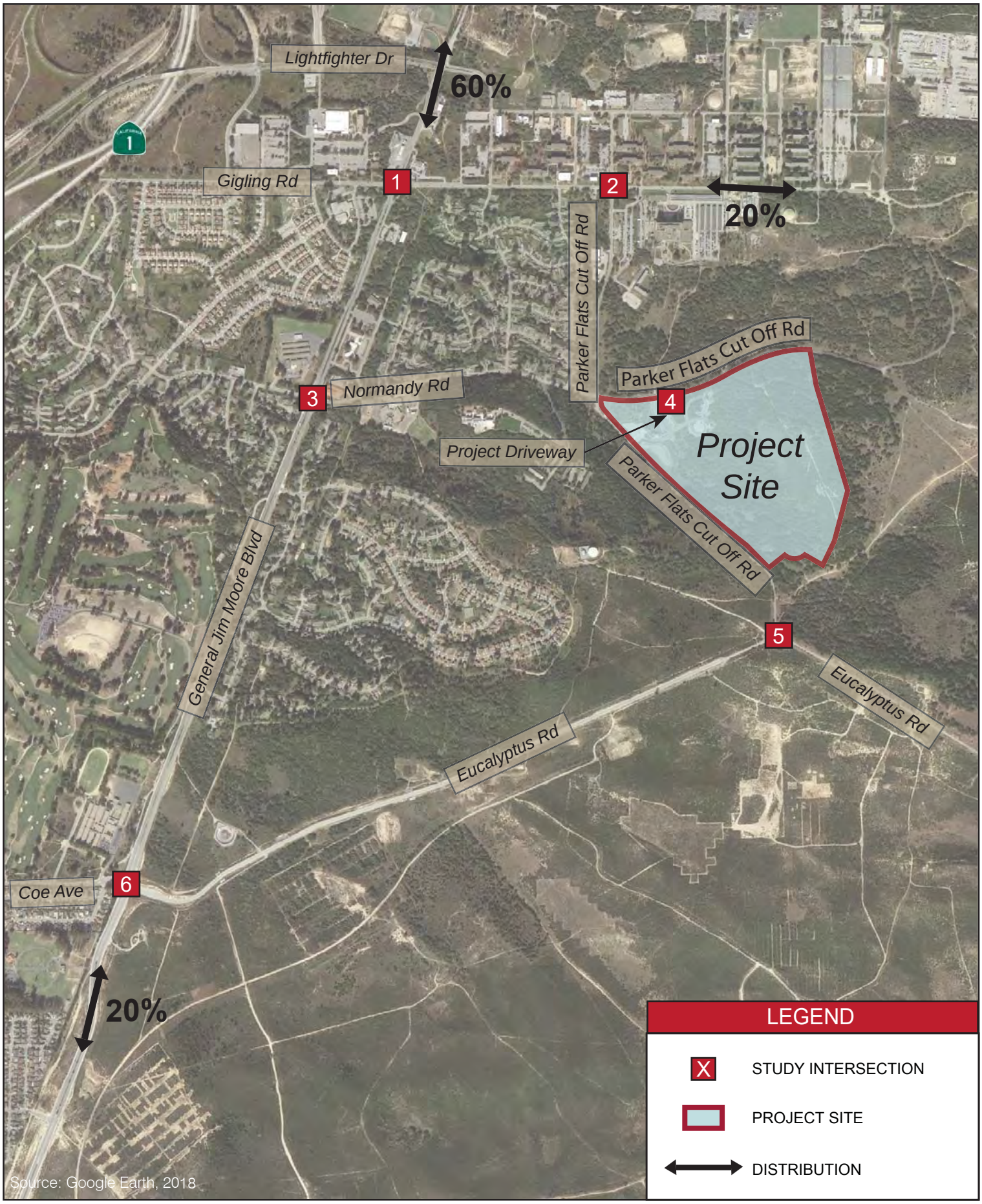
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Central Coast Veterans Cemetery

Figure 8

Cumulative Alternative 1 Network Trip Assignment (Phase 2, 3, & 4)



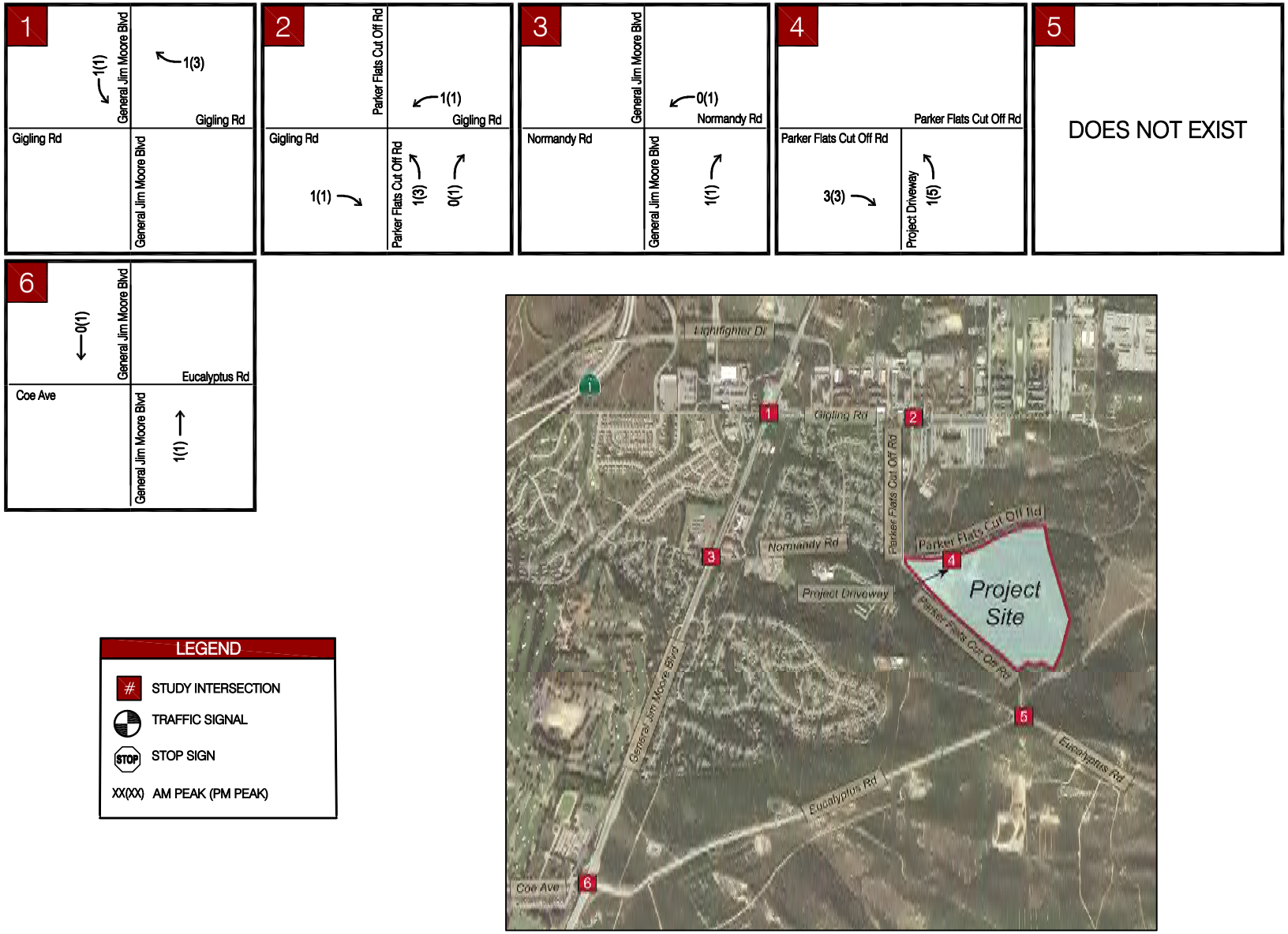
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Figure 9

Cumulative Alternative 2 Network Trip Distribution (Phase 2, 3, & 4)



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Central Coast Veterans Cemetery

Figure 10

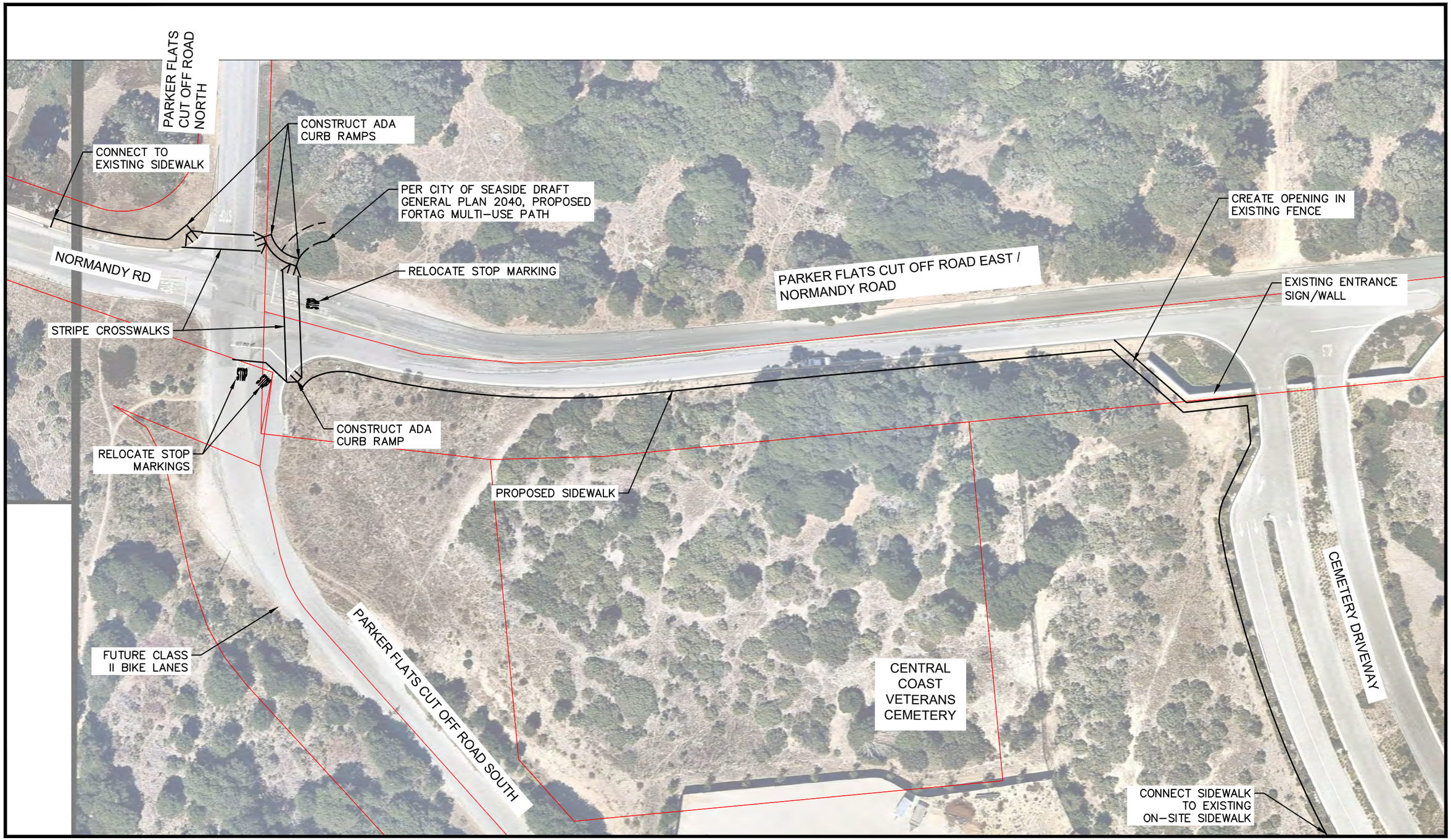
Cumulative Alternative 2 Network Trip Assignment (Phase 2, 3, & 4)

Pedestrian and Bicycle Improvements

Pedestrian and bicycle access to and from the Project site was evaluated for existing and future conditions. Currently, the cemetery (Phase 1) has no pedestrian or dedicated bicycle access. It is recommended to connect the cemetery to the existing sidewalk northwest of the Normandy Road/Parker Flats Cut-Off Road intersection. Sidewalk will need to be constructed from the on-site sidewalk network north to Parker Flats Cut-Off Road East/Normandy Road and then west along roadway. Since the entrance sign and fencing have already been built at the cemetery's entrance and no space remains for sidewalk adjacent to the driveway, it is recommended to route the sidewalk behind the entrance sign and create an opening or gate in the metal fencing. Curb ramps and crosswalks would need to be implemented across the east and north legs of the Normandy Road/Parker Flats Cut-Off Road intersection and/or the Normandy Road / Cemetery Access Road. The intersection will be a future connection point to the proposed Fort Ord Trail and Greenway (FORTAG Trail).

Existing bicycle access to the cemetery uses the vehicular travel lanes on Parker Flats Cut-Off Road East/Normandy Road for shared access. For future conditions several bike network improvements are planned near the cemetery. According to the City of Seaside Draft General Plan 2040, the proposed FORTAG Trail is planned to go along Parker Flats Cut-Off Road East and South on the north and west sides of the cemetery. The trail is planned to be located across the street from the Project. Normandy Road to the west and Parker Flats Cut-Off Road North and South are planned to have on-street Class II bike lane facilities. No on-street bike improvements are planned for the Project's north frontage, Parker Flats Cut-Off Road East/Normandy Road, and bikes would have to use the vehicular lanes or use the FORTAG trail. It is anticipated that as an alternative, a connection may be provided to the Project entrance from the FORTAG trail to the north.

To provide pedestrian and transit connectivity, it is recommended that the Project construct pedestrian improvements as shown in **Figure 11** prior to Project buildout.



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NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

– EXISTING R/W PER MONTEREY COUNTY GIS

FIGURE 11
PEDESTRIAN AND BIKE IMPROVEMENTS
CENTRAL COAST VETERANS CEMETERY

FV-097811004 MARCH 2019

4. EXISTING PLUS PROJECT (PHASE 2) CONDITIONS

Traffic operations were evaluated at the study intersections under Existing plus Project conditions. **Figure 12** shows the Existing Plus Project lane geometry and traffic control and **Figure 13** shows the Existing Plus Project peak hour traffic volumes.

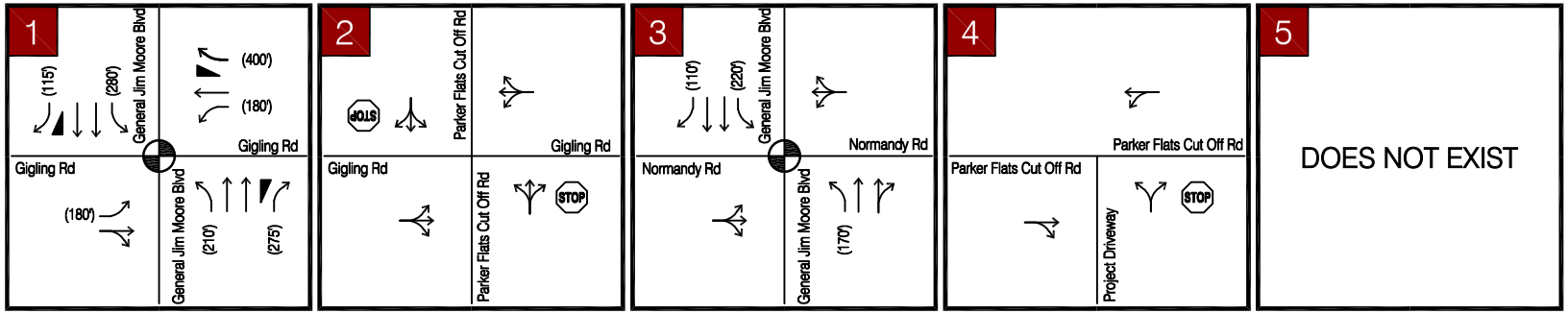
All study intersections operate at an acceptable LOS during Existing Plus Project (Phase 2) Conditions, except for the following:

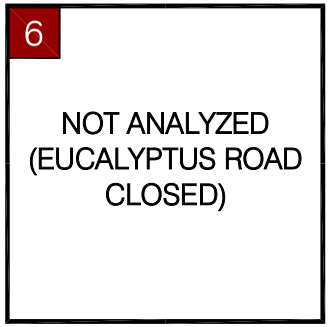
- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
    - The AM peak hour intersection continues to operate at LOS D with the Project and delay decreases by 0.3 seconds due to relatively low Project trip assignment (see table footnote for details on how intersection delay can decrease with Project). Therefore, the intersection is not significantly impacted by the Project.*

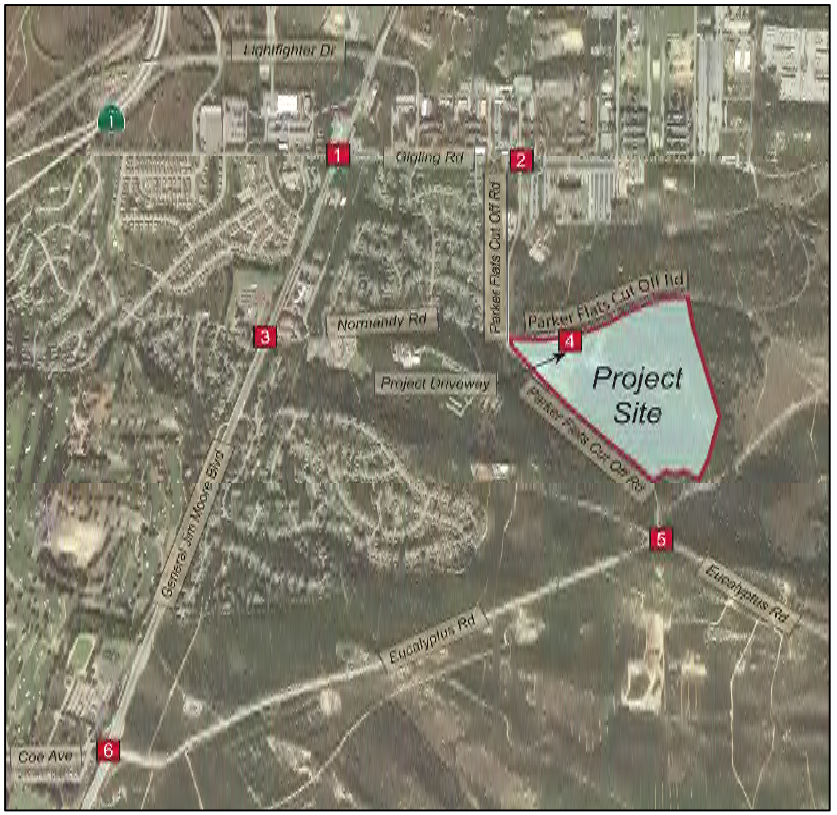
**For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the Project results in an increase of more than 1.0 second in average delay.*

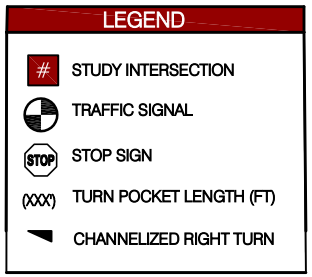
As previously discussed and included in the **Appendix**.

Results of the analysis are presented in **Table 5** and Synchro output sheets are provided in the **Appendix**.









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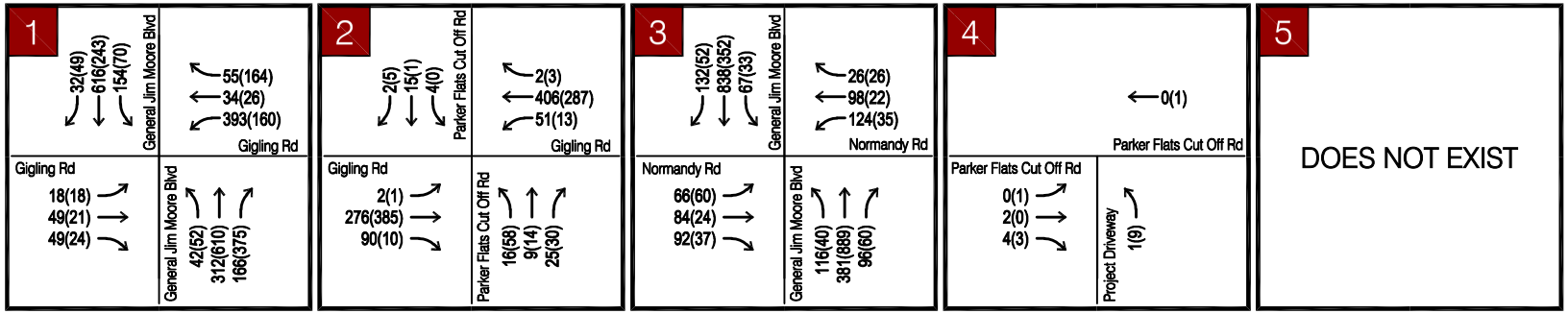
N

NOT TO SCALE

Central Coast Veterans Cemetery

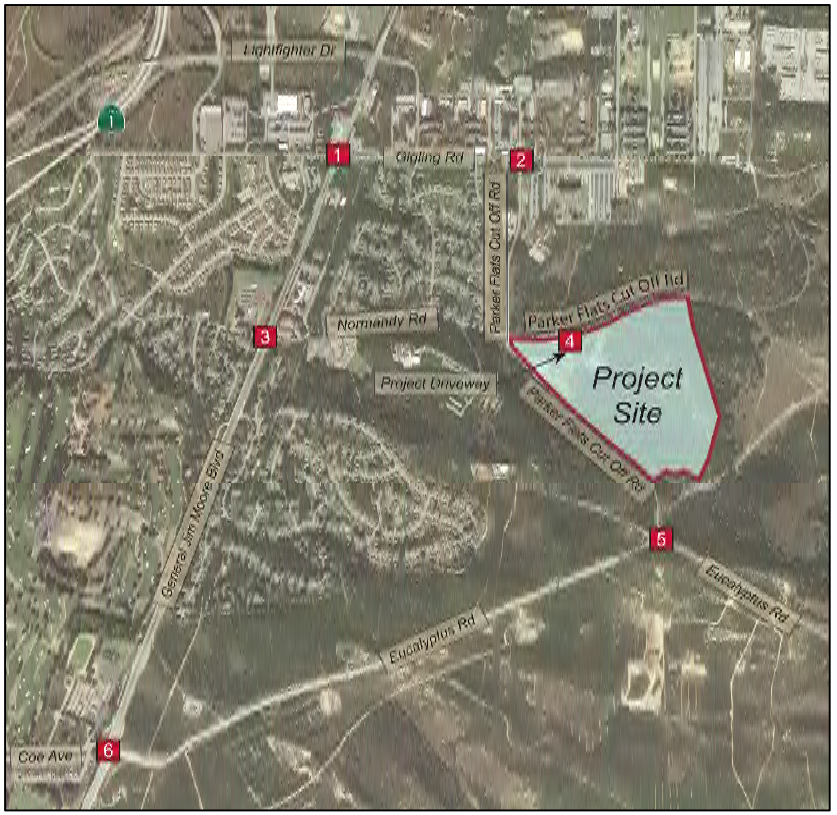
Figure 12

Existing Plus Phase 2 Lane Geometry and Traffic Control



6

NOT ANALYZED
(EUCALYPTUS ROAD
CLOSED)



LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- XX(XX) AM PEAK (PM PEAK)

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N

NOT TO SCALE

Central Coast Veterans Cemetery

Figure 13

Existing Plus Phase 2 Volumes

Table 5 – Existing Plus Phase 2 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Existing Conditions						Existing Plus Phase 2 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**48.2**	**D**	Overall	18.5	B	Overall	**48.1**	**D**	Overall	18.6	B
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	1.9	-	Overall	2.6	-	Overall	1.9	-	Overall	2.6	-
				Worst Approach	20.7	C (SB)	Worst Approach	19.0	C (NB)	Worst Approach	20.7	C (SB)	Worst Approach	19.1	C (NB)
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	24.6	C	Overall	14.6	B	Overall	24.6	C	Overall	14.6	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0	-	Overall	5.3	-	Overall	1.1	-	Overall	5.7	-
				Worst Approach	0	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.5	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Connector Roadway	MC	SSSC	DOES NOT EXIST											
6	General Jim Moore Blvd & Coe Ave	CS	AWSC	NOT ANALYZED (EUCALYPTUS ROAD CLOSED)											

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

5. CUMULATIVE CONDITIONS

Traffic operations were evaluated under the following future year 2040 cumulative conditions:

- Cumulative Alternative 1 Conditions
  - Assumes construction of the Northeast Southwest Arterial Connector Roadway Project (also known as "Eastside Parkway") by the year 2040.
- Cumulative Alternative 2 Conditions
  - Assumes no construction of the Northeast Southwest Arterial Connector Roadway Project (also known as "Eastside Parkway").

Cumulative Transportation Network Improvements

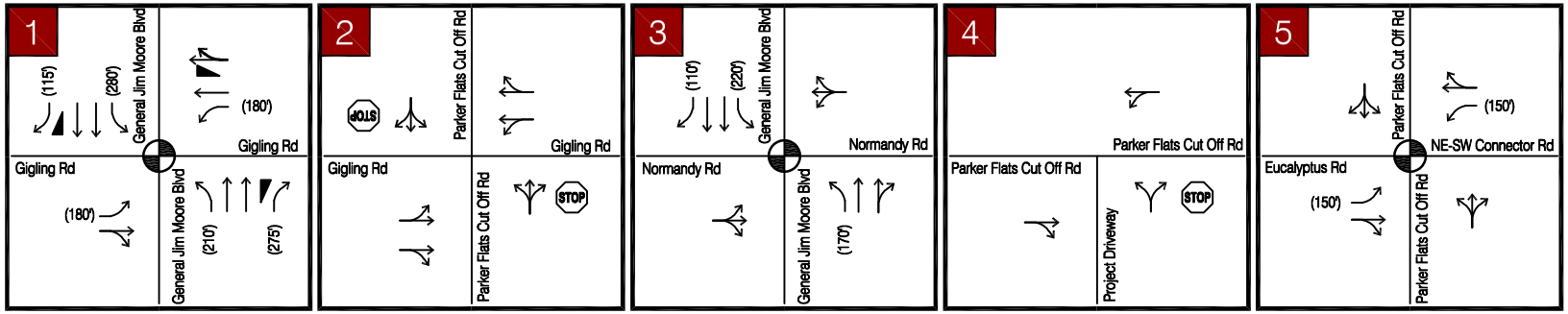
Cumulative Alternative 1 Network Improvements

This cumulative alternative assumes that the Northeast Southwest Arterial Connector Roadway Project would be constructed and that Eucalyptus Road improvements would be completed and connected/extended to Parker Flats Cut Off Road, creating a new intersection (Study Intersection #5). The new Northeast Southwest Arterial Connector Roadway would extend to the east towards Salinas, providing an alternative route to the City of Seaside. The MUTCD peak hour signal warrant (Warrant #3) for intersections #5 and #6 indicate that both intersections should be signalized with construction of the Northeast Southwest Arterial Connector Roadway Project due to high future traffic volumes. Therefore, signalization of both intersections was assumed in Cumulative Alternative 1 conditions. Signal warrant worksheets and a write-up of assumptions are included in the **Appendix**.

Cumulative Alternative 2 Network Improvements

This cumulative alternative assumes that the Northeast Southwest Arterial Connector Roadway Project is not constructed by cumulative future year 2040 and that the cumulative transportation network would be similar to existing conditions. The MUTCD peak hour signal warrant (Warrant #3) for intersection #6 indicates that the intersection traffic volumes satisfy the warrant in existing and Cumulative Alternative 2 Conditions without the proposed Project. Therefore, signalization was assumed in Cumulative Alternative 2 conditions. Signal warrant worksheets and a write-up of assumptions are included in the **Appendix**.

Intersection geometry and traffic control assumed in Cumulative (2040) Alternative 1 and Alternative 2 conditions is illustrated in **Figure 14** and **Figure 15**, respectively.





LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- (XXX') TURN POCKET LENGTH (FT)
- CHANNELIZED RIGHT TURN

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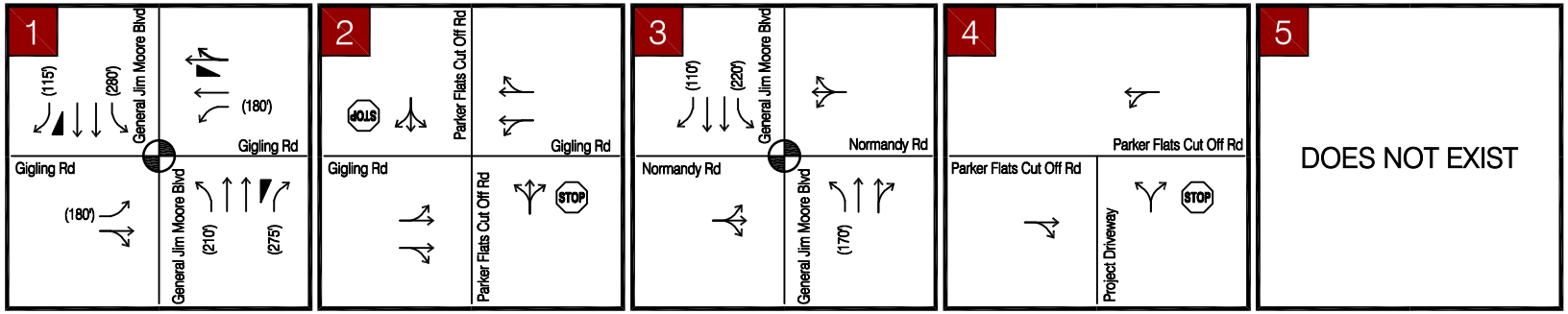
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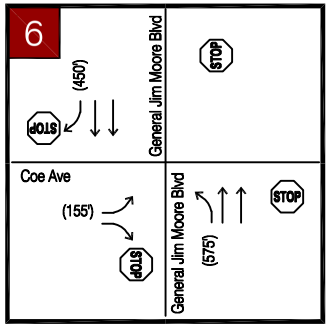
NOT TO SCALE

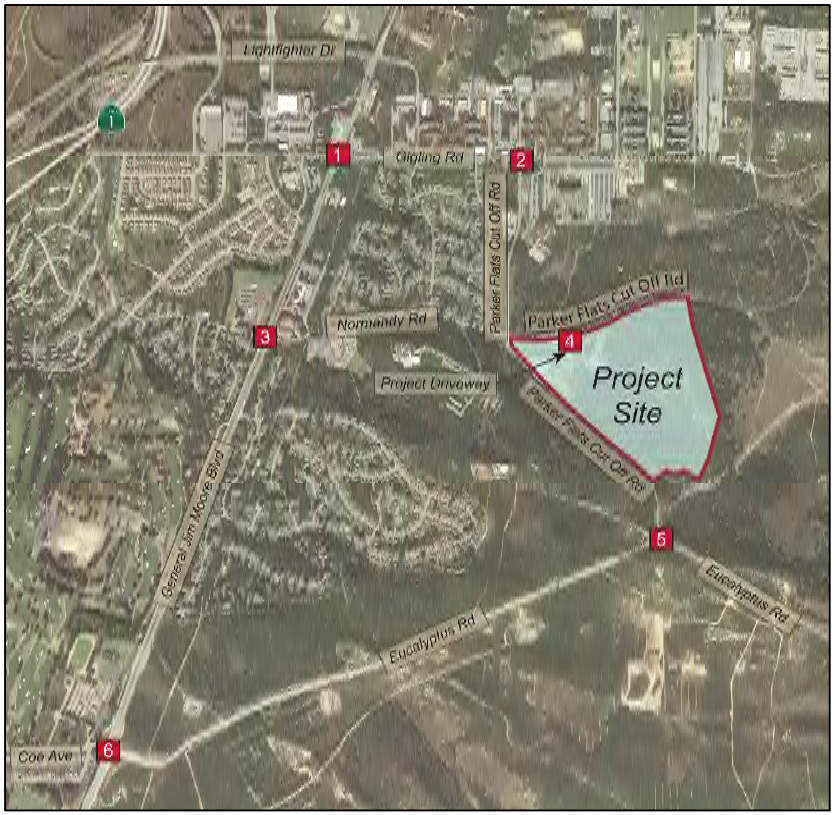
Peak Hour Turning Volumes

Central Coast Veterans Cemetery
Figure 14

Cumulative Alternative 1 Conditions Lane Geometry and Traffic Control







LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- (XXX') TURN POCKET LENGTH (FT)
- CHANNELIZED RIGHT TURN

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N

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Central Coast Veterans Cemetery
Figure 15

Cumulative Alternative 2 Conditions Lane Geometry and Traffic Control

Cumulative Volumes

Cumulative conditions traffic volume development is based upon the AM and PM peak hour forecasts obtained from the Association of Monterey Bay Area Government (AMBAG) model from the AMBAG 2040 MTP/SCS study and existing turning movement data collected in the field.

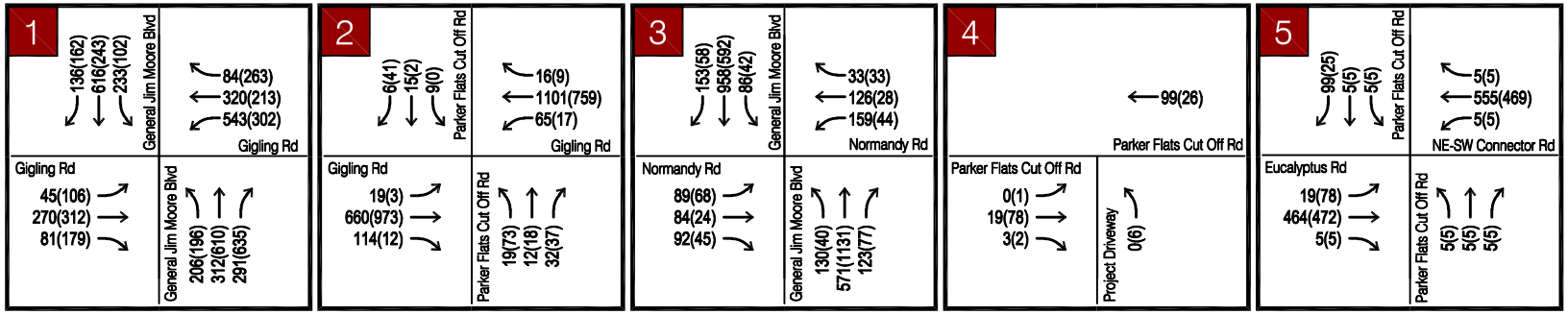
Year 2040 roadway link volumes from the recently certified AMBAG Travel Demand Forecast model were obtained for Cumulative traffic volume growth estimates. Approved FORA land use assumptions were incorporated into the model.

The model was used to plot bi-directional AM and PM peak-hour traffic volumes on each segment along roadways within the study area. Model base year (2015) and horizon year (2040) forecast volumes were compared to determine the annual incremental growth in traffic volumes at study intersection approaches and departure links. The incremental growth was then adjusted and added to the current year (2018) traffic count volumes to calculate the change roadway link volumes. Final adjusted forecast volumes were then converted to Cumulative (2040) intersection turning movement volumes using a process commonly referred to as the Furness method, which uses an iterative process to derive future turning movement volumes based on future year roadway link volumes and an initial estimate of turning percentages (obtained from the existing 2018 intersection turning movement counts).

Intersections which serve the residential neighborhoods along General Jim Moore Boulevard are not always represented accurately in the regional travel demand model, as such the annual incremental growth from the Transportation Analysis Zone (TAZ) was reviewed and the traffic accessing the neighborhood was adjusted accordingly.

The construction of the Northeast Southwest Arterial Connector Roadway Project (also known as “Eastside Parkway”) alters travel patterns and creates new connections. Manual adjustments were done to more accurately represent future traffic as a result of the altered traffic pattern. This was done by reviewing the annual incremental growth in traffic volumes at study intersection approaches and adjusting them to incorporate the expected traffic on the Northeast Southwest Arterial Connector Roadway.

“Off the shelf” AMBAG 2040 model runs were used to estimate Alternative 1 future volumes. The model used for Alternative 1 future volume estimates includes the assumption that the Northeast Southwest Arterial Connector Roadway Project is constructed by the year 2040. Alternative 2 was also run using the AMBAG model with the assumptions that the Northeast Southwest Arterial Connector Roadway is not constructed by the year 2040.Cumulative Alternative 1 and Alternative 2 peak hour traffic volumes are shown in **Figure 16** and **Figure 17**, respectively.





LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- XX(XX) AM PEAK (PM PEAK)

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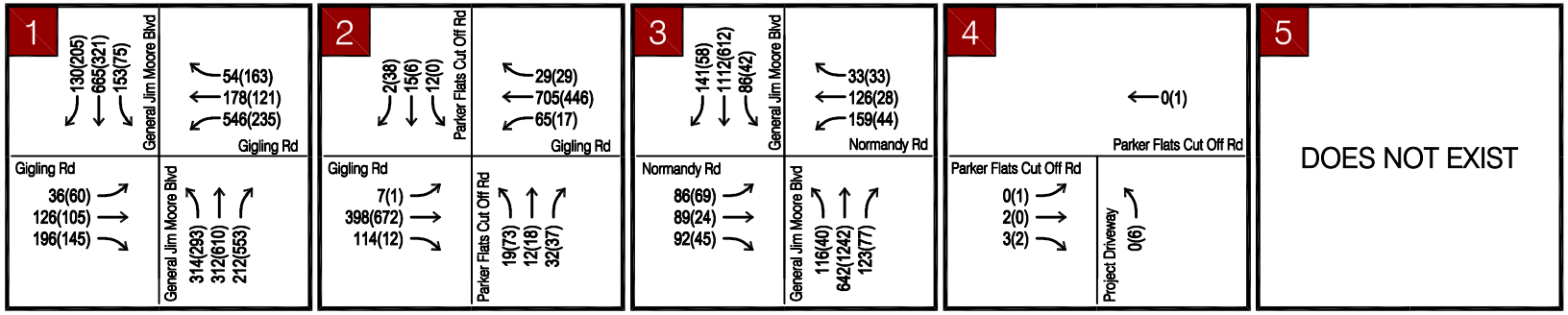
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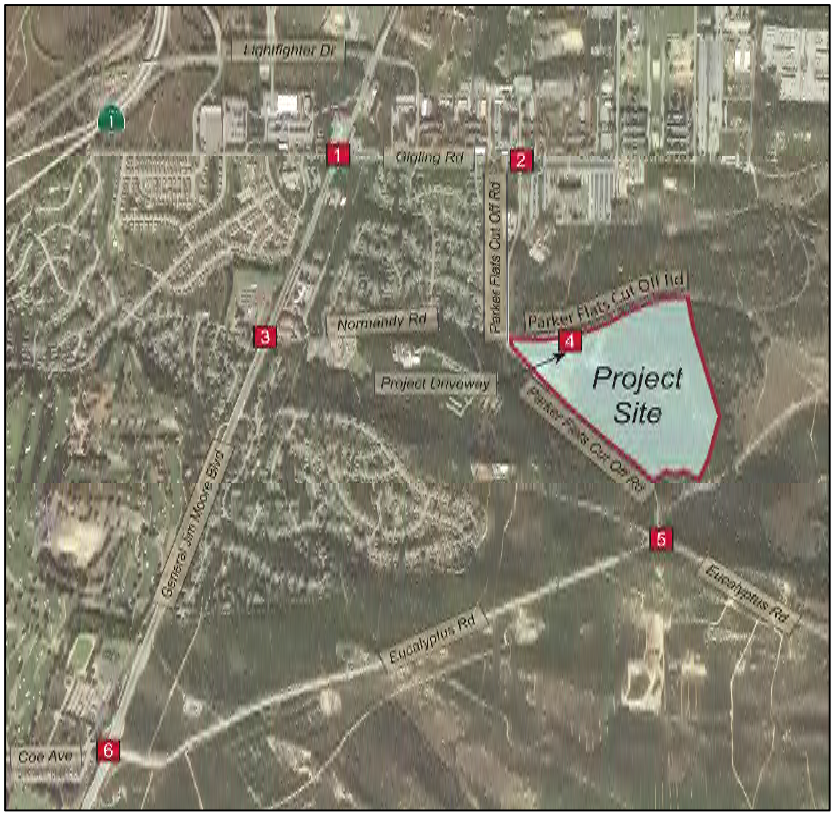
NOT TO SCALE

Central Coast Veterans Cemetery

Figure 16

Cumulative Alternative 1 Conditions Peak Hour Volumes





LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- XX(XX) AM PEAK (PM PEAK)

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Central Coast Veterans Cemetery

Figure 17

Cumulative Alternative 2 Conditions Peak Hour Volumes

Cumulative Intersection Level of Service

Traffic operations were evaluated at the study intersections based on Cumulative Alternative 1 and Alternative 2 conditions lane geometry, traffic control, and peak hour traffic volumes.

Study Intersection #5 is a future intersection that will be constructed as part of the Northeast Southwest Arterial Connector Roadway Project and is therefore analyzed in Cumulative Alternative 1 conditions only.

All study intersections operate at an acceptable LOS during Cumulative Alternative 1 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
- General Jim Moore Boulevard & Coe Avenue (Intersection #6) (AM peak hour)

All study intersections operate at an acceptable LOS during Cumulative Alternative 2 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)

The Cumulative Alternative 1 analysis results are presented in **Table 6**. The Cumulative Alternative 2 analysis results are presented in **Table 7**. Synchro output sheets are provided in the **Appendix**.

Note that study intersections #5 and #6 satisfy Manual of Uniform Traffic Control Devices (MUTCD 2014) peak hour signal warrant #3 in Cumulative Alternative 1 Conditions and a signal is warranted at these study intersections. Study intersection #6 warrants signal control in Cumulative Alternative 2 Conditions. Peak hour signal warrant worksheets and a brief writeup of assumptions are included in the **Appendix**.

Table 6 – Cumulative Alternative 1 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**72.0**	**E**	Overall	**52.5**	**D**
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	14.4	-	Overall	25.8	-
				Worst Approach	**331.7**	**F (SB)**	Worst Approach	**383.2**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	29.0	C	Overall	17.1	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	0.5	-
				Worst Approach	0.0	A (NB)	Worst Approach	9.4	A (NB)
5	Parker Flats Rd & Northeast Southwest Connector Roadway	MC	Signal	Overall	6.6	A	Overall	14.5	B
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**72.3**	**E**	Overall	24.0	C

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

Table 7 – Cumulative Alternative 2 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**94.0**	**F**	Overall	31.6	C
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	3.0	-	Overall	5.3	-
				Worst Approach	**47.2**	**E (SB)**	Worst Approach	**50.0**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	28.7	C	Overall	17.3	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0	-	Overall	5.3	-
				Worst Approach	0	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Arterial Connector Roadway	MC	AWSC	DOES NOT EXIST					
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	22.1	C	Overall	5.9	A

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

Cumulative Plus Phase 2, 3, and 4 Conditions Level of Service

Traffic operations were evaluated at the study intersections based on Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions and Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions.

Alternative 1 and 2 lane geometry and traffic control is shown in **Figure 14** and **Figure 15,** respectively. Alternative 1 and 2 peak hour traffic volumes are shown in **Figure 16** and **Figure 17**, respectively.

As shown in **Table 8**, all intersections would operate at acceptable levels of service during Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM & PM peak hour)
    - The intersection operates at LOS E in the AM and LOS D in PM with the Project. Delay decreases by 0.1 seconds in the AM and increases by 0.1 seconds in the PM due to relatively low Project trip assignment (see table footnote for details on how intersection delay can decrease with Project). Therefore, the intersection is not significantly impacted by the Project.*
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
    - The intersection would continue to operate at LOS F in the AM and PM peak hours with the Project. Delay increases would not change in the AM with the Project, but delay would increase by 4.8 seconds during the PM with the Project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). However, it is anticipated that a traffic signal will be implemented as Gigling Road will become a four lane roadway per MTP. The Project trips were added to non-critical movements. The average delay is a weighted average, so the average delay per vehicle goes down. For interpolation purposes, we assume that additional project traffic has no impact.**
- General Jim Moore Boulevard & Coe Avenue (Intersection #6) (AM peak hour)
    - During the AM peak hour, the intersection would continue to operate at LOS E and average vehicle would increase from 72.3 seconds per vehicle without Project traffic, to 74.4 seconds per vehicle with Project traffic. Therefore, this intersection would be potentially significantly impacted by the Project. Adjusting signal timings and signal phasing would improve intersection operations and reduce AM peak hour delay to 72.2 seconds per vehicle. The improved signal timings would therefore result in a lower average vehicle delay with the Project when compared to “no Project” conditions. This proposed mitigation would therefore mitigate the potentially significant impact. The intersection would continue to operate at unacceptable LOS E.**

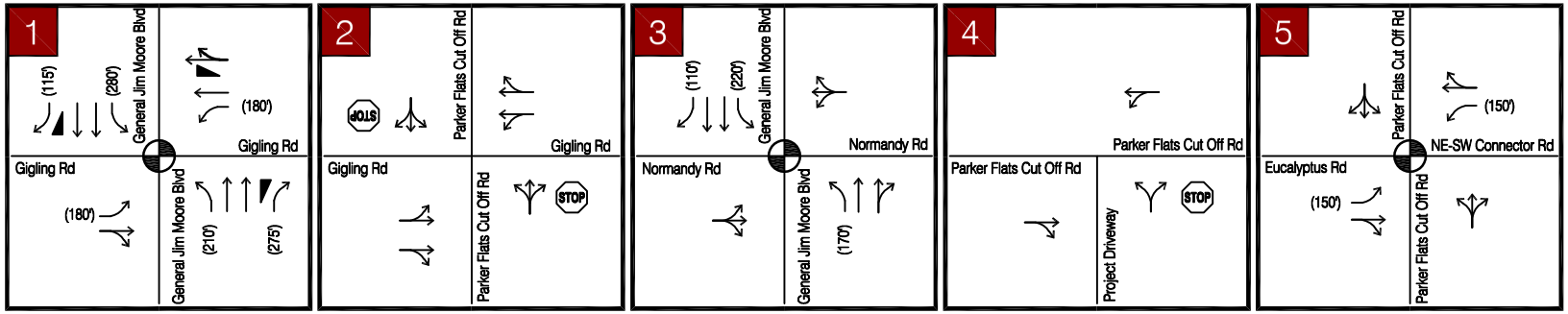
Mitigated Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions LOS are shown in **Table 9**.

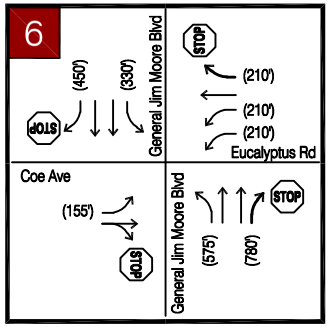
As shown in **Table 10**, all intersections would operate at acceptable levels of service during Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions, except for the following:

- General Jim Moore Boulevard & Gigling Road (Intersection #1) (AM peak hour)
    - The intersection continues to operate at LOS F in the AM with the Project. Delay does not change in the AM. Therefore, the intersection is not significantly impacted by the Project.*
- Gigling Road & Parker Flats Road (Intersection #2) (AM & PM peak hours)
    - The intersection would continue to operate at LOS E in the AM and LOS F in the PM peak hours with the Project. Delay would increase by 2.8 in the AM with the Project and delay would increase by 6.0 seconds during the PM with the Project. This side-street stop-controlled intersection does not satisfy the MUTCD Peak Hour Signal Warrant (Warrant #3). Therefore, it is not a significant impact.**

**For signalized intersections already operating at unacceptable LOS D, a significant impact would occur if a project increases the average delay by more than 2.0 seconds. If the intersection is already operating at LOS E or F, a significant impact would occur if the Project results in an increase of more than 1.0 second in average delay.*

***The level of service standard for unsignalized intersections is LOS C for the average delay of all entering traffic at most locations. In addition to average delay for all entering traffic (overall intersection delay), the standard for side street operations is LOS E or F, in conjunction with peak hour signal warrants described in the most recent version of the Caltrans Traffic Manual.*







LEGEND

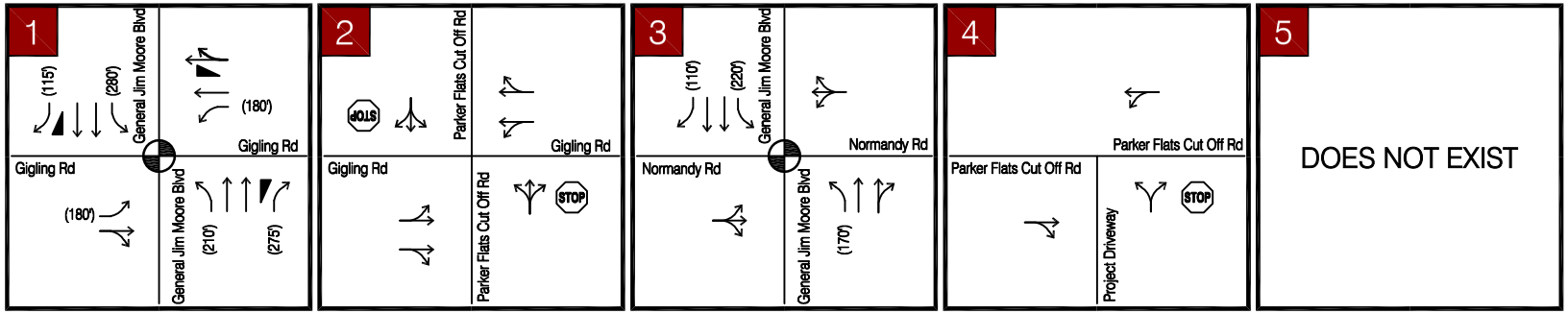
- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- (XXX') TURN POCKET LENGTH (FT)
- CHANNELIZED RIGHT TURN

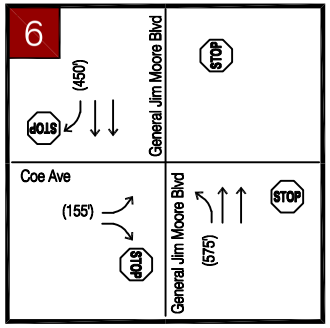
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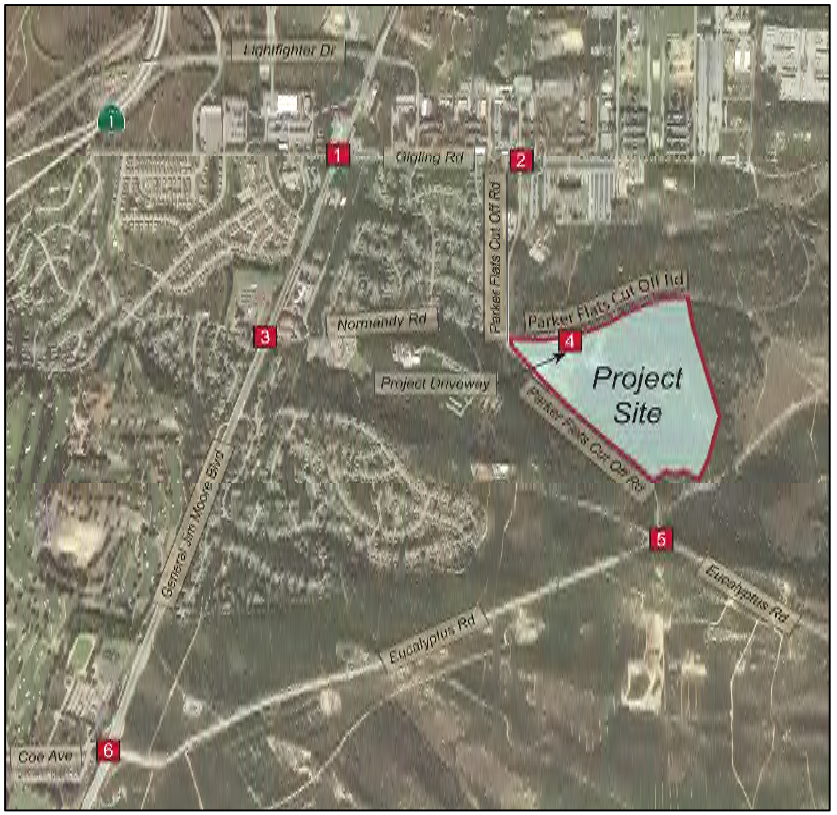
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NOT TO SCALE

Central Coast Veterans Cemetery
Figure 18
Cumulative Alternative 1 Plus Phase 2, 3, & 4
Lane Geometry and Traffic Control







LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP STOP SIGN
- (XXX') TURN POCKET LENGTH (FT)
- CHANNELIZED RIGHT TURN

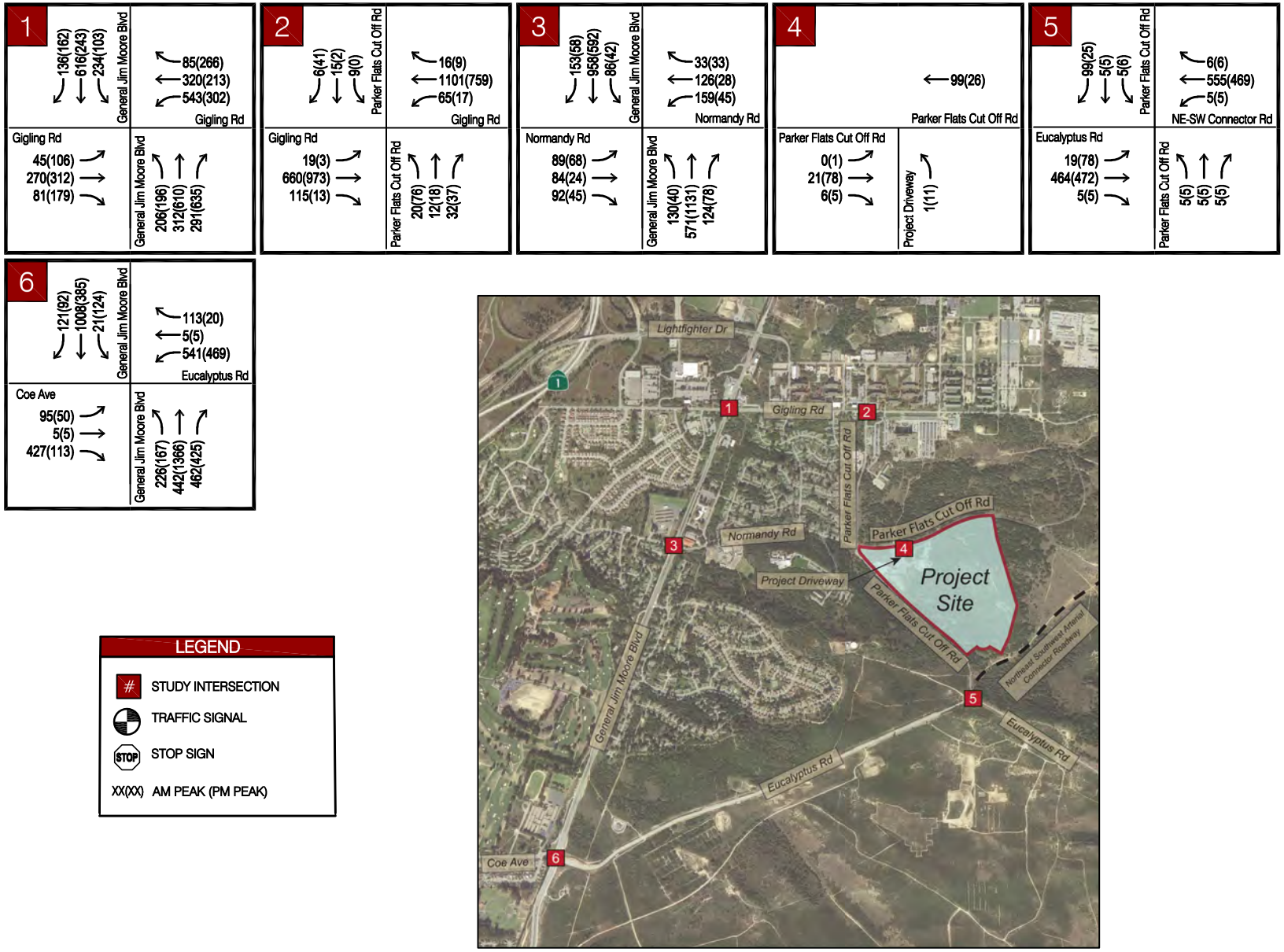
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N

NOT TO SCALE

Central Coast Veterans Cemetery
Figure 19

Cumulative Alternative 2 Plus Phase 2, 3, & 4 Lane Geometry and Traffic Control



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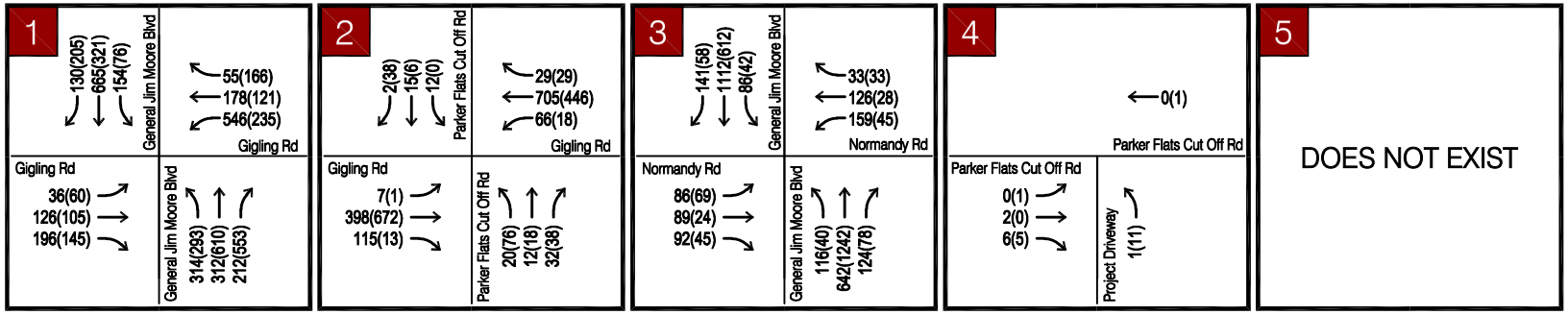
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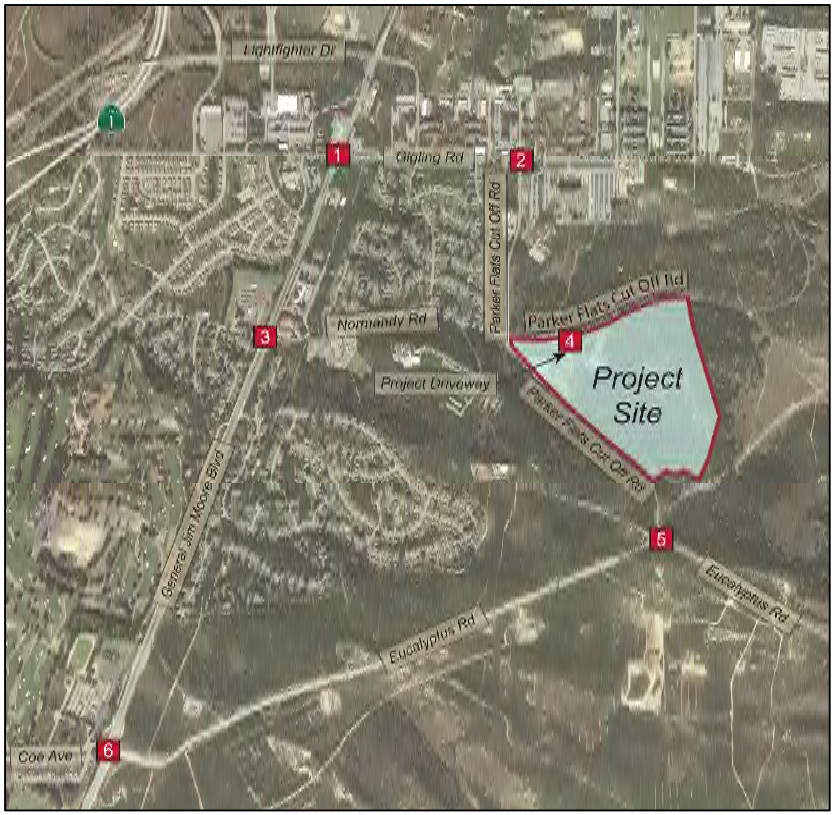
NOT TO SCALE

Central Coast Veterans Cemetery

Figure 20

Cumulative Alternative 1 Plus Phase 2, 3, & 4 Conditions
Peak Hour Volumes





LEGEND

- # STUDY INTERSECTION
- TRAFFIC SIGNAL
- STOP SIGN
- XX(XX) AM PEAK (PM PEAK)

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N

NOT TO SCALE

Central Coast Veterans Cemetery

Figure 21

Cumulative Alternative 2 Plus Phase 2, 3, & 4 Conditions
Peak Hour Volumes

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Table 8 – Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions						Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**72.0**	**E**	Overall	**52.5**	**D**	Overall	**71.9**	**E**	Overall	**52.6**	**D**
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	14.4	-	Overall	25.8	-	Overall	15.0	-	Overall	27.3	-
				Worst Approach	**331.7**	**F (SB)**	Worst Approach	**383.2**	**F (NB)**	Worst Approach	**331.7**	**F (SB)**	Worst Approach	**398.0**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	29.0	C	Overall	17.1	B	Overall	29.0	C	Overall	17.2	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	0.5	-	Overall	0.1	-	Overall	0.9	-
				Worst Approach	0.0	A (NB)	Worst Approach	9.4	A (NB)	Worst Approach	9.5	A (NB)	Worst Approach	9.5	A (NB)
5	Parker Flats Rd & NE-SW Connector Rd	MC	Signal	Overall	6.6	A	Overall	14.5	B	Overall	6.5	A	Overall	14.6	B
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**72.3**	**E**	Overall	24.0	C	Overall	**74.4**	**E**	Overall	24.0	C

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

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Table 9 – Mitigated Cumulative Alternative 1 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Plus Phase 2,3,4 Conditions						Mitigated Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
6	General Jim Moore Blvd & Coe Ave	CS	Signal	Overall	**74.4**	**E**	Overall	24.0	C	Overall	**72.2**	**E**	Overall	24.0	C

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

Table 10 – Cumulative Alternative 2 Plus Phase 2, 3, and 4 Conditions Intersection Level of Service

#	Intersection	Maintaining Agency	Control Type	Cumulative Conditions						Cumulative Plus Phase 2,3,4 Conditions					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS	Movement	Delay	LOS
1	General Jim Moore Blvd & Gigling Rd	CS	Signal	Overall	**94.0**	**F**	Overall	31.6	C	Overall	**94.0**	**F**	Overall	31.6	C
2	Gigling Rd & Parker Flats Rd	CS	SSSC	Overall	3.0	-	Overall	5.3	-	Overall	3.0	-	Overall	5.8	-
				Worst Approach	**47.2**	**E (SB)**	Worst Approach	**50.0**	**F (NB)**	Worst Approach	**47.7**	**E (SB)**	Worst Approach	**53.7**	**F (NB)**
3	General Jim Moore Blvd & Normandy Rd	CS	Signal	Overall	28.7	C	Overall	17.3	B	Overall	28.7	C	Overall	17.3	B
4	Project Driveway & Parker Flats Rd	CS	SSSC	Overall	0.0	-	Overall	5.3	-	Overall	0.9	-	Overall	5.3	-
				Worst Approach	0.0	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.6	A (NB)	Worst Approach	8.6	A (NB)
5	Parker Flats Rd & Northeast Southwest Arterial Connector Roadway	MC	AWSC	DOES NOT EXIST											
6	General Jim Moore Blvd & Coe Ave	CS	AWSC	Overall	22.1	C	Overall	5.9	A	Overall	22.0	C	Overall	5.9	A

Notes:

1. Analysis performed using HCM 2010 methodologies for intersections 1,2,3,4, and 5.

2. Delay indicated in seconds/vehicle.

3. City of Seaside (CS) LOS standard is C. Monterey County (MC) LOS standard is D.

*4. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

5. If a specific movement has a delay less than the approach or intersection average, and the trips are increased for this movement, the overall intersection delay could be decreased.

6. QUALITATIVE EVALUATION OF 100 YEAR MASTER PLAN BUILDOUT

The Central Coast Veterans Cemetery 2015 Master Plan objectives include:

- Provide burial space for, but not limited to, Monterey County Region veterans for the next 100 years;
- Fulfill the vision of providing a veteran's cemetery at the former largest military base on the west coast, where many veterans were likely to have served;
- Create a monument to commemorate the service and sacrifice of California State Veterans; and
- Incorporate the visual qualities and characteristics of the local landscape and native vegetation, working with the existing site features as much as possible, while meeting the programmatic needs.

The 100-year buildout of the Master Plan proposes to develop a total of 41.65 acres of cemetery uses on the Project site at a rate of one phase every 10 years. The phasing is shown in **Table 11**.

Table 11 – Master Plan Phasing Plan

Phase	Acres Developed	Phase	Acres Developed
Phase 1 (already constructed)	9.10 acres	Phase 7	3.17 acres
Phase 2	4.29 acres	Phase 8	4.77 acres
Phase 3	2.07 acres	Phase 9	3.77 acres
Phase 4	2.51 acres	Phase 10	2.94 acres
Phase 5	3.77 acres	Phase 11	0.83 acres
Phase 6	4.43 acres		
		Total	**41.65**

Development of the remaining phases (Phase 2 through Phase 11) would result in 32.55 acres of cemetery uses in addition to the 9.10 acres already developed as part of Phase 1. **Table 12** shows the anticipated trip generation of buildout of the remaining phases site (Phase 2 through Phase 11) and is based upon the trip generation methodology discussed in previous chapters of this report. As shown in **Table 12**, it is anticipated that full buildout of the remaining phases (Phase 2 through Phase 11) would generate approximately 11 AM peak hour, 29 PM peak hour, and 196 gross daily trips on average weekdays. This trip generation represents roughly one vehicle to or from the cemetery every five minutes during the AM peak hour and roughly three vehicles to or from the cemetery during the PM peak hour. These are relatively low rates and are not anticipated to have a noticeable effect on the future local transportation network.

Table 12 – Proposed Buildout (Phase 1 through Phase 11) Weekday Trip Generation

Land Use	ITE Land Use Code	Phase	Size		Daily Rate[1]	Daily Trips	AM Peak Hour[2]				PM Peak Hour[2]			
							Rate	In	Out	Total	Rate	In	Out	Total
Existing Conditions														
Cemetery	566	1	9.10	acres	6.02	56	0.33	3	0	3	0.88	2	6	8
Proposed for LOS Analysis														
Cemetery	566	2 thru 11	32.55	acres	6.02	196	0.33	9	2	11	0.88	9	20	29
New Project Trips (Phases 2 through 11)					-	196	-	9	2	11	-	9	20	29
Existing + New Project Trips (Phases 1 through 11)					-	252	-	12	2	14	-	11	26	37

Notes:

1. ITE Code 566 (Cemetery); Based on ITE average rate.

2. Based on traffic counts collected on 1/24/2019

3. Note that trips generated by each phase of the Project are rounded when appropriate. Daily trips are rounded to the nearest even number to represent in and out trips.

**ITE = Institute of Transportation Engineers, Trip Generation 10th Edition (2010)*

7. VEHICLE MILES TRAVELED

To estimate the Vehicle Miles Traveled (VMT) generated by the proposed Project, household locations by census tract with population information were used in combination with the estimated number of daily trips generated by the project for Existing Conditions and for each phase of the proposed project, as previously summarized. It was assumed that the Project would primarily serve veterans and their families located within 75-miles of the cemetery based on the cemetery's administrative draft EIR[1] and the location of existing veterans' cemeteries. As the demographics in the future are unknown, the existing population distribution was used for all calculations. Although it is understood that population locations in the future will deviate slightly from existing locations, for the purposes of this analysis it was felt that using existing locations was a reasonable estimation of future population locations

GIS based tools were used to calculate the population located within in this 75-mile area, delineated by one-mile bands extending outwards from the Project, as shown in **Figure 22.** The number of people living in each of the one-mile bands was used to generate a distribution of people-per-mile surrounding the Project. This distribution was multiplied by the number of daily trips per scenario to estimate VMT per one-mile band. To estimate the total daily VMT generated by the project for the two scenarios, Existing plus Phase 2 and Buildout Conditions, the one-mile VMT estimates were totaled. The estimated number of daily trips and daily VMT generated by the proposed project per scenario are summarized in **Table 13.** As shown, Phase 2 is estimated to produce approximately 1,290 daily VMT. The combination of Phases 2, 3, and 4 is estimated to produce 2,770 daily VMT. Buildout of the remaining phases (Phases 2 through 11) is estimated to generate 9,710 daily VMT. Due to the assumed population locations being consistent for all analysis scenarios, the average trip length is estimated to be 49.5 miles for all scenarios.

Table 13 – Project Generated Daily Trips and Daily VMT by Scenario

Scenario	Daily Trips	Daily VMT
Phase 2	26	1,290
Phase 2, 3, & 4	56	2,770
Phases 2 thru 11	196	9,710

[1] *California Central Coast Veterans Cemetery Project Administrative Draft EIR/EA*. Denise Duffy & Associates, Inc. March 2019.

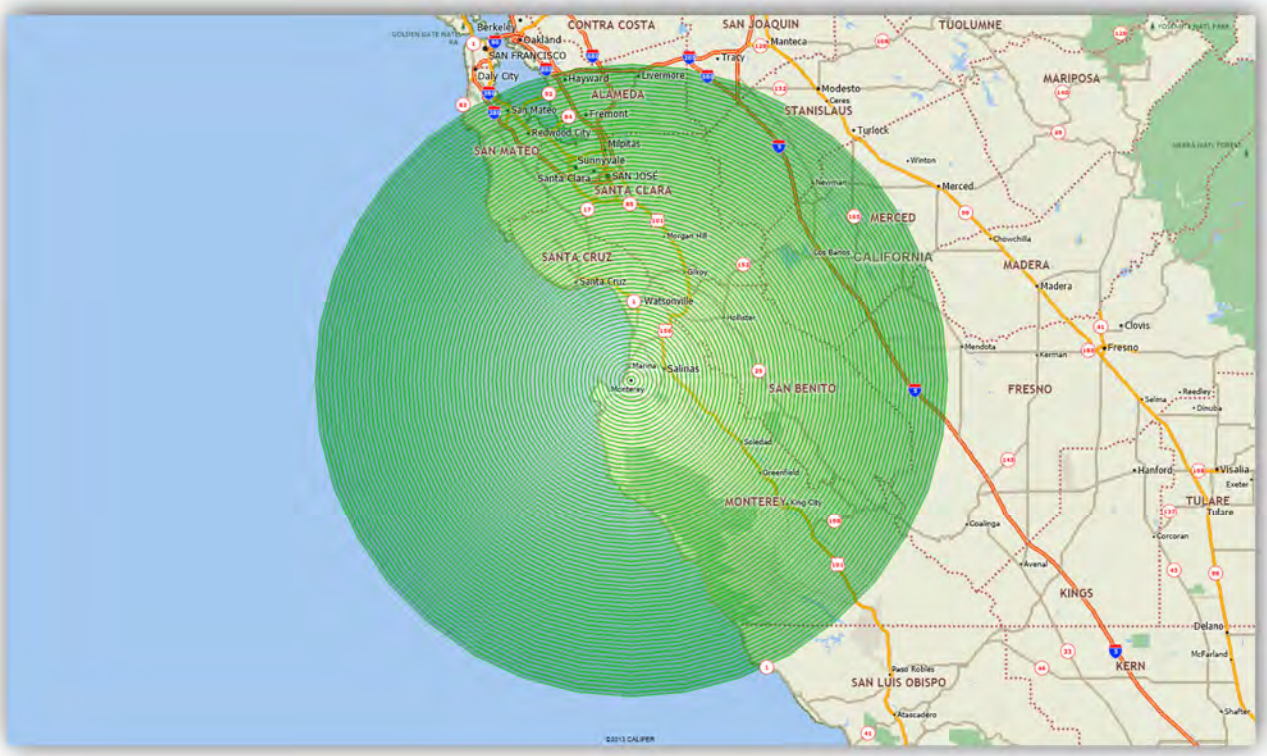


Figure 22 – Demographic Bands Around Project Location

8. PEDESTRIAN, BICYCLE, AND TRANSIT MOBILITY EVALUATION

The Project was evaluated to determine if it would adversely affect adopted policies, plans, and/or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks and pedestrian flow) or generate pedestrian, bicycle, or transit travel demand that could not be accommodated by transit, bicycle, or pedestrian facilities and plans.

Pedestrian Mobility

The City of Seaside General Plan 2040 identifies Normandy Road as a "Neighborhood Arterial" and places a high priority on pedestrian mobility. Additionally, an MST transit stop is located approximately 1,900 feet west of the Project site on the north side of Normandy Road, however, there is a gap in the sidewalk network along the Project frontage and just west of the Normandy Road & Parker Flats Cut-Off Road intersection.

As part of Phase 3, it is recommended that the Project constructs ADA compliant sidewalk along the Parker Flats Cut Off Road frontage and at the intersection of Normandy Road & Parker Flats Cut-Off Road. The sidewalk should continuing south along the Project Driveway (on-site) and connect with the existing sidewalk located approximately 400 feet south of the main entrance driveway off of Parker Flats Cut Off Road. Crosswalks are also recommended along the east leg at the Normandy Road/Parker Flats Cut Off Road and north-south oriented Parker Flats Cut Off Road, as a FORTAG multi-use path is proposed along the north side of Parker Flats Cut Off Road, as identified in **Figure 11**. Construction of the recommended pedestrian facilities would close an existing sidewalk gap and provide a route for pedestrians to access the site from west Normandy Road, where an existing MST transit stop is located.

For the Project to be consistent with City of Seaside General Plan 2040 policies, construction of sidewalk and crosswalks are recommended.

Bicycle Mobility

The City of Seaside General Plan 2040 identifies Normandy Road as a "Neighborhood Arterial" and places a high priority on bicycle mobility and it is recommended that the Project provide on-site bicycle parking to accommodate any users that wish to travel to the site via bicycle.

According to the City of Seaside Draft General Plan 2040, a FORTAG multi-use path is proposed along the northern boundary of the Project site. It continues south of the intersection of Parker Flats Cut Off Road and Normandy Road, west of the Project site. In addition, a Class II bicycle pathway is proposed along north-south oriented Parker Flats Cut Off Road and along Normandy Road. Bicyclists would have the opportunity to access the Project site by walking their bikes along the proposed crosswalk and sidewalk improvements along the Project frontage, once the improvements have been constructed as part of the future Phase 3 of the Project.

For the Project to be consistent with City of Seaside General Plan 2040 policies, construction of bicycle parking is recommended. Transit Mobility

The City of Seaside General Plan 2040 identifies Normandy Road as a "Neighborhood Arterial" and places a high priority on transit mobility. However, it is not anticipated that the Project would generate a significant amount of transit demand. Therefore, the existing transit facilities should be able to accommodate any transit riders generated by the Project. For any users that wish to travel to the site via transit, an MST transit stop is located approximately 1,900 feet west of the Project site along Normandy Road. Existing MST Service routes and stops are discussed in detail in the **Existing Transit Facilities** section of this report.

Therefore, this Project would not conflict with any local transit policies or generate transit demand that could not be accommodated by existing transit infrastructure facilities.

Summary of Potential Impacts on Pedestrian, Bicycle, and Transit Mobility

It is recommended that the Project construct ADA compliant sidewalks and crosswalks, as well as bicycle parking, and other amenities as part of Phase 3 development. The improvements would be constructed in compliance with adopted County standards. Therefore, the Project would be consistent with local policies once the recommended sidewalk, crosswalks, and bicycle parking are constructed and would not cause significant impacts to pedestrian, bicycle, or transit facilities.

9. CONSTRUCTION AND SPECIAL EVENT TRAFFIC

The following sections describe Project traffic generation due to Phase 2 construction, as well as special events.

Phase 2 Construction Traffic

Construction information for development of Phase 2 is shown in **Table 14**. It is anticipated that construction will occur in the near term and that the existing transportation road network will be in place.

Based on discussion with Phase 2 construction engineers, Phase 2 will be constructed over a roughly 12-month period. Up to 20 construction worker trips are anticipated to and from the site per day.

Weekday peak traffic hours in the Project vicinity occur between 7:00am and 9:00am, as well as between 4:00pm and 6:00pm). Typical construction hours are 7:00am to 3:00pm. Therefore, construction workers are expected to generate roughly up to 20 vehicle trips per day, which would occur during off-peak traffic hours.

Typical construction equipment associated with the building trades would be transported to the site at various times depending on the nature of construction occurring at any time.

The construction traffic would be less than project traffic and the potential impacts and mitigations for project traffic would suffice.

Table 14 – Construction Information (Phase 2)

Construction Phase	Duration (Days)	Off-Road Equipment	Construction Vehicle Trips
Demolition & Basin Excavation	80	3 Excavators 1 Water Truck 1 Chipper 2 Dozers 1 Tractor/Loader/Backhoe	20 Worker Trips/Day
Site Preparation & Grubbing	40	1 Water Truck 3 Dozers 4 Tractor/Loader/Backhoes	20 Worker Trips/Day 525 Haul Truck Trips
Site Grading & Excavation	100	1 Excavator 1 Grader 1 Water Truck 1 Roller/Compactor 1 Dozer 3 Tractor/Loader/Backhoes	20 Worker Trips/Day
Onsite Road Construction/Paving	40	1 Paver 2 Paving Equipment 2 Roller/Compactors 1 Tractor/Loader/Backhoe 1 Trencher	15 Worker Trips/Day 50 Haul Truck Trips

Based on default equipment assumptions contained in the CalEEMod computer model and, where available, project-specific construction information. All equipment assumed to operate 8 hours per day. Worker trips are based on CalEEMod default assumptions and estimated equipment usage.
Haul truck trips for the site preparation and grading phase assumes 4,200 cubic yards of material to be imported and an average haul truck capacity of 16 cubic yards.

Haul truck trips for the paving assumes approximately 202 cubic yards of material to be imported (0.3 acres to be paved, 5 inch application material thickness) and an average haul truck capacity of 8 cubic yards.

Source: Noise & Groundborne Vibration Impact Analysis for Central Coast Veterans Cemetery Project, Ambient Air Quality & Noise Consulting (March 2019)

Trip Generation with Special Events

The Project is expected to host special events several times during the year, and these events would attract appreciable numbers of people to the site. Events would be expected to occur on Memorial Day, Veterans Day, and Independence Day, and an average of approximately 1,000 visitors per event are expected. Special events would generate an appreciable number of vehicle trips, and assuming typical vehicle occupancy rates achieved for public events (i.e., 2.5 persons per vehicle) 800 daily trips (400 inbound and 400 outbound) could occur. The Project description notes that these special events would be organized by the local community, and off-site parking with shuttle service would be required. During major events, off-site parking within the former Fort Ord property would be utilized to accommodate the increased parking demand. Shuttle service would be provided to the Project site.

It is very common to manage special events in this manner and many other special events in the Monterey Bay area make use of offsite parking and shuttle service. The applicant shall prepare a special event transportation management plan to mitigate potential short term impacts during special events.

10. SUMMARY OF IMPACTS AND MITIGATION MEASURES

This Project is consistent with the land use assumptions provided by Denise Duffy & Associates Planning Department staff and the City of Seaside General Plan 2004.

Project Impacts

Construction Activities

Construction Truck Traffic. The Project could generate construction trucks on the routes to and from the site. While the number of trucks would not have an appreciable effect on the quality of traffic flow on surrounding streets, adding trucks to Normandy Road could create safety conflicts between school age pedestrians and motor vehicles. Truck noise could be an issue due to the presence of several all-way stops adjoining the school. These issues could be addressed by directing contractors to use other streets for construction truck traffic, particularly during school hours.

Regular Operations

Level of Service. The Project may add 3 to 14 peak hour trips to the circulation system proving access to the site. This traffic contribution would be too small to have a measurable impact on the operation of signalized intersections. Thus, the project's impacts are not significant from the standpoint of minimum Level of Service standards.

Safety. The Project could add a small amount of traffic to Normandy Road during times when students are traveling to and from school. Project trips could incremental contribute to before and after school congestion, and increased conflicts between school age pedestrians and motor vehicles is a potential safety impact.

Measures to address this issue include:

1. Normandy Road between General Jim Moore Blvd and Parker Flats Cut Off Road;

2. Scheduling internment activities at times avoid automobile travel during the periods before and after the school day.

Special Events

Traffic. Trips would be attracted to the site by special events a few times each year. Travel to and from the site would be spread throughout the day, but there would be peak traffic periods immediately before and after scheduled events. Special events would likely occur on holidays or weekends when background traffic volumes are lower than on typical weekdays. Because special event traffic only occurs occasionally each year, traffic impacts associated with special events are not significant.

Parking. Special events will attract an appreciable number of vehicles to the site that will need to be parked. Assuming that all attendees were at the site at one time, a 1,000 person event could create a demand for 400 parking spaces. This demand would clearly exceed the capacity of on-

site parking facilities, and would result in overflow parking onto adjoining streets and to other areas of Fort Ord.

As noted in the Project description, accommodating special events will require a management strategy that makes use of parking resources that are already available at Fort Ord. Paved parking is prevalent in existing paved areas off of Gigling Road north and east of the site. Because of the distances involved and the age of most attendees, a system of shuttle vehicles will be needed to transport attendees to the Project site, and a transportation management plan will need to be implemented to direct motorists to the identified parking facilities.

Cumulative Impacts

Cumulative traffic impacts would consider the ramifications of completion of the balance of the Veterans Cemetery project, other development under the Fort Ord Reuse plan, background traffic growth and the completion of regional circulation system improvements.

Balance of the Veterans Cemetery Project

The Veterans Cemetery would continue to expand in the future after the current project is filled and new are used for internment. The amount of vehicular traffic associated with day to day internment activities would not be appreciably different, but a large facility could incrementally attract a greater number of visitors. However, the relative traffic impacts and mitigation requirements for the Veterans Cemetery at full build out would not be appreciably different from those associated with the existing Phase 1 or proposed Phase 2.

Regional Circulation System Improvements

Regional Highway Improvements:

- SR-1: Widen from 4 lanes to 6 lanes in Seaside and Sand City between Fremont Avenue and Del Monte Interchanges (TAMC RTP, FORA CIP)
- SR-1 / Imjin Parkway Interchange: Reconstruct the interchange. (TAMC RTP, FORA CIP)
- SR- 1 / Monterey Road Interchange: Construct a new interchange at Monterey Road (TAMC RTP, FORA CIP)
- SR-156: Widen from 2 lanes to 4 lanes and upgrade the highway to freeway status with appropriate interchanges modifications as needed between SR-156 in 48 Castroville to US-101 in Prunedale. (TAMC RTP, FORA CIP)
- Multi-Modal Corridor: Construct new 11.5 mile multimodal corridor between the City of Marina and Salinas along 9th Street, 5th Avenue, Inter-Garrison Road, Reservation, and Davis Road. The corridor will include dedicated BRT lanes, bike lanes, wide sidewalks, and with connections to the Salinas Transit Center and a new Marina Transit Center on the east side of SR-1 and the 9th Street Bridge within the future Marina Dunes project area. (TAMC RTP)
- Davis Road: Widen from 2 lanes to 4 lanes from Blanco Road to Reservation Road (TAMC RTP, FORA CIP)
- Reservation Road: Widen from 2 lanes to 4 lanes between East Garrison Road and Davis Road (TAMC RTP, FORA CIP)

FORA Fort Ord Roadway Segment Improvements (funding through FORA fee program):

- Inter-Garrison Road: Widen from 2 lanes to 4 lanes between Eastside Parkway and Reservation Road.
- Eastside Parkway: Construct new 4 lane arterial between Inter-Garrison Road and General Jim Moore Boulevard.
- Davis Road: Widen from 2 lanes to 4 lanes between Blanco Road and Reservation Road.
- Gigling Road: Widen from 2 lanes to 4 lanes between Eastside Parkway and General Jim Moore Boulevard.

Future Traffic Volumes Conditions

Cumulative traffic conditions are expected to meet minimum standards and the Project would contribute a negligible amount of peak hour traffic, thus the cumulative impact of the proposed Project would not be significant. The Project would pay adopted impact mitigation fees which would contribute its fair share towards regional improvements.

Mitigation Fee Programs

The Project is located in Monterey County and City of Seaside. It is also located in FORA. Therefore, multiple impact fee programs could be applicable.

Fort Ord Reuse Authority (FORA)

FORA collects development impact fees on projects built within the former Fort Ord area. The fees provide funding for various traffic infrastructure improvements, both on the former army base and regionally. Payment of the impact fees would mitigate the proposed project's share of impacts on regional roadways within the former Fort Ord. Examples of former Fort Ord roadways that would have improvements funded by the FORA fee include General Jim Moore Boulevard and South Boundary Road. Payment of the fees would also mitigate the Project's cumulative impacts towards regional improvements, such as SR 1, SR 68 and SR 156. The following current 2018-2019 FORA capital improvement program (CIP) projects are located near the Project site:

Fully Funded Improvements:

- Widen Davis Road from two to four lanes between Reservation Road and Blanco Road, including reconstruction of the existing bridge over the Salinas River and intersection improvements at Davis Road & Blanco Road;
- Widen Reservation Road to four lanes between the East Garrison Gate and Davis Road;
- Widen Intergarrison Road to four lane arterial between the future Northeast Southwest Arterial Connector Roadway and Reservation Road;
- Widen Gigling Road from two to four lanes between General Jim Moore Boulevard and the future Eastside Parkway;
- Construct Northeast Southwest Arterial Connector Roadway (Eastside Parkway) between Eucalyptus Road and Intergarrison Road. The new road will be four lanes.
- Upgrade Eucalyptus Road to 2 lane collector from Seaside/Monterey County Line to Parker Flats Cut-Off Road.

It should be recognized that the FORA capital improvement program focuses on improvements to the higher order access and mobility routes as listed above. The specific local network improvements will be identified with each of the FORA project developments. The FORA capital improvement program also contributes some money towards, but does not fully fund, other regional improvements, specifically the following:

Partially Funded Improvements:

- Widening of SR 1 to three lanes in each direction between Fremont Boulevard and Del Monte Avenue in Seaside/Sand City;
- Construction of the SR 1 /Monterey Road interchange, to be located between the Light Fighter Drive and Fremont Boulevard interchanges;
- State Route 156 widening to a four-lane freeway and construction of new interchanges.

Monterey County (TAMC)

TAMC's most recently established development impact fee program was last updated in 2018. Through an agreement between TAMC and FORA, development projects are exempt from the TAMC development impact fee, if they are located within the FORA planning area and are subject to the FORA transportation fee. The FORA fee covers regional impacts outside Fort Ord (TAMC 2009). Monterey County does not have a separate traffic impact fee.

City of Seaside

The City of Seaside does not have a traffic impact fee. Any necessary monetary contributions towards impacts in the City of Seaside would involve fair-share payments towards the implementation of necessary improvements.

APPENDIX

A. EXISTING CONDITIONS TRAFFIC COUNTS

B. EXISTING CONDITIONS SYNCHRO OUTPUT SHEETS

C. EXISTING PLUS PHASE 2 CONDITIONS SYNCHRO OUTPUT SHEETS

D. CUMULATIVE CONDITIONS SYNCHRO OUTPUT SHEETS

E. CUMULATIVE PLUS SUBSEQUENT CONDITIONS SYNCHRO OUTPUT SHEETS

F. TRAFFIC IMPACT ASSESSMENT FOR CALIFORNIA CENTRAL COAST VETERANS CEMETERY PREPARED BY KD ANDERSON & ASSOCIATES, INC.

G. MST ROUTE MAP AND SCHEDULES

H. TAMC 2011 BICYCLE AND PEDESTRIAN MASTER PLAN FIGURE 4: EXISTING AND PROPOSED BIKEWAYS MAP

I. REGULATORY BACKGROUND INFORMATION

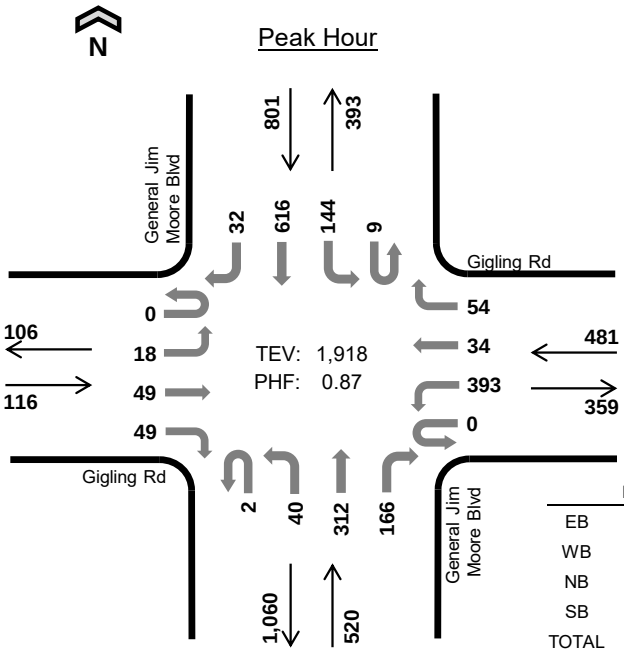
J. SIGNAL WARRANT EVALUATIONS

K. PHASE 2 SITE LAYOUT

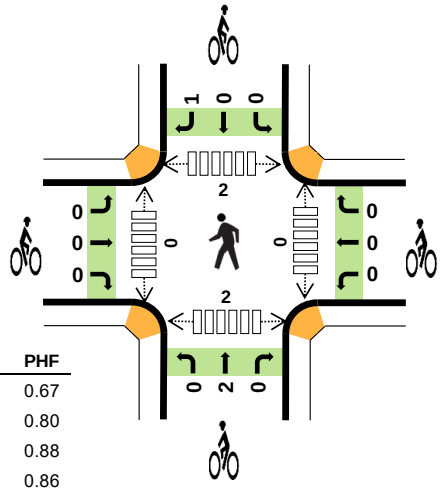
A. EXISTING CONDITIONS
TRAFFIC COUNTS

General Jim Moore Blvd
Gigling Rd

Date: 01-24-2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	2.6%	0.67
WB	0.8%	0.80
NB	0.6%	0.88
SB	2.0%	0.86
TOTAL	1.4%	0.87



Two-Hour Count Summaries

Interval Start		Gigling Rd Eastbound				Gigling Rd Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	1	3	6	0	64	4	14	1	1	55	17	2	23	67	4	262	0
7:15 AM		**0**	**5**	**6**	**7**	**0**	**123**	**4**	**14**	**0**	**2**	**62**	**37**	**1**	**35**	**151**	**7**	**454**	0
7:30 AM		**0**	**5**	**16**	**19**	**0**	**127**	**13**	**11**	**0**	**7**	**79**	**41**	**2**	**37**	**187**	**8**	**552**	0
7:45 AM		**0**	**4**	**21**	**18**	**0**	**79**	**13**	**12**	**1**	**18**	**87**	**41**	**2**	**37**	**166**	**6**	**505**	1,773
8:00 AM		**0**	**4**	**6**	**5**	**0**	**64**	**4**	**17**	**1**	**13**	**84**	**47**	**4**	**35**	**112**	**11**	**407**	**1,918**
8:15 AM		0	3	4	7	0	57	1	12	1	6	76	30	3	44	116	7	367	1,831
8:30 AM		0	5	3	8	0	42	4	10	0	5	47	19	3	34	99	9	288	1,567
8:45 AM		0	0	11	1	0	42	6	13	1	4	55	27	2	34	56	6	258	1,320
Count Total		0	27	70	71	0	598	49	103	5	56	545	259	19	279	954	58	3,093	0
Peak Hour	**All**	**0**	**18**	**49**	**49**	**0**	**393**	**34**	**54**	**2**	**40**	**312**	**166**	**9**	**144**	**616**	**32**	**1,918**	**0**
	HV	**0**	**1**	**2**	**0**	**0**	**2**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**2**	**10**	**4**	**26**	**0**
	HV%	**-**	**6%**	**4%**	**0%**	**-**	**1%**	**3%**	**2%**	**0%**	**0%**	**1%**	**1%**	**0%**	**1%**	**2%**	**13%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	3	1	3	*8*	0	0	0	1	*1*	0	0	0	2	*2*
7:15 AM	**2**	**1**	**1**	**3**	***7***	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**1**	**1**	*2*
7:30 AM	**1**	**2**	**0**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**1**	**1**	**5**	***7***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**1**	**0**	*1*
8:00 AM	**0**	**0**	**1**	**5**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
8:15 AM	1	4	2	8	*15*	0	0	0	0	*0*	0	0	0	1	*1*
8:30 AM	1	0	4	6	*11*	0	0	1	0	*1*	0	0	0	0	*0*
8:45 AM	0	2	2	3	*7*	0	0	0	1	*1*	0	0	0	2	*2*
Count Total	6	13	12	36	*67*	0	0	3	3	*6*	0	0	2	7	*9*
Peak Hour	**3**	**4**	**3**	**16**	***26***	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**2**	**2**	***4***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Gigling Rd				Gigling Rd				General Jim Moore Blvd				General Jim Moore Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	3	0	0	0	0	1	0	0	2	1	0	8	0
7:15 AM	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**7**	0
7:30 AM	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**6**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**4**	**0**	**7**	28
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**3**	**6**	**26**
8:15 AM	0	1	0	0	0	3	0	1	0	0	2	0	0	1	5	2	15	34
8:30 AM	0	0	1	0	0	0	0	0	0	0	4	0	0	1	5	0	11	39
8:45 AM	0	0	0	0	0	2	0	0	0	0	1	1	0	1	2	0	7	39
Count Total	0	3	3	0	0	10	1	2	0	0	10	2	0	7	23	6	67	0
Peak Hour	**0**	**1**	**2**	**0**	**0**	**2**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**2**	**10**	**4**	**26**	**0**

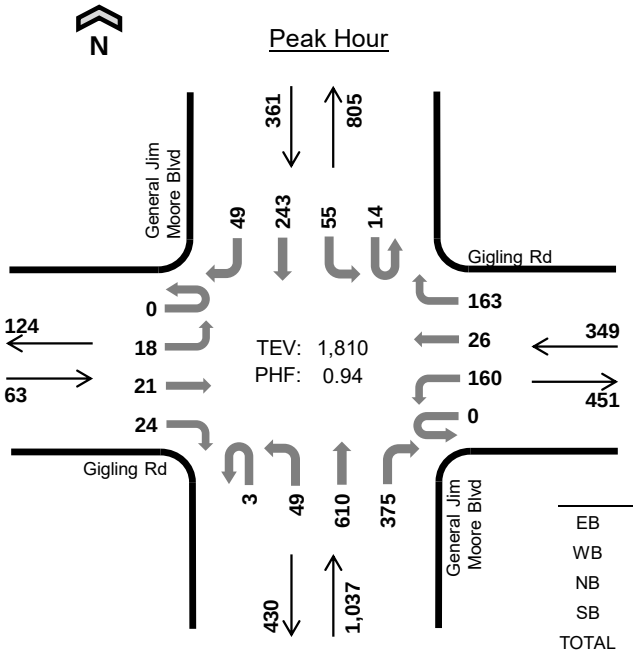
Two-Hour Count Summaries - Bikes

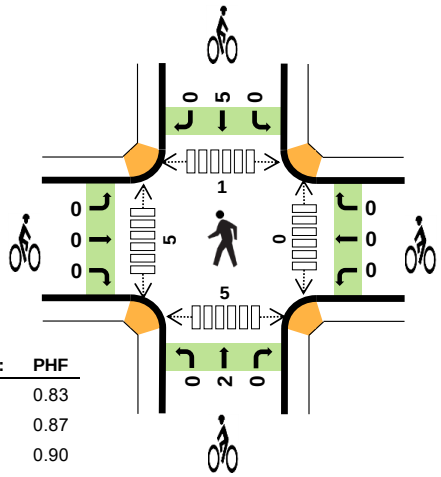
Interval Start	Gigling Rd			Gigling Rd			General Jim Moore Blvd			General Jim Moore Blvd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	4
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Count Total	0	0	0	0	0	0	0	3	0	0	2	1	6	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

General Jim Moore Blvd
Gigling Rd

Date: 01-24-2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	1.6%	0.83
WB	1.4%	0.87
NB	0.5%	0.90
SB	1.1%	0.80
TOTAL	0.8%	0.94

Two-Hour Count Summaries

Interval Start	Gigling Rd Eastbound				Gigling Rd Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	6	3	11	0	29	7	37	0	10	111	46	5	20	73	13	371	0
4:15 PM	0	7	2	8	0	33	10	26	1	13	121	63	3	13	65	10	375	0
4:30 PM	**0**	**6**	**7**	**6**	**0**	**30**	**5**	**53**	**1**	**4**	**135**	**87**	**4**	**12**	**77**	**17**	**444**	0
4:45 PM	**0**	**5**	**3**	**9**	**0**	**43**	**12**	**45**	**1**	**18**	**169**	**99**	**3**	**13**	**46**	**13**	**479**	1,669
5:00 PM	**0**	**5**	**7**	**5**	**0**	**44**	**5**	**44**	**1**	**13**	**138**	**93**	**5**	**19**	**76**	**13**	**468**	1,766
5:15 PM	**0**	**2**	**4**	**4**	**0**	**43**	**4**	**21**	**0**	**14**	**168**	**96**	**2**	**11**	**44**	**6**	**419**	**1,810**
5:30 PM	0	5	5	13	0	31	1	22	0	10	144	79	7	11	50	11	389	1,755
5:45 PM	0	5	2	7	0	27	3	16	0	12	118	54	4	17	52	13	330	1,606
Count Total	0	41	33	63	0	280	47	264	4	94	1,104	617	33	116	483	96	3,275	0
Peak Hour All	**0**	**18**	**21**	**24**	**0**	**160**	**26**	**163**	**3**	**49**	**610**	**375**	**14**	**55**	**243**	**49**	**1,810**	**0**
Peak Hour HV	**0**	**1**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**1**	**4**	**0**	**1**	**2**	**1**	**15**	**0**
Peak Hour HV%	**-**	**6%**	**0%**	**0%**	**-**	**2%**	**4%**	**1%**	**0%**	**0%**	**0%**	**1%**	**0%**	**2%**	**1%**	**2%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	1	2	3	*6*	0	0	0	0	*0*	0	1	0	5	*6*
4:15 PM	1	1	4	1	*7*	0	0	0	0	*0*	2	1	2	2	*7*
4:30 PM	**0**	**2**	**3**	**2**	***7***	**0**	**0**	**0**	**3**	***3***	**0**	**4**	**1**	**2**	*7*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	***2***	**0**	**1**	**0**	**1**	*2*
5:00 PM	**0**	**1**	**1**	**1**	***3***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**2**	*2*
5:15 PM	**1**	**2**	**1**	**1**	***5***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
5:30 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	0	1	*1*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	3	7	12	8	*30*	0	0	2	5	*7*	2	7	3	13	*25*
Peak Hour	**1**	**5**	**5**	**4**	***15***	**0**	**0**	**2**	**5**	***7***	**0**	**5**	**1**	**5**	***11***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Gigling Rd				Gigling Rd				General Jim Moore Blvd				General Jim Moore Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	1	0	0	0	0	1	1	0	0	3	0	6	0
4:15 PM	0	1	0	0	0	1	0	0	0	0	2	2	0	0	0	1	7	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**2**	**0**	**0**	**2**	**0**	**7**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	20
5:00 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**3**	17
5:15 PM	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**5**	**15**
5:30 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	10
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Count Total	0	2	1	0	0	5	1	1	0	0	5	7	0	1	5	2	30	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**1**	**4**	**0**	**1**	**2**	**1**	**15**	**0**

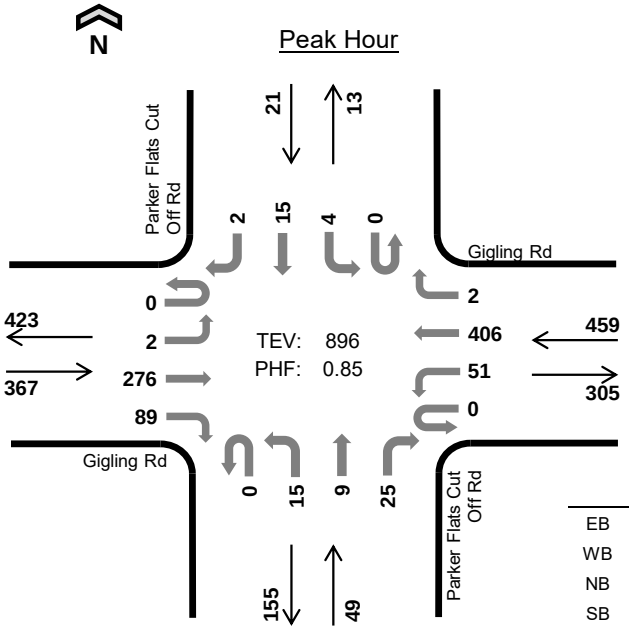
Two-Hour Count Summaries - Bikes

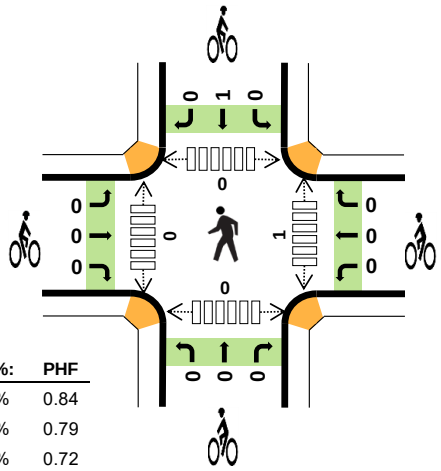
Interval Start	Gigling Rd			Gigling Rd			General Jim Moore Blvd			General Jim Moore Blvd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	5
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	6
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**7**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	0	0	2	0	0	5	0	7	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**5**	**0**	**7**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Parker Flats Cut Off Rd
Gigling Rd

Date: 01-24-2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM





	HV %:	PHF
EB	1.4%	0.84
WB	0.9%	0.79
NB	2.0%	0.72
SB	0.0%	0.58
TOTAL	1.1%	0.85

Two-Hour Count Summaries

Interval Start		Gigling Rd Eastbound				Gigling Rd Westbound				Parker Flats Cut Off Rd Northbound				Parker Flats Cut Off Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	2	28	7	0	0	83	0	0	6	1	1	0	0	0	0	128	0
7:15 AM		**0**	**0**	**54**	**10**	**0**	**5**	**123**	**1**	**0**	**4**	**2**	**4**	**0**	**0**	**2**	**0**	**205**	0
7:30 AM		**0**	**1**	**78**	**19**	**0**	**16**	**130**	**0**	**0**	**2**	**3**	**6**	**0**	**3**	**5**	**1**	**264**	0
7:45 AM		**0**	**0**	**75**	**34**	**0**	**16**	**82**	**1**	**0**	**4**	**2**	**5**	**0**	**0**	**8**	**1**	**228**	825
8:00 AM		**0**	**1**	**69**	**26**	**0**	**14**	**71**	**0**	**0**	**5**	**2**	**10**	**0**	**1**	**0**	**0**	**199**	**896**
8:15 AM		0	0	49	26	0	4	60	0	0	6	3	5	0	2	7	1	163	854
8:30 AM		0	1	40	16	0	2	42	0	0	7	2	3	0	1	4	0	118	708
8:45 AM		0	4	45	17	0	5	48	0	0	2	1	4	0	0	3	1	130	610
Count Total		0	9	438	155	0	62	639	2	0	36	16	38	0	7	29	4	1,435	0
Peak Hour	**All**	**0**	**2**	**276**	**89**	**0**	**51**	**406**	**2**	**0**	**15**	**9**	**25**	**0**	**4**	**15**	**2**	**896**	**0**
	HV	**0**	**0**	**5**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**10**	**0**
	HV%	**-**	**0%**	**2%**	**0%**	**-**	**0%**	**1%**	**50%**	**-**	**0%**	**0%**	**4%**	**-**	**0%**	**0%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	3	0	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**2**	**2**	**0**	**0**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***
8:15 AM	1	3	1	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	2	0	0	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	1	3	0	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	9	13	2	0	*24*	0	0	0	1	*1*	1	0	0	0	*1*
Peak Hour	**5**	**4**	**1**	**0**	***10***	**0**	**0**	**0**	**1**	***1***	**1**	**0**	**0**	**0**	***1***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Gigling Rd				Gigling Rd				Parker Flats Cut Off Rd				Parker Flats Cut Off Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0
7:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	0
7:30 AM	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	0
7:45 AM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	12
8:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**10**
8:15 AM	0	0	0	1	0	0	3	0	0	1	0	0	0	0	0	0	5	13
8:30 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	11
8:45 AM	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	4	12
Count Total	0	0	7	2	0	1	11	1	0	1	0	1	0	0	0	0	24	0
Peak Hour	**0**	**0**	**5**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**10**	**0**

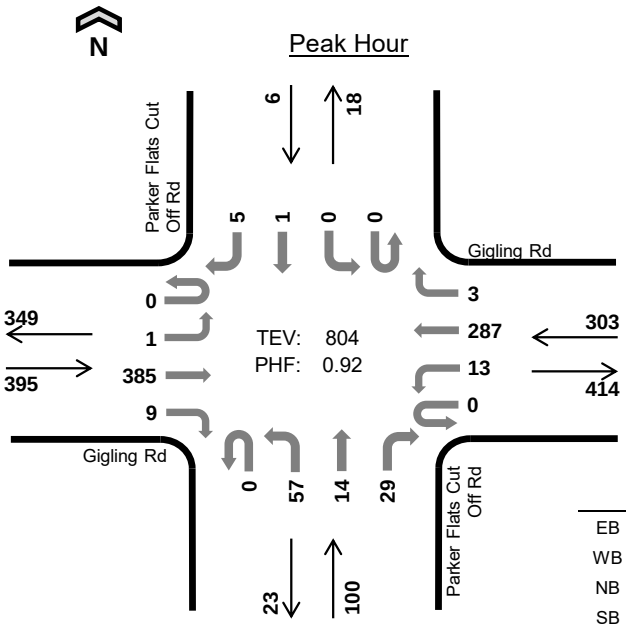
Two-Hour Count Summaries - Bikes

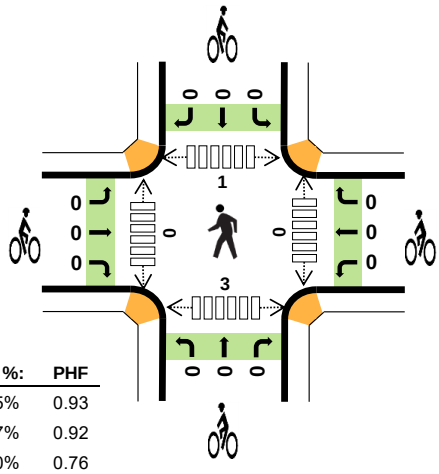
Interval Start	Gigling Rd			Gigling Rd			Parker Flats Cut Off Rd			Parker Flats Cut Off Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Parker Flats Cut Off Rd
Gigling Rd

Date: 01-24-2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	1.5%	0.93
WB	1.7%	0.92
NB	0.0%	0.76
SB	0.0%	0.30
TOTAL	1.4%	0.92

Two-Hour Count Summaries

Interval Start	Gigling Rd Eastbound				Gigling Rd Westbound				Parker Flats Cut Off Rd Northbound				Parker Flats Cut Off Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	53	4	0	3	48	0	0	22	2	7	0	0	0	0	140	0
4:15 PM	0	0	65	3	0	1	55	0	0	10	3	3	0	0	0	0	140	0
4:30 PM	**0**	**0**	**89**	**4**	**0**	**4**	**77**	**0**	**0**	**14**	**2**	**8**	**0**	**0**	**0**	**0**	**198**	0
4:45 PM	**0**	**1**	**98**	**2**	**0**	**4**	**78**	**0**	**0**	**18**	**4**	**4**	**0**	**0**	**0**	**0**	**209**	687
5:00 PM	**0**	**0**	**105**	**1**	**0**	**3**	**70**	**2**	**0**	**17**	**4**	**12**	**0**	**0**	**0**	**5**	**219**	766
5:15 PM	**0**	**0**	**93**	**2**	**0**	**2**	**62**	**1**	**0**	**8**	**4**	**5**	**0**	**0**	**1**	**0**	**178**	**804**
5:30 PM	0	0	80	2	0	5	41	0	0	7	2	5	0	0	0	2	144	750
5:45 PM	0	0	65	2	0	2	33	1	0	9	3	3	0	0	2	0	120	661
Count Total	0	2	648	20	0	24	464	4	0	105	24	47	0	0	3	7	1,348	0
Peak Hour All	**0**	**1**	**385**	**9**	**0**	**13**	**287**	**3**	**0**	**57**	**14**	**29**	**0**	**0**	**1**	**5**	**804**	**0**
Peak Hour HV	**0**	**0**	**6**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**0**
Peak Hour HV%	**-**	**0%**	**2%**	**0%**	**-**	**0%**	**2%**	**0%**	**-**	**0%**	**0%**	**0%**	**-**	**-**	**0%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	0	0	*1*	0	0	1	0	*1*	0	0	0	1	*1*
4:15 PM	3	1	0	0	*4*	0	0	0	0	*0*	0	0	0	1	*1*
4:30 PM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**1**	*2*
4:45 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	*2*
5:00 PM	**3**	**1**	**0**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	0	*1*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	10	6	0	0	*16*	0	0	1	0	*1*	0	0	2	5	*7*
Peak Hour	**6**	**5**	**0**	**0**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**3**	***4***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Gigling Rd				Gigling Rd				Parker Flats Cut Off Rd				Parker Flats Cut Off Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4:15 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0
4:30 PM	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	0
4:45 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	9
5:00 PM	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	12
5:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**11**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Count Total	0	0	10	0	0	0	6	0	0	0	0	0	0	0	0	0	16	0
Peak Hour	**0**	**0**	**6**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**0**

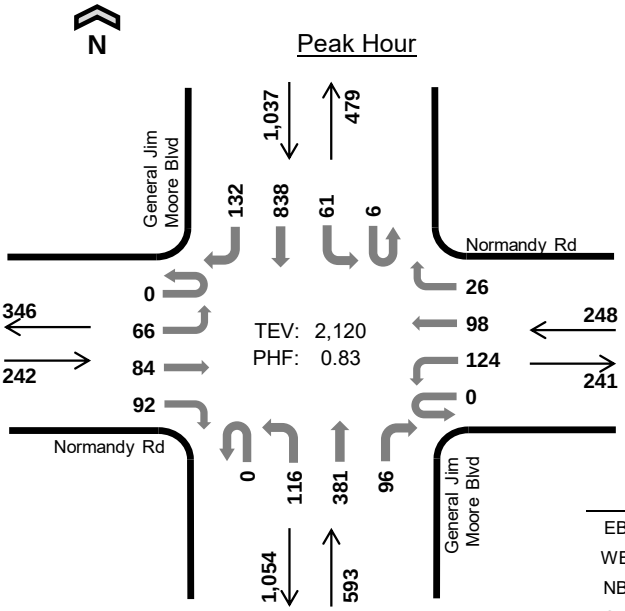
Two-Hour Count Summaries - Bikes

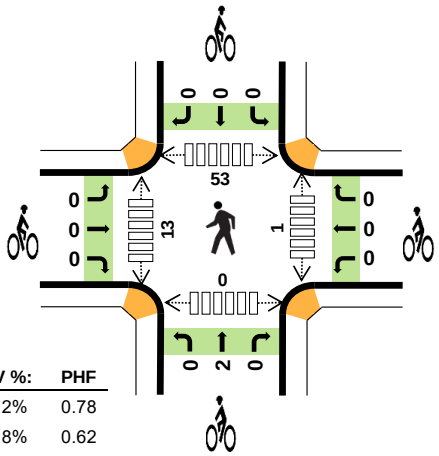
Interval Start	Gigling Rd			Gigling Rd			Parker Flats Cut Off Rd			Parker Flats Cut Off Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

General Jim Moore Blvd
Normandy Rd

Date: 01-24-2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM





	HV %:	PHF
EB	1.2%	0.78
WB	0.8%	0.62
NB	0.7%	0.78
SB	1.0%	0.80
TOTAL	0.9%	0.83

Two-Hour Count Summaries

Interval Start	Normandy Rd Eastbound				Normandy Rd Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	9	6	8	0	10	4	3	0	4	52	3	0	8	102	16	225	0
7:15 AM	**0**	**14**	**11**	**20**	**0**	**18**	**14**	**3**	**0**	**17**	**71**	**16**	**0**	**12**	**230**	**15**	**441**	0
7:30 AM	**0**	**13**	**36**	**16**	**0**	**37**	**27**	**5**	**0**	**38**	**102**	**43**	**1**	**22**	**262**	**40**	**642**	0
7:45 AM	**0**	**16**	**31**	**31**	**0**	**45**	**43**	**12**	**0**	**51**	**114**	**25**	**5**	**21**	**174**	**62**	**630**	1,938
8:00 AM	**0**	**23**	**6**	**25**	**0**	**24**	**14**	**6**	**0**	**10**	**94**	**12**	**0**	**6**	**172**	**15**	**407**	**2,120**
8:15 AM	0	9	5	12	0	12	4	6	0	10	84	11	0	13	176	4	346	2,025
8:30 AM	0	5	3	14	0	13	9	4	0	8	64	3	2	5	135	5	270	1,653
8:45 AM	0	11	0	8	0	6	3	0	0	3	64	3	0	3	95	6	202	1,225
Count Total	0	100	98	134	0	165	118	39	0	141	645	116	8	90	1,346	163	3,163	0
Peak Hour All	**0**	**66**	**84**	**92**	**0**	**124**	**98**	**26**	**0**	**116**	**381**	**96**	**6**	**61**	**838**	**132**	**2,120**	**0**
Peak Hour HV	**0**	**0**	**1**	**2**	**0**	**1**	**0**	**1**	**0**	**1**	**2**	**1**	**0**	**0**	**9**	**1**	**19**	**0**
Peak Hour HV%	**-**	**0%**	**1%**	**2%**	**-**	**1%**	**0%**	**4%**	**-**	**1%**	**1%**	**1%**	**0%**	**0%**	**1%**	**1%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	2	2	4	*9*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**1**	**1**	**1**	**1**	***4***	**0**	**0**	**2**	**0**	***2***	**0**	**5**	**4**	**0**	*9*
7:30 AM	**2**	**1**	**1**	**2**	***6***	**0**	**0**	**0**	**0**	***0***	**1**	**5**	**30**	**0**	*36*
7:45 AM	**0**	**0**	**0**	**5**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**16**	**0**	*18*
8:00 AM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**3**	**0**	***4***
8:15 AM	0	0	1	8	*9*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	0	4	5	*9*	0	0	0	1	*1*	1	0	0	0	*1*
8:45 AM	0	0	2	3	*5*	0	0	1	1	*2*	0	1	1	0	*2*
Count Total	4	4	13	30	*51*	0	0	3	2	*5*	2	14	54	0	*70*
Peak Hour	**3**	**2**	**4**	**10**	***19***	**0**	**0**	**2**	**0**	***2***	**1**	**13**	**53**	**0**	***67***

Two-Hour Count Summaries - Heavy Vehicles

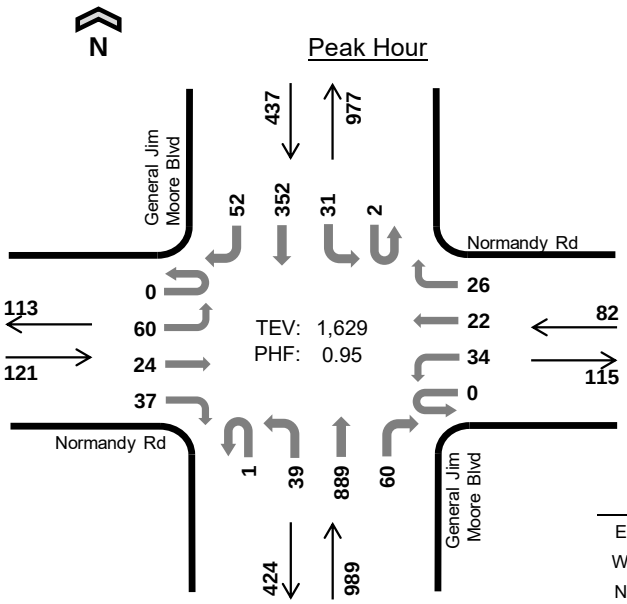
Interval Start	Normandy Rd Eastbound				Normandy Rd Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	1	0	1	1	0	0	1	1	0	0	0	4	0	9	0
7:15 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**4**	0
7:30 AM	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**0**	**6**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**5**	24
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**1**	**4**	**19**
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	8	0	9	24
8:30 AM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	9	27
8:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	5	27
Count Total	0	0	1	3	0	2	1	1	0	2	10	1	0	0	29	1	51	0
Peak Hour	**0**	**0**	**1**	**2**	**0**	**1**	**0**	**1**	**0**	**1**	**2**	**1**	**0**	**0**	**9**	**1**	**19**	**0**

Two-Hour Count Summaries - Bikes

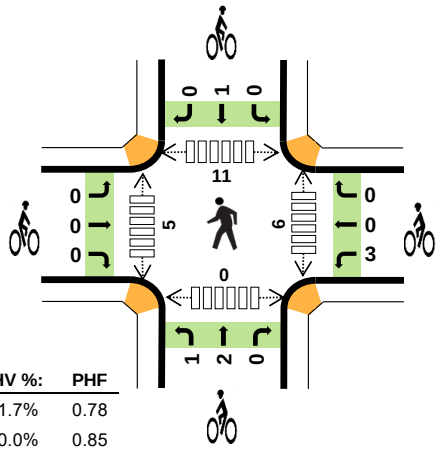
Interval Start	Normandy Rd Eastbound			Normandy Rd Westbound			General Jim Moore Blvd Northbound			General Jim Moore Blvd Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	1
8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	2	3
Count Total	0	0	0	0	0	0	0	3	0	1	1	0	5	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

General Jim Moore Blvd
Normandy Rd



Date: 01-24-2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	1.7%	0.78
WB	0.0%	0.85
NB	0.4%	0.90
SB	1.1%	0.83
TOTAL	0.7%	0.95

Two-Hour Count Summaries

Interval Start		Normandy Rd Eastbound				Normandy Rd Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	11	6	3	0	16	10	4	2	12	143	12	1	10	87	9	326	0
4:15 PM		0	17	4	12	0	9	4	5	0	10	178	7	0	12	94	6	358	0
4:30 PM		**0**	**12**	**10**	**8**	**0**	**12**	**2**	**10**	**1**	**12**	**185**	**16**	**0**	**8**	**89**	**17**	**382**	0
4:45 PM		**0**	**16**	**9**	**14**	**0**	**10**	**1**	**9**	**0**	**13**	**247**	**14**	**0**	**5**	**80**	**10**	**428**	1,494
5:00 PM		**0**	**20**	**2**	**10**	**0**	**6**	**10**	**5**	**0**	**7**	**208**	**14**	**1**	**11**	**105**	**15**	**414**	1,582
5:15 PM		**0**	**12**	**3**	**5**	**0**	**6**	**9**	**2**	**0**	**7**	**249**	**16**	**1**	**7**	**78**	**10**	**405**	**1,629**
5:30 PM		0	12	11	4	0	11	5	4	1	16	206	9	1	11	72	6	369	1,616
5:45 PM		0	10	12	3	0	19	9	7	0	5	143	11	0	11	65	7	302	1,490
Count Total		0	110	57	59	0	89	50	46	4	82	1,559	99	4	75	670	80	2,984	0
Peak Hour	**All**	**0**	**60**	**24**	**37**	**0**	**34**	**22**	**26**	**1**	**39**	**889**	**60**	**2**	**31**	**352**	**52**	**1,629**	**0**
	HV	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**5**	**0**	**11**	**0**
	HV%	**-**	**2%**	**0%**	**3%**	**-**	**0%**	**0%**	**0%**	**0%**	**3%**	**0%**	**0%**	**0%**	**0%**	**1%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	3	3	*6*	0	0	0	0	*0*	1	1	1	0	*3*
4:15 PM	0	0	4	1	*5*	0	1	0	1	*2*	0	1	1	0	*2*
4:30 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**1**	**0**	***1***	**2**	**0**	**5**	**0**	*7*
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**3**	**0**	**1**	***4***	**1**	**5**	**3**	**0**	*9*
5:00 PM	**2**	**0**	**0**	**1**	***3***	**0**	**0**	**1**	**0**	***1***	**2**	**0**	**1**	**0**	*3*
5:15 PM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**1**	**0**	***1***	**1**	**0**	**2**	**0**	***3***
5:30 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	2	0	*2*
5:45 PM	0	0	1	0	*1*	1	0	0	0	*1*	0	0	0	0	*0*
Count Total	2	1	12	9	*24*	1	4	3	2	*10*	7	7	15	0	*29*
Peak Hour	**2**	**0**	**4**	**5**	***11***	**0**	**3**	**3**	**1**	***7***	**6**	**5**	**11**	**0**	***22***

Two-Hour Count Summaries - Heavy Vehicles

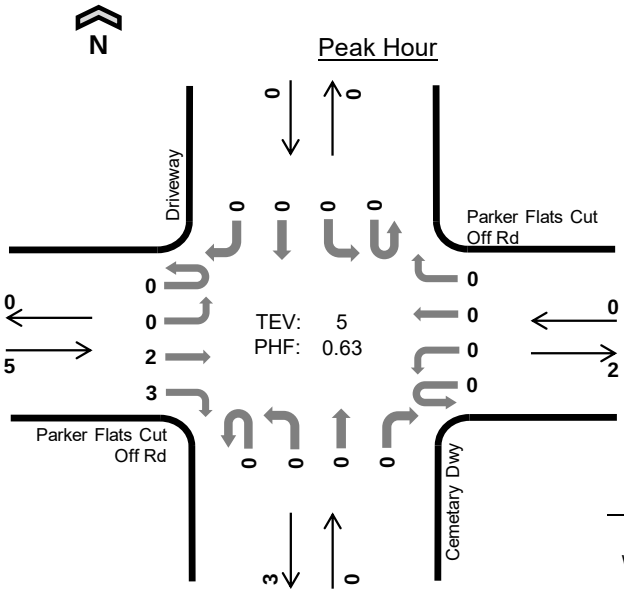
Interval Start	Normandy Rd				Normandy Rd				General Jim Moore Blvd				General Jim Moore Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3	0	6	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	5	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**4**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	16
5:00 PM	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	13
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**3**	**11**
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	8
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	8
Count Total	0	1	0	1	0	1	0	0	0	3	9	0	0	0	9	0	24	0
Peak Hour	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**5**	**0**	**11**	**0**

Two-Hour Count Summaries - Bikes

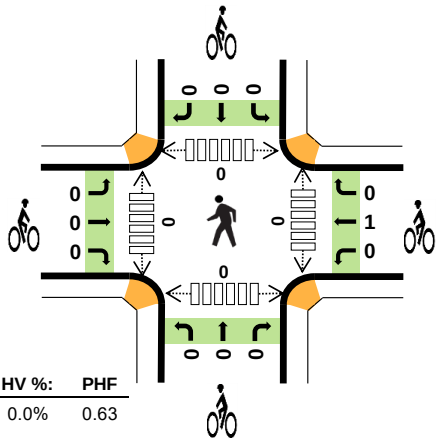
Interval Start	Normandy Rd			Normandy Rd			General Jim Moore Blvd			General Jim Moore Blvd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	1	0	0	0	0	0	0	1	0	2	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	0
4:45 PM	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	7
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	8
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**7**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	3
Count Total	0	0	1	4	0	0	1	2	0	0	2	0	10	0
Peak Hour	**0**	**0**	**0**	**3**	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**7**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Cemetary Dwy
Parker Flats Cut Off Rd



Date: 01-24-2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	0.0%	0.63
WB	-	-
NB	-	-
SB	-	-
TOTAL	0.0%	0.63

Two-Hour Count Summaries

Interval Start		Parker Flats Cut Off Rd Eastbound				Parker Flats Cut Off Rd Westbound				Cemetary Dwy Northbound				Driveway Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM		**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	0
7:30 AM		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM		**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	4
8:00 AM		**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**5**
8:15 AM		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:30 AM		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4
8:45 AM		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
Count Total		0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	7	0
Peak Hour	**All**	**0**	**0**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	HV%	**-**	**-**	**0%**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	0	0	*1*	0	1	0	0	*1*	0	0	0	0	*0*
Peak Hour	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Parker Flats Cut Off Rd				Parker Flats Cut Off Rd				Cemetary Dwy				Driveway				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Count Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

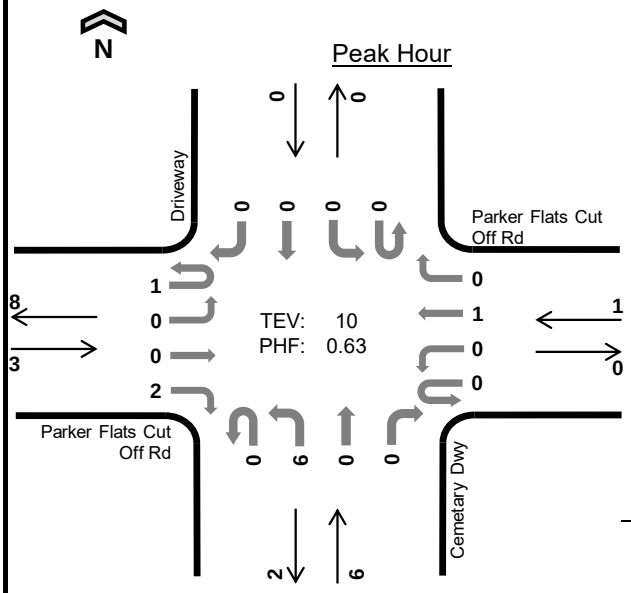
Two-Hour Count Summaries - Bikes

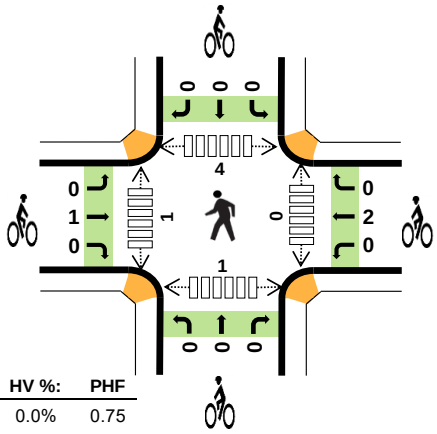
Interval Start	Parker Flats Cut Off Rd			Parker Flats Cut Off Rd			Cemetary Dwy			Driveway			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Cemetary Dwy
Parker Flats Cut Off Rd

Date: 01-24-2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM





	HV %:	PHF
EB	0.0%	0.75
WB	0.0%	0.25
NB	0.0%	0.50
SB	-	-
TOTAL	0.0%	0.63

Two-Hour Count Summaries

Interval Start	Parker Flats Cut Off Rd Eastbound				Parker Flats Cut Off Rd Westbound				Cemetary Dwy Northbound				Driveway Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
4:15 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	0
4:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	8
5:00 PM	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**10**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
Count Total	2	0	0	3	0	0	2	0	0	6	0	0	0	0	0	0	13	0
Peak Hour All	**1**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Peak Hour HV%	**0%**	**-**	**-**	**0%**	**-**	**-**	**0%**	**-**	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	0	*1*
4:15 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**1**	**2**	**1**	*4*
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**1**	**0**	*1*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	2	0	*2*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	2	0	*3*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	0	0	*0*	1	2	0	0	*3*	0	2	9	1	*12*
Peak Hour	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**0**	**0**	***3***	**0**	**1**	**4**	**1**	***6***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Parker Flats Cut Off Rd				Parker Flats Cut Off Rd				Cemetary Dwy				Driveway				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

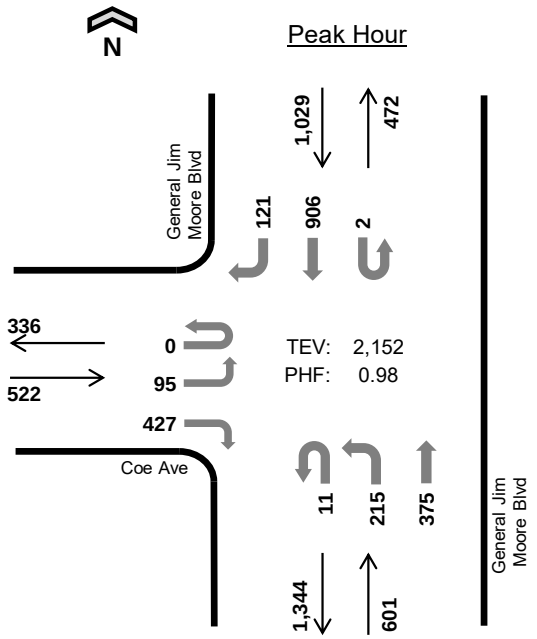
Two-Hour Count Summaries - Bikes

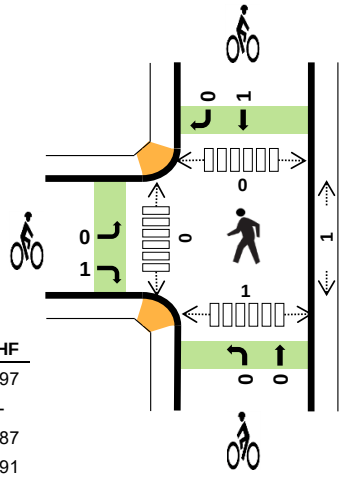
Interval Start	Parker Flats Cut Off Rd			Parker Flats Cut Off Rd			Cemetary Dwy			Driveway			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	3
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	1	0	0	2	0	0	0	0	0	0	0	3	0
Peak Hour	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

General Jim Moore Blvd
Coe Ave

Date: 01-24-2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	1.1%	0.97
WB	-	-
NB	0.5%	0.87
SB	1.6%	0.91
TOTAL	1.2%	0.98

Two-Hour Count Summaries

Interval Start		Coe Ave Eastbound				0 Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	6	0	16	0	0	0	0	0	3	26	0	0	0	112	9	172	0
7:15 AM		0	19	0	36	0	0	0	0	1	9	53	0	0	0	238	12	368	0
7:30 AM		**0**	**33**	**0**	**96**	**0**	**0**	**0**	**0**	**1**	**19**	**108**	**0**	**1**	**0**	**260**	**22**	**540**	0
7:45 AM		**0**	**18**	**0**	**110**	**0**	**0**	**0**	**0**	**5**	**44**	**117**	**0**	**0**	**0**	**231**	**24**	**549**	1,629
8:00 AM		**0**	**20**	**0**	**111**	**0**	**0**	**0**	**0**	**2**	**88**	**82**	**0**	**0**	**0**	**203**	**42**	**548**	2,005
8:15 AM		**0**	**24**	**0**	**110**	**0**	**0**	**0**	**0**	**3**	**64**	**68**	**0**	**1**	**0**	**212**	**33**	**515**	**2,152**
8:30 AM		0	18	0	67	0	0	0	0	0	22	52	0	0	0	163	14	336	1,948
8:45 AM		0	7	0	28	0	0	0	0	0	11	46	0	1	0	121	12	226	1,625
Count Total		0	145	0	574	0	0	0	0	12	260	552	0	3	0	1,540	168	3,254	0
Peak Hour	**All**	**0**	**95**	**0**	**427**	**0**	**0**	**0**	**0**	**11**	**215**	**375**	**0**	**2**	**0**	**906**	**121**	**2,152**	**0**
	HV	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**13**	**3**	**25**	**0**
	HV%	**-**	**2%**	**-**	**1%**	**-**	**-**	**-**	**-**	**0%**	**0%**	**1%**	**-**	**0%**	**-**	**1%**	**2%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	3	3	*6*	1	0	0	0	*1*	1	0	0	1	*2*
7:15 AM	1	0	0	5	*6*	0	0	0	1	*1*	4	0	0	2	*6*
7:30 AM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**1**	**0**	**0**	**6**	***7***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**3**	**0**	**1**	**3**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
8:15 AM	**2**	**0**	**1**	**6**	***9***	**1**	**0**	**0**	**0**	***1***	**1**	**0**	**0**	**0**	***1***
8:30 AM	4	0	2	6	*12*	0	0	0	0	*0*	1	0	2	0	*3*
8:45 AM	0	0	1	3	*4*	0	0	0	1	*1*	1	0	0	0	*1*
Count Total	11	0	9	33	*53*	2	0	0	3	*5*	8	0	2	4	*14*
Peak Hr	**6**	**0**	**3**	**16**	***25***	**1**	**0**	**0**	**1**	***2***	**1**	**0**	**0**	**1**	***2***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Coe Ave				0				General Jim Moore Blvd				General Jim Moore Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	1	6	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	1	6	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	0
7:45 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**7**	21
8:00 AM	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**1**	**7**	22
8:15 AM	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**5**	**1**	**9**	**25**
8:30 AM	0	2	0	2	0	0	0	0	0	0	2	0	0	0	5	1	12	35
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	4	32
Count Total	0	4	0	7	0	0	0	0	0	2	7	0	0	0	27	6	53	0
Peak Hour	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**13**	**3**	**25**	**0**

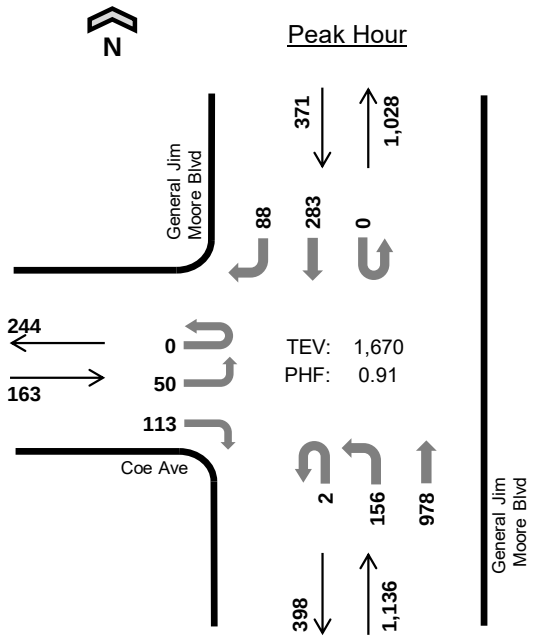
Two-Hour Count Summaries - Bikes

Interval Start	Coe Ave			0			General Jim Moore Blvd			General Jim Moore Blvd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	3
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
8:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Count Total	0	0	2	0	0	0	0	0	0	0	3	0	5	0
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**

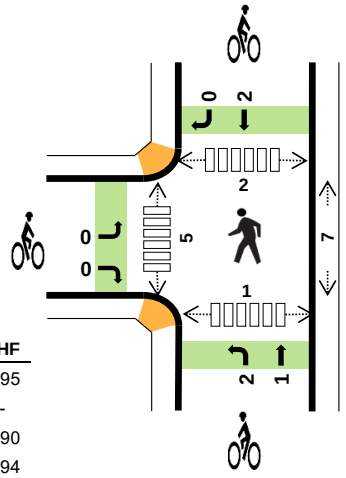
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

General Jim Moore Blvd
Coe Ave

Date: 01-24-2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.6%	0.95
WB	-	-
NB	0.3%	0.90
SB	1.3%	0.94
TOTAL	0.5%	0.91



Two-Hour Count Summaries

Interval Start	Coe Ave Eastbound				0 Westbound				General Jim Moore Blvd Northbound				General Jim Moore Blvd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	20	0	25	0	0	0	0	1	23	155	0	0	0	76	17	317	0
4:15 PM	0	10	0	20	0	0	0	0	1	44	182	0	1	0	74	17	349	0
4:30 PM	**0**	**12**	**0**	**24**	**0**	**0**	**0**	**0**	**1**	**40**	**223**	**0**	**0**	**0**	**74**	**20**	**394**	0
4:45 PM	**0**	**12**	**0**	**29**	**0**	**0**	**0**	**0**	**0**	**32**	**258**	**0**	**0**	**0**	**64**	**18**	**413**	1,473
5:00 PM	**0**	**11**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**39**	**228**	**0**	**0**	**0**	**73**	**23**	**406**	1,562
5:15 PM	**0**	**15**	**0**	**28**	**0**	**0**	**0**	**0**	**1**	**45**	**269**	**0**	**0**	**0**	**72**	**27**	**457**	**1,670**
5:30 PM	0	32	0	31	0	0	0	0	0	30	199	0	0	0	59	11	362	1,638
5:45 PM	0	9	0	15	0	0	0	0	0	27	145	0	0	0	59	13	268	1,493
Count Total	0	121	0	204	0	0	0	0	4	280	1,659	0	1	0	551	146	2,966	0
Peak Hour All	**0**	**50**	**0**	**113**	**0**	**0**	**0**	**0**	**2**	**156**	**978**	**0**	**0**	**0**	**283**	**88**	**1,670**	**0**
Peak Hour HV	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**4**	**1**	**9**	**0**
Peak Hour HV%	**-**	**2%**	**-**	**0%**	**-**	**-**	**-**	**-**	**0%**	**1%**	**0%**	**-**	**-**	**-**	**1%**	**1%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	1	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	4	2	*6*	0	0	0	1	*1*	0	0	3	0	*3*
4:30 PM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**2**	**0**	***2***	**1**	**3**	**0**	**0**	*4*
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	***1***	**2**	**1**	**0**	**1**	*4*
5:00 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**1**	**0**	*4*
5:15 PM	**1**	**0**	**0**	**3**	***4***	**0**	**0**	**1**	**1**	***2***	**1**	**1**	**1**	**0**	***3***
5:30 PM	1	0	2	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	3	0	10	10	*23*	0	0	3	3	*6*	7	5	5	1	*18*
Peak Hr	**1**	**0**	**3**	**5**	***9***	**0**	**0**	**3**	**2**	***5***	**7**	**5**	**2**	**1**	***15***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Coe Ave				0				General Jim Moore Blvd				General Jim Moore Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	3	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	6	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**3**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	13
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	11
5:15 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**4**	**9**
5:30 PM	0	1	0	0	0	0	0	0	0	0	2	0	0	0	1	0	4	10
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	10
Count Total	0	2	0	1	0	0	0	0	0	1	9	0	0	0	9	1	23	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**4**	**1**	**9**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Coe Ave			0			General Jim Moore Blvd			General Jim Moore Blvd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	4
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**2**	**5**
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	0	2	1	0	0	3	0	6	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**2**	**0**	**5**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

B. EXISTING CONDITIONS SYNCHRO OUTPUT SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	49	49	393	34	54	42	312	166	153	616	32
Future Volume (veh/h)	18	49	49	393	34	54	42	312	166	153	616	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	19	52	52	418	36	0	45	332	0	163	655	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	66	93	93	347	497	422	179	651	291	332	957	428
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.11	0.11	0.19	0.26	0.00	0.10	0.18	0.00	0.19	0.27	0.00
Ln Grp Delay, s/veh	27.8	0.0	25.7	138.9	15.0	0.0	23.3	20.6	0.0	20.9	18.7	0.0
Ln Grp LOS	C		C	F	B		C	C		C	B	
Approach Vol, veh/h		123			454			377			818	
Approach Delay, s/veh		26.0			129.0			20.9			19.1	
Approach LOS		C			F			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	14.6	14.4	15.0	10.3	9.9	19.0	6.5	18.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	24.5	10.5	31.0	11.0	24.5	8.0	33.5
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	6.4	6.5	12.5	5.1	3.3	10.9	2.6	2.8
Green Ext Time (g_e), s	0.2	1.8	0.0	0.5	0.0	3.6	0.0	0.1
Prob of Phs Call (p_c)	0.91	1.00	1.00	0.91	0.49	1.00	0.25	1.00
Prob of Max Out (p_x)	0.49	0.00	1.00	0.00	0.00	0.16	0.05	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		862		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		862		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	163	0	418	0	45	0	19	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	4.4	0.0	10.5	0.0	1.3	0.0	0.6	0.0
Cycle Q Clear Time (g_c), s	4.4	0.0	10.5	0.0	1.3	0.0	0.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	332	0	347	0	179	0	66	0
V/C Ratio (X)	0.49	0.00	1.21	0.00	0.25	0.00	0.29	0.00
Avail Cap (c_a), veh/h	363	0	347	0	363	0	264	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	19.8	0.0	21.9	0.0	22.6	0.0	25.5	0.0
Incr Delay (d2), s/veh	1.1	0.0	117.0	0.0	0.7	0.0	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	20.9	0.0	138.9	0.0	23.3	0.0	27.8	0.0
1st-Term Q (Q1), veh/ln	2.2	0.0	5.1	0.0	0.6	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	11.3	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	2.3	0.0	16.4	0.0	0.7	0.0	0.3	0.0
%ile Storage Ratio (RQ%)	0.20	0.00	2.29	0.00	0.08	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	17.9	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	332	0	0	0	655	0	36
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	4.5	0.0	0.0	0.0	8.9	0.0	0.8
Cycle Q Clear Time (g_c), s	0.0	4.5	0.0	0.0	0.0	8.9	0.0	0.8
Lane Grp Cap (c), veh/h	0	651	0	0	0	957	0	497
V/C Ratio (X)	0.00	0.51	0.00	0.00	0.00	0.68	0.00	0.07
Avail Cap (c_a), veh/h	0	1613	0	0	0	1613	0	1161
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	20.0	0.0	0.0	0.0	17.8	0.0	15.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	0.9	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	20.6	0.0	0.0	0.0	18.7	0.0	15.0
1st-Term Q (Q1), veh/ln	0.0	2.2	0.0	0.0	0.0	4.4	0.0	0.4

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.3	0.0	0.0	0.0	4.5	0.0	0.4
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.00	0.24	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	104	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1723	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.50	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	291	0	185	0	428	0	422
V/C Ratio (X)	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	722	0	984	0	722	0	987
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	23.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	25.7	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.2
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	2	276	89	51	406	2	15	9	25	4	15	2
Future Vol, veh/h	2	276	89	51	406	2	15	9	25	4	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	300	97	55	441	2	16	10	27	4	16	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	443	0	0	397	0	0	914	906	350	924	953	442
Stage 1	-	-	-	-	-	-	353	353	-	552	552	-
Stage 2	-	-	-	-	-	-	561	553	-	372	401	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1117	-	-	1162	-	-	254	276	693	250	259	615
Stage 1	-	-	-	-	-	-	664	631	-	518	515	-
Stage 2	-	-	-	-	-	-	512	514	-	648	601	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1117	-	-	1162	-	-	228	258	692	222	242	615
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	258	-	222	242	-
Stage 1	-	-	-	-	-	-	663	630	-	517	483	-
Stage 2	-	-	-	-	-	-	462	482	-	611	600	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	16.8	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	358	1117	-	-	1162	-	-	252
HCM Lane V/C Ratio	0.149	0.002	-	-	0.048	-	-	0.091
HCM Control Delay (s)	16.8	8.2	0	-	8.3	0	-	20.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	84	92	124	98	26	116	381	96	67	838	132
Future Volume (veh/h)	66	84	92	124	98	26	116	381	96	67	838	132
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.97		0.96	0.97		0.96	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	69	88	97	131	103	27	122	401	101	71	882	139
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	193	242	226	330	244	57	155	894	222	99	1025	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.38	0.37	0.37	0.38	0.37	0.37	0.09	0.32	0.32	0.06	0.29	0.29
Ln Grp Delay, s/veh	15.7	0.0	0.0	15.8	0.0	0.0	50.8	18.4	18.5	41.7	29.3	18.9
Ln Grp LOS	B			B			D	B	B	D	C	B
Approach Vol, veh/h		254			261			624			1092	
Approach Delay, s/veh		15.7			15.8			24.8			28.7	
Approach LOS		B			B			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	9.6	27.0		29.4	25.0	11.7		29.4
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	21.0		32.0	20.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.5	5.0	3.7		5.7
Max Q Clear (g_c+I1), s	4.6	9.6		9.0	17.5	6.4		9.8
Green Ext Time (g_e), s	0.0	2.2		1.6	1.5	0.0		1.7
Prob of Phs Call (p_c)	0.73	1.00		1.00	1.00	0.89		1.00
Prob of Max Out (p_x)	1.00	0.18		0.00	1.00	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			336		1792		673

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		2810		654	3574			660

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		699		612	1563			154

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	71	0	0	254	0	122	0	261
Grp Sat Flow (s), veh/h/ln	1792	0	0	1602	0	1792	0	1487
Q Serve Time (g_s), s	2.6	0.0	0.0	0.0	0.0	4.4	0.0	0.8
Cycle Q Clear Time (g_c), s	2.6	0.0	0.0	7.0	0.0	4.4	0.0	7.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1242	0	0	0	1184
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1840	0	0	0	1598
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	24.9	0.0	0.0	0.0	24.9
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	17.1	0.0	0.0	0.0	17.9
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	2.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	2.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.27	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	99	0	0	673	0	155	0	642
V/C Ratio (X)	0.72	0.00	0.00	0.38	0.00	0.79	0.00	0.41
Avail Cap (c_a), veh/h	135	0	0	848	0	163	0	805
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	30.7	0.0	0.0	15.3	0.0	29.6	0.0	15.4
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.3	0.0	21.2	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.7	0.0	0.0	15.7	0.0	50.8	0.0	15.8
1st-Term Q (Q1), veh/ln	1.3	0.0	0.0	3.3	0.0	2.2	0.0	3.5
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.1	0.0	0.9	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.6	0.0	0.0	3.4	0.0	3.1	0.0	3.5
%ile Storage Ratio (RQ%)	0.18	0.00	0.00	0.08	0.00	0.46	0.00	0.03
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	253	0	0	882	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	7.4	0.0	0.0	15.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.4	0.0	0.0	15.5	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	569	0	0	1025	0	0	0
V/C Ratio (X)	0.00	0.45	0.00	0.00	0.86	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	569	0	0	1081	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	17.9	0.0	0.0	22.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	6.9	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.4	0.0	0.0	29.3	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.7	0.0	0.0	7.6	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	1.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.7	0.0	0.0	8.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.08	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	249	0	0	139	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1722	0	0	1563	0	0	0
Q Serve Time (g_s), s	0.0	7.6	0.0	0.0	4.6	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.6	0.0	0.0	4.6	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.41	0.00	0.38	1.00	0.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	548	0	0	448	0	0	0
V/C Ratio (X)	0.00	0.45	0.00	0.00	0.31	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	548	0	0	473	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	18.0	0.0	0.0	18.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.5	0.0	0.0	18.9	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.6	0.0	0.0	2.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.7	0.0	0.0	2.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.46	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	3	0	0	0	0
Future Vol, veh/h	2	3	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	5	0	0	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	8	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	2	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1625	-	1018	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1625	-	1018	1083
Mov Cap-2 Maneuver	-	-	-	-	1018	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1625	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	21	24	160	26	163	52	610	375	69	243	49
Future Volume (veh/h)	18	21	24	160	26	163	52	610	375	69	243	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	19	22	26	170	28	0	55	649	0	73	259	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	66	82	97	249	391	332	207	994	445	245	1071	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.11	0.11	0.14	0.21	0.00	0.12	0.28	0.00	0.14	0.30	0.00
Ln Grp Delay, s/veh	27.1	0.0	22.5	24.9	16.9	0.0	22.0	17.6	0.0	21.2	14.1	0.0
Ln Grp LOS	C		C	C	B		C	B		C	B	
Approach Vol, veh/h		67			198			704			332	
Approach Delay, s/veh		23.8			23.8			17.9			15.7	
Approach LOS		C			C			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	11.7	19.2	11.8	10.1	10.6	20.3	6.4	15.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	24.5	10.5	31.0	11.0	24.5	8.0	33.5
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	3.9	10.5	6.8	3.4	3.5	4.9	2.5	2.6
Green Ext Time (g_e), s	0.1	3.5	0.1	0.2	0.0	1.5	0.0	0.1
Prob of Phs Call (p_c)	0.66	1.00	0.92	0.77	0.55	1.00	0.24	0.97
Prob of Max Out (p_x)	0.02	0.13	1.00	0.00	0.01	0.00	0.05	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		780		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		922		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	73	0	170	0	55	0	19	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	1.9	0.0	4.8	0.0	1.5	0.0	0.5	0.0
Cycle Q Clear Time (g_c), s	1.9	0.0	4.8	0.0	1.5	0.0	0.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	245	0	249	0	207	0	66	0
V/C Ratio (X)	0.30	0.00	0.68	0.00	0.27	0.00	0.29	0.00
Avail Cap (c_a), veh/h	373	0	356	0	373	0	271	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	20.5	0.0	21.6	0.0	21.3	0.0	24.8	0.0
Incr Delay (d2), s/veh	0.7	0.0	3.3	0.0	0.7	0.0	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.2	0.0	24.9	0.0	22.0	0.0	27.1	0.0
1st-Term Q (Q1), veh/ln	1.0	0.0	2.4	0.0	0.7	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.0	0.0	2.6	0.0	0.8	0.0	0.3	0.0
%ile Storage Ratio (RQ%)	0.09	0.00	0.36	0.00	0.09	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	649	0	0	0	259	0	28
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	8.5	0.0	0.0	0.0	2.9	0.0	0.6
Cycle Q Clear Time (g_c), s	0.0	8.5	0.0	0.0	0.0	2.9	0.0	0.6
Lane Grp Cap (c), veh/h	0	994	0	0	0	1071	0	391
V/C Ratio (X)	0.00	0.65	0.00	0.00	0.00	0.24	0.00	0.07
Avail Cap (c_a), veh/h	0	1657	0	0	0	1657	0	1192
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	16.8	0.0	0.0	0.0	14.0	0.0	16.8
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.0	0.1	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	17.6	0.0	0.0	0.0	14.1	0.0	16.9
1st-Term Q (Q1), veh/ln	0.0	4.1	0.0	0.0	0.0	1.4	0.0	0.3

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.2	0.0	0.0	0.0	1.4	0.0	0.3
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.00	0.08	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	48	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1703	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.54	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	445	0	180	0	479	0	332
V/C Ratio (X)	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	741	0	999	0	741	0	1014
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	21.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	385	9	13	287	3	57	14	29	0	1	5
Future Vol, veh/h	1	385	9	13	287	3	57	14	29	0	1	5
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	418	10	14	312	3	62	15	32	0	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	316	0	0	431	0	0	773	772	426	792	776	315
Stage 1	-	-	-	-	-	-	428	428	-	343	343	-
Stage 2	-	-	-	-	-	-	345	344	-	449	433	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1244	-	-	1129	-	-	316	330	628	307	328	725
Stage 1	-	-	-	-	-	-	605	585	-	672	637	-
Stage 2	-	-	-	-	-	-	671	637	-	589	582	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1243	-	-	1126	-	-	308	323	626	278	321	724
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	323	-	278	321	-
Stage 1	-	-	-	-	-	-	603	583	-	671	627	-
Stage 2	-	-	-	-	-	-	655	627	-	544	580	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	19	11.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	364	1243	-	-	1126	-	-	599
HCM Lane V/C Ratio	0.299	0.001	-	-	0.013	-	-	0.011
HCM Control Delay (s)	19	7.9	0	-	8.2	0	-	11.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	24	37	34	22	26	40	889	60	33	352	52
Future Volume (veh/h)	60	24	37	34	22	26	40	889	60	33	352	52
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.96
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	63	25	39	36	23	27	42	936	63	35	371	55
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	232	94	89	204	121	94	388	1285	87	71	723	311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.20	0.19	0.19	0.20	0.19	0.19	0.22	0.38	0.38	0.04	0.20	0.20
Ln Grp Delay, s/veh	15.6	0.0	0.0	15.1	0.0	0.0	13.7	13.7	13.7	25.4	15.9	14.5
Ln Grp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		127			86			1041			461	
Approach Delay, s/veh		15.6			15.1			13.7			16.4	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	7.7	22.3		13.1	14.7	15.3		13.1
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	21.0		32.0	20.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.4	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	2.8	12.2		4.8	6.0	2.8		3.8
Green Ext Time (g_e), s	0.0	3.9		0.7	2.1	0.0		0.5
Prob of Phs Call (p_c)	0.34	1.00		0.93	1.00	0.40		0.93
Prob of Max Out (p_x)	1.00	0.63		0.00	0.04	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			575		1792		455

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3392		504	3574			647

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		228		478	1541			504

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	35	0	0	127	0	42	0	86
Grp Sat Flow (s), veh/h/ln	1792	0	0	1557	0	1792	0	1607
Q Serve Time (g_s), s	0.8	0.0	0.0	0.9	0.0	0.8	0.0	0.0
Cycle Q Clear Time (g_c), s	0.8	0.0	0.0	2.8	0.0	0.8	0.0	1.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1357	0	0	0	1342
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1823	0	0	0	1832
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	8.6	0.0	0.0	0.0	8.6
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	6.8	0.0	0.0	0.0	5.7
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.5
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.8
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.42
Lane Grp Cap (c), veh/h	71	0	0	434	0	388	0	437
V/C Ratio (X)	0.49	0.00	0.00	0.29	0.00	0.11	0.00	0.20
Avail Cap (c_a), veh/h	208	0	0	1264	0	388	0	1283
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	20.3	0.0	0.0	15.2	0.0	13.5	0.0	14.9
Incr Delay (d2), s/veh	5.2	0.0	0.0	0.4	0.0	0.1	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.4	0.0	0.0	15.6	0.0	13.7	0.0	15.1
1st-Term Q (Q1), veh/ln	0.4	0.0	0.0	1.3	0.0	0.4	0.0	0.9
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.5	0.0	0.0	1.3	0.0	0.4	0.0	0.9
%ile Storage Ratio (RQ%)	0.06	0.00	0.00	0.03	0.00	0.06	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	493	0	0	371	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	10.2	0.0	0.0	4.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.2	0.0	0.0	4.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	677	0	0	723	0	0	0
V/C Ratio (X)	0.00	0.73	0.00	0.00	0.51	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	871	0	0	1659	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	11.5	0.0	0.0	15.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	0.0	0.6	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.7	0.0	0.0	15.9	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	4.9	0.0	0.0	2.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.4	0.0	0.0	2.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	506	0	0	55	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1833	0	0	1541	0	0	0
Q Serve Time (g_s), s	0.0	10.2	0.0	0.0	1.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.2	0.0	0.0	1.3	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.12	0.00	0.31	1.00	0.00	0.00	0.31
Lane Grp Cap (c), veh/h	0	694	0	0	311	0	0	0
V/C Ratio (X)	0.00	0.73	0.00	0.00	0.18	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	893	0	0	715	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	11.5	0.0	0.0	14.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	0.0	0.3	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.7	0.0	0.0	14.5	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	5.1	0.0	0.0	0.5	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.13	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	5.3

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	0	2	0	1	6	0
Future Vol, veh/h	1	0	2	0	1	6	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	0	3	0	2	10	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	4	0	6	3
Stage 1	-	-	-	-	-	3	-
Stage 2	-	-	-	-	-	3	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1631	-	1021	1087
Stage 1	-	-	-	-	-	1025	-
Stage 2	-	-	-	-	-	1025	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1629	-	1019	1086
Mov Cap-2 Maneuver	-	-	-	-	-	1019	-
Stage 1	-	-	-	-	-	1024	-
Stage 2	-	-	-	-	-	1024	-

Approach	EB	WB	NB
HCM Control Delay, s		0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1629	-
HCM Lane V/C Ratio	0.009	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

C. EXISTING PLUS PHASE 2 CONDITIONS SYNCHRO OUTPUT SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	49	49	393	34	55	42	312	166	154	616	32
Future Volume (veh/h)	18	49	49	393	34	55	42	312	166	154	616	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	19	52	52	418	36	0	45	332	0	164	655	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	66	93	93	347	497	422	179	650	291	332	957	428
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.11	0.11	0.19	0.26	0.00	0.10	0.18	0.00	0.19	0.27	0.00
Ln Grp Delay, s/veh	27.8	0.0	25.7	138.9	15.0	0.0	23.3	20.6	0.0	21.0	18.7	0.0
Ln Grp LOS	C		C	F	B		C	C		C	B	
Approach Vol, veh/h		123			454			377			819	
Approach Delay, s/veh		26.0			129.0			21.0			19.2	
Approach LOS		C			F			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	14.6	14.4	15.0	10.3	9.9	19.0	6.5	18.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	24.5	10.5	31.0	11.0	24.5	8.0	33.5
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	6.5	6.5	12.5	5.1	3.3	10.9	2.6	2.8
Green Ext Time (g_e), s	0.2	1.8	0.0	0.5	0.0	3.6	0.0	0.1
Prob of Phs Call (p_c)	0.92	1.00	1.00	0.91	0.49	1.00	0.25	1.00
Prob of Max Out (p_x)	0.51	0.00	1.00	0.00	0.00	0.16	0.05	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		862		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		862		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	164	0	418	0	45	0	19	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	4.5	0.0	10.5	0.0	1.3	0.0	0.6	0.0
Cycle Q Clear Time (g_c), s	4.5	0.0	10.5	0.0	1.3	0.0	0.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	332	0	347	0	179	0	66	0
V/C Ratio (X)	0.49	0.00	1.21	0.00	0.25	0.00	0.29	0.00
Avail Cap (c_a), veh/h	363	0	347	0	363	0	264	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	19.8	0.0	21.9	0.0	22.6	0.0	25.5	0.0
Incr Delay (d2), s/veh	1.1	0.0	117.0	0.0	0.7	0.0	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.0	0.0	138.9	0.0	23.3	0.0	27.8	0.0
1st-Term Q (Q1), veh/ln	2.2	0.0	5.1	0.0	0.6	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	11.3	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	2.3	0.0	16.4	0.0	0.7	0.0	0.3	0.0
%ile Storage Ratio (RQ%)	0.21	0.00	2.29	0.00	0.08	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	17.9	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	332	0	0	0	655	0	36
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	4.5	0.0	0.0	0.0	8.9	0.0	0.8
Cycle Q Clear Time (g_c), s	0.0	4.5	0.0	0.0	0.0	8.9	0.0	0.8
Lane Grp Cap (c), veh/h	0	650	0	0	0	957	0	497
V/C Ratio (X)	0.00	0.51	0.00	0.00	0.00	0.68	0.00	0.07
Avail Cap (c_a), veh/h	0	1613	0	0	0	1613	0	1161
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	20.0	0.0	0.0	0.0	17.8	0.0	15.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	0.9	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	20.6	0.0	0.0	0.0	18.7	0.0	15.0
1st-Term Q (Q1), veh/ln	0.0	2.2	0.0	0.0	0.0	4.4	0.0	0.4

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.3	0.0	0.0	0.0	4.5	0.0	0.4
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.00	0.24	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	104	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1723	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.50	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	291	0	185	0	428	0	422
V/C Ratio (X)	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	722	0	984	0	722	0	987
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	23.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	25.7	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.1
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	276	90	51	406	2	16	9	25	4	15	2
Future Vol, veh/h	2	276	90	51	406	2	16	9	25	4	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	300	98	55	441	2	17	10	27	4	16	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	443	0	0	398	0	0	914	906	350	925	954	442
Stage 1	-	-	-	-	-	-	353	353	-	552	552	-
Stage 2	-	-	-	-	-	-	561	553	-	373	402	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1117	-	-	1161	-	-	254	276	693	250	259	615
Stage 1	-	-	-	-	-	-	664	631	-	518	515	-
Stage 2	-	-	-	-	-	-	512	514	-	648	600	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1117	-	-	1161	-	-	228	258	692	222	242	615
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	258	-	222	242	-
Stage 1	-	-	-	-	-	-	663	630	-	517	483	-
Stage 2	-	-	-	-	-	-	462	482	-	611	599	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	17	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	354	1117	-	-	1161	-	-	252
HCM Lane V/C Ratio	0.154	0.002	-	-	0.048	-	-	0.091
HCM Control Delay (s)	17	8.2	0	-	8.3	0	-	20.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	84	92	124	98	26	116	381	96	67	838	132
Future Volume (veh/h)	66	84	92	124	98	26	116	381	96	67	838	132
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.97		0.96	0.97		0.96	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	69	88	97	131	103	27	122	401	101	71	882	139
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	193	242	226	330	244	57	155	894	222	99	1025	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.38	0.37	0.37	0.38	0.37	0.37	0.09	0.32	0.32	0.06	0.29	0.29
Ln Grp Delay, s/veh	15.7	0.0	0.0	15.8	0.0	0.0	50.8	18.4	18.5	41.7	29.3	18.9
Ln Grp LOS	B			B			D	B	B	D	C	B
Approach Vol, veh/h		254			261			624			1092	
Approach Delay, s/veh		15.7			15.8			24.8			28.7	
Approach LOS		B			B			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	9.6	27.0		29.4	25.0	11.7		29.4
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	21.0		32.0	20.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.5	5.0	3.7		5.7
Max Q Clear (g_c+I1), s	4.6	9.6		9.0	17.5	6.4		9.8
Green Ext Time (g_e), s	0.0	2.2		1.6	1.5	0.0		1.7
Prob of Phs Call (p_c)	0.73	1.00		1.00	1.00	0.89		1.00
Prob of Max Out (p_x)	1.00	0.18		0.00	1.00	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			336		1792		673

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		2810		654	3574			660

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		699		612	1563			154

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	71	0	0	254	0	122	0	261
Grp Sat Flow (s), veh/h/ln	1792	0	0	1602	0	1792	0	1487
Q Serve Time (g_s), s	2.6	0.0	0.0	0.0	0.0	4.4	0.0	0.8
Cycle Q Clear Time (g_c), s	2.6	0.0	0.0	7.0	0.0	4.4	0.0	7.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1242	0	0	0	1184
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1840	0	0	0	1598
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	24.9	0.0	0.0	0.0	24.9
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	17.1	0.0	0.0	0.0	17.9
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	2.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	2.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.27	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	99	0	0	673	0	155	0	642
V/C Ratio (X)	0.72	0.00	0.00	0.38	0.00	0.79	0.00	0.41
Avail Cap (c_a), veh/h	135	0	0	848	0	163	0	805
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	30.7	0.0	0.0	15.3	0.0	29.6	0.0	15.4
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.3	0.0	21.2	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.7	0.0	0.0	15.7	0.0	50.8	0.0	15.8
1st-Term Q (Q1), veh/ln	1.3	0.0	0.0	3.3	0.0	2.2	0.0	3.5
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.1	0.0	0.9	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.6	0.0	0.0	3.4	0.0	3.1	0.0	3.5
%ile Storage Ratio (RQ%)	0.18	0.00	0.00	0.08	0.00	0.46	0.00	0.03
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	253	0	0	882	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	7.4	0.0	0.0	15.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.4	0.0	0.0	15.5	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	569	0	0	1025	0	0	0
V/C Ratio (X)	0.00	0.45	0.00	0.00	0.86	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	569	0	0	1081	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	17.9	0.0	0.0	22.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	6.9	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.4	0.0	0.0	29.3	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.7	0.0	0.0	7.6	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	1.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.7	0.0	0.0	8.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.08	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	249	0	0	139	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1722	0	0	1563	0	0	0
Q Serve Time (g_s), s	0.0	7.6	0.0	0.0	4.6	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.6	0.0	0.0	4.6	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.41	0.00	0.38	1.00	0.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	548	0	0	448	0	0	0
V/C Ratio (X)	0.00	0.45	0.00	0.00	0.31	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	548	0	0	473	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	18.0	0.0	0.0	18.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.5	0.0	0.0	18.9	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.6	0.0	0.0	2.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.7	0.0	0.0	2.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.46	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	4	0	0	1	0
Future Vol, veh/h	2	4	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	6	0	0	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	9	0	8	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	2	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1624	-	1018	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1624	-	1018	1083
Mov Cap-2 Maneuver	-	-	-	-	1018	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1018	-	-	1624	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	21	24	160	26	164	52	610	375	70	243	49
Future Volume (veh/h)	18	21	24	160	26	164	52	610	375	70	243	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	19	22	26	170	28	0	55	649	0	74	259	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	66	82	97	249	390	332	206	993	444	247	1074	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.11	0.11	0.14	0.21	0.00	0.12	0.28	0.00	0.14	0.30	0.00
Ln Grp Delay, s/veh	27.2	0.0	22.6	25.0	17.0	0.0	22.1	17.6	0.0	21.2	14.1	0.0
Ln Grp LOS	C		C	C	B		C	B		C	B	
Approach Vol, veh/h		67			198			704			333	
Approach Delay, s/veh		23.9			23.9			17.9			15.7	
Approach LOS		C			C			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	11.8	19.2	11.8	10.1	10.6	20.4	6.4	15.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	24.5	10.5	31.0	11.0	24.5	8.0	33.5
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	4.0	10.5	6.8	3.4	3.5	4.9	2.5	2.6
Green Ext Time (g_e), s	0.1	3.5	0.1	0.2	0.0	1.5	0.0	0.1
Prob of Phs Call (p_c)	0.66	1.00	0.92	0.77	0.55	1.00	0.24	0.98
Prob of Max Out (p_x)	0.02	0.13	1.00	0.00	0.01	0.00	0.05	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		780		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		922		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	74	0	170	0	55	0	19	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	2.0	0.0	4.8	0.0	1.5	0.0	0.5	0.0
Cycle Q Clear Time (g_c), s	2.0	0.0	4.8	0.0	1.5	0.0	0.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	247	0	249	0	206	0	66	0
V/C Ratio (X)	0.30	0.00	0.68	0.00	0.27	0.00	0.29	0.00
Avail Cap (c_a), veh/h	372	0	355	0	372	0	271	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	20.5	0.0	21.7	0.0	21.4	0.0	24.8	0.0
Incr Delay (d2), s/veh	0.7	0.0	3.3	0.0	0.7	0.0	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.2	0.0	25.0	0.0	22.1	0.0	27.2	0.0
1st-Term Q (Q1), veh/ln	1.0	0.0	2.4	0.0	0.7	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.0	0.0	2.6	0.0	0.8	0.0	0.3	0.0
%ile Storage Ratio (RQ%)	0.09	0.00	0.36	0.00	0.09	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	649	0	0	0	259	0	28
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	8.5	0.0	0.0	0.0	2.9	0.0	0.6
Cycle Q Clear Time (g_c), s	0.0	8.5	0.0	0.0	0.0	2.9	0.0	0.6
Lane Grp Cap (c), veh/h	0	993	0	0	0	1074	0	390
V/C Ratio (X)	0.00	0.65	0.00	0.00	0.00	0.24	0.00	0.07
Avail Cap (c_a), veh/h	0	1654	0	0	0	1654	0	1191
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	16.9	0.0	0.0	0.0	14.0	0.0	16.9
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.0	0.1	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	17.6	0.0	0.0	0.0	14.1	0.0	17.0
1st-Term Q (Q1), veh/ln	0.0	4.1	0.0	0.0	0.0	1.4	0.0	0.3

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.2	0.0	0.0	0.0	1.4	0.0	0.3
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.00	0.08	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	48	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1703	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.54	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	444	0	180	0	480	0	332
V/C Ratio (X)	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	740	0	997	0	740	0	1012
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	21.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	22.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	385	10	13	287	3	58	14	30	0	1	5
Future Vol, veh/h	1	385	10	13	287	3	58	14	30	0	1	5
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	418	11	14	312	3	63	15	33	0	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	316	0	0	432	0	0	774	773	427	793	777	315
Stage 1	-	-	-	-	-	-	429	429	-	343	343	-
Stage 2	-	-	-	-	-	-	345	344	-	450	434	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1244	-	-	1128	-	-	316	330	628	306	328	725
Stage 1	-	-	-	-	-	-	604	584	-	672	637	-
Stage 2	-	-	-	-	-	-	671	637	-	589	581	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1243	-	-	1125	-	-	308	323	626	276	321	724
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	323	-	276	321	-
Stage 1	-	-	-	-	-	-	602	582	-	671	627	-
Stage 2	-	-	-	-	-	-	655	627	-	543	579	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	19.1	11.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	365	1243	-	-	1125	-	-	599
HCM Lane V/C Ratio	0.304	0.001	-	-	0.013	-	-	0.011
HCM Control Delay (s)	19.1	7.9	0	-	8.2	0	-	11.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	24	37	35	22	26	40	889	60	33	352	52
Future Volume (veh/h)	60	24	37	35	22	26	40	889	60	33	352	52
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.96
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	63	25	39	37	23	27	42	936	63	35	371	55
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	232	94	89	206	120	93	388	1285	86	71	723	311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.20	0.19	0.19	0.20	0.19	0.19	0.22	0.38	0.38	0.04	0.20	0.20
Ln Grp Delay, s/veh	15.6	0.0	0.0	15.1	0.0	0.0	13.7	13.7	13.7	25.4	15.9	14.5
Ln Grp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		127			87			1041			461	
Approach Delay, s/veh		15.6			15.1			13.7			16.4	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	7.7	22.3		13.1	14.7	15.3		13.1
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	21.0		32.0	20.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.4	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	2.8	12.2		4.8	6.0	2.8		3.8
Green Ext Time (g_e), s	0.0	3.9		0.7	2.1	0.0		0.5
Prob of Phs Call (p_c)	0.34	1.00		0.93	1.00	0.40		0.93
Prob of Max Out (p_x)	1.00	0.63		0.00	0.04	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			575		1792		467

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3392		504	3574			640

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		228		478	1541			498

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	35	0	0	127	0	42	0	87
Grp Sat Flow (s), veh/h/ln	1792	0	0	1557	0	1792	0	1606
Q Serve Time (g_s), s	0.8	0.0	0.0	0.9	0.0	0.8	0.0	0.0
Cycle Q Clear Time (g_c), s	0.8	0.0	0.0	2.8	0.0	0.8	0.0	1.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1357	0	0	0	1342
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1823	0	0	0	1832
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	8.6	0.0	0.0	0.0	8.6
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	6.8	0.0	0.0	0.0	5.7
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.4
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.8
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.43
Lane Grp Cap (c), veh/h	71	0	0	434	0	388	0	438
V/C Ratio (X)	0.49	0.00	0.00	0.29	0.00	0.11	0.00	0.20
Avail Cap (c_a), veh/h	208	0	0	1264	0	388	0	1282
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	20.3	0.0	0.0	15.2	0.0	13.5	0.0	14.9
Incr Delay (d2), s/veh	5.2	0.0	0.0	0.4	0.0	0.1	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.4	0.0	0.0	15.6	0.0	13.7	0.0	15.1
1st-Term Q (Q1), veh/ln	0.4	0.0	0.0	1.3	0.0	0.4	0.0	0.9
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.5	0.0	0.0	1.3	0.0	0.4	0.0	0.9
%ile Storage Ratio (RQ%)	0.06	0.00	0.00	0.03	0.00	0.06	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	493	0	0	371	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	10.2	0.0	0.0	4.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.2	0.0	0.0	4.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	677	0	0	723	0	0	0
V/C Ratio (X)	0.00	0.73	0.00	0.00	0.51	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	871	0	0	1659	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	11.5	0.0	0.0	15.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	0.0	0.6	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.7	0.0	0.0	15.9	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	4.9	0.0	0.0	2.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.4	0.0	0.0	2.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	506	0	0	55	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1833	0	0	1541	0	0	0
Q Serve Time (g_s), s	0.0	10.2	0.0	0.0	1.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.2	0.0	0.0	1.3	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.12	0.00	0.31	1.00	0.00	0.00	0.31
Lane Grp Cap (c), veh/h	0	694	0	0	311	0	0	0
V/C Ratio (X)	0.00	0.73	0.00	0.00	0.18	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	893	0	0	715	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	11.5	0.0	0.0	14.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	0.0	0.3	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.7	0.0	0.0	14.5	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	5.1	0.0	0.0	0.5	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.13	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	5.7

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	0	3	0	1	9	0
Future Vol, veh/h	1	0	3	0	1	9	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	0	5	0	2	14	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	6	0	7	4
Stage 1	-	-	-	-	-	4	-
Stage 2	-	-	-	-	-	3	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1628	-	1019	1085
Stage 1	-	-	-	-	-	1024	-
Stage 2	-	-	-	-	-	1025	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1626	-	1017	1084
Mov Cap-2 Maneuver	-	-	-	-	-	1017	-
Stage 1	-	-	-	-	-	1023	-
Stage 2	-	-	-	-	-	1024	-

Approach	EB	WB	NB
HCM Control Delay, s		0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1017	-	-	1626	-
HCM Lane V/C Ratio	0.014	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

D. CUMULATIVE CONDITIONS SYNCHRO OUTPUT SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	270	81	543	320	84	206	312	291	233	616	136
Future Volume (veh/h)	45	270	81	543	320	84	206	312	291	233	616	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	48	287	86	578	340	0	219	332	0	248	655	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	90	307	92	573	1755	0	225	651	291	253	708	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.05	0.22	0.22	0.32	0.49	0.00	0.13	0.18	0.00	0.14	0.20	0.00
Ln Grp Delay, s/veh	66.5	0.0	78.0	85.0	19.1	0.0	109.9	49.6	0.0	107.2	70.1	0.0
Ln Grp LOS	E		E	F	B		F	D		F	E	
Approach Vol, veh/h		421			918			551			903	
Approach Delay, s/veh		76.7			60.6			73.6			80.3	
Approach LOS		E			E			E			F	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	23.3	28.7	47.0	33.9	21.2	30.8	11.1	69.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	18.8	24.7	42.5	31.0	16.7	26.8	9.2	64.3
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.2	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	20.3	13.1	44.5	28.9	18.2	25.9	5.5	9.1
Green Ext Time (g_e), s	0.0	1.5	0.0	0.5	0.0	0.4	0.0	2.4
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	0.83	1.00
Prob of Max Out (p_x)	1.00	0.07	1.00	1.00	1.00	1.00	1.00	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		1390		3574		3668

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		416		1599		0

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	248	0	578	0	219	0	48	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	18.3	0.0	42.5	0.0	16.2	0.0	3.5	0.0
Cycle Q Clear Time (g_c), s	18.3	0.0	42.5	0.0	16.2	0.0	3.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	253	0	573	0	225	0	90	0
V/C Ratio (X)	0.98	0.00	1.01	0.00	0.97	0.00	0.54	0.00
Avail Cap (c_a), veh/h	253	0	573	0	225	0	124	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	56.8	0.0	45.2	0.0	57.9	0.0	61.6	0.0
Incr Delay (d2), s/veh	50.4	0.0	39.8	0.0	52.1	0.0	4.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	107.2	0.0	85.0	0.0	109.9	0.0	66.5	0.0
1st-Term Q (Q1), veh/ln	9.0	0.0	20.8	0.0	8.0	0.0	1.7	0.0
2nd-Term Q (Q2), veh/ln	3.5	0.0	6.3	0.0	3.3	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	12.6	0.0	27.2	0.0	11.2	0.0	1.8	0.0
%ile Storage Ratio (RQ%)	1.13	0.00	3.81	0.00	1.35	0.00	0.26	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	2
Grp Vol (v), veh/h	0	332	0	0	0	655	0	340
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1787
Q Serve Time (g_s), s	0.0	11.1	0.0	0.0	0.0	23.9	0.0	7.1
Cycle Q Clear Time (g_c), s	0.0	11.1	0.0	0.0	0.0	23.9	0.0	7.1
Lane Grp Cap (c), veh/h	0	651	0	0	0	708	0	1755
V/C Ratio (X)	0.00	0.51	0.00	0.00	0.00	0.93	0.00	0.19
Avail Cap (c_a), veh/h	0	664	0	0	0	721	0	1755
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.0	0.0	0.0	0.0	52.3	0.0	19.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	17.7	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	49.6	0.0	0.0	0.0	70.1	0.0	19.1
1st-Term Q (Q1), veh/ln	0.0	5.5	0.0	0.0	0.0	11.8	0.0	3.5

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	1.7	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.0	13.6	0.0	3.5
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.00	0.00	0.75	0.00	0.04
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	373	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1806	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.23	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	291	0	399	0	317	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	297	0	421	0	322	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	50.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.2	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	78.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.5	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	72.0
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	14.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	660	114	65	1101	16	19	12	32	9	15	6
Future Vol, veh/h	19	660	114	65	1101	16	19	12	32	9	15	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	717	124	71	1197	17	21	13	35	10	16	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1214	0	0	841	0	0	1570	2177	422	1756	2231	607
Stage 1	-	-	-	-	-	-	821	821	-	1348	1348	-
Stage 2	-	-	-	-	-	-	749	1356	-	408	883	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	570	-	-	790	-	-	75	46	580	54	42	439
Stage 1	-	-	-	-	-	-	335	387	-	159	218	-
Stage 2	-	-	-	-	-	-	370	216	-	591	362	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	570	-	-	790	-	-	31	31	579	26	28	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	31	31	-	26	28	-
Stage 1	-	-	-	-	-	-	311	360	-	148	157	-
Stage 2	-	-	-	-	-	-	236	156	-	497	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.7	275.2	$ 331.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	60	570	-	-	790	-	-	33
HCM Lane V/C Ratio	1.141	0.036	-	-	0.089	-	-	0.988
HCM Control Delay (s)	275.2	11.6	0.4	-	10	1.2	-	$ 331.7
HCM Lane LOS	F	B	A	-	B	A	-	F
HCM 95th %tile Q(veh)	5.6	0.1	-	-	0.3	-	-	3.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	84	92	159	126	33	130	571	123	86	958	153
Future Volume (veh/h)	89	84	92	159	126	33	130	571	123	86	958	153
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.98		0.96	0.97		0.96	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	94	88	97	167	133	35	137	601	129	91	1008	161
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	222	206	194	309	232	55	167	989	212	117	1116	489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.09	0.34	0.34	0.07	0.31	0.31
Ln Grp Delay, s/veh	18.4	0.0	0.0	20.1	0.0	0.0	59.9	22.3	22.4	54.0	34.7	20.2
Ln Grp LOS	B			C			E	C	C	D	C	C
Approach Vol, veh/h		279			335			867			1260	
Approach Delay, s/veh		18.4			20.1			28.3			34.2	
Approach LOS		B			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	10.9	31.5		32.6	29.4	13.0		32.6
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	6.0	25.0		32.0	24.0	7.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.6	5.0	3.7		5.7
Max Q Clear (g_c+I1), s	5.8	15.0		12.1	22.3	7.6		16.4
Green Ext Time (g_e), s	0.0	3.1		1.7	1.2	0.0		2.0
Prob of Phs Call (p_c)	0.85	1.00		1.00	1.00	0.94		1.00
Prob of Max Out (p_x)	1.00	0.40		0.01	1.00	1.00		0.05

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			430		1792		644

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		2906		561	3574			631

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		622		528	1566			149

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	91	0	0	279	0	137	0	335
Grp Sat Flow (s), veh/h/ln	1792	0	0	1518	0	1792	0	1424
Q Serve Time (g_s), s	3.8	0.0	0.0	0.0	0.0	5.6	0.0	4.4
Cycle Q Clear Time (g_c), s	3.8	0.0	0.0	10.1	0.0	5.6	0.0	14.4
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1206	0	0	0	1185
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1489	0	0	0	1330
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	28.1	0.0	0.0	0.0	28.1
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	13.7	0.0	0.0	0.0	18.1
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
Time to First Blk (g_f), s	0.0	0.0	0.0	3.9	0.0	0.0	0.0	2.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	3.9	0.0	0.0	0.0	2.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.34	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	117	0	0	633	0	167	0	605
V/C Ratio (X)	0.78	0.00	0.00	0.44	0.00	0.82	0.00	0.55
Avail Cap (c_a), veh/h	143	0	0	719	0	167	0	688
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	34.5	0.0	0.0	18.0	0.0	33.4	0.0	19.3
Incr Delay (d2), s/veh	19.4	0.0	0.0	0.5	0.0	26.5	0.0	0.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	54.0	0.0	0.0	18.4	0.0	59.9	0.0	20.1
1st-Term Q (Q1), veh/ln	1.8	0.0	0.0	4.3	0.0	2.8	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.1	0.0	1.2	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.5	0.0	0.0	4.4	0.0	4.0	0.0	5.7
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.11	0.00	0.59	0.00	0.04
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	369	0	0	1008	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	12.9	0.0	0.0	20.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	12.9	0.0	0.0	20.3	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	608	0	0	1116	0	0	0
V/C Ratio (X)	0.00	0.61	0.00	0.00	0.90	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	608	0	0	1143	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.6	0.0	0.0	24.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.7	0.0	0.0	10.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.3	0.0	0.0	34.7	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.4	0.0	0.0	9.9	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	1.5	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.6	0.0	0.0	11.5	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.11	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	361	0	0	161	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1740	0	0	1566	0	0	0
Q Serve Time (g_s), s	0.0	13.0	0.0	0.0	5.9	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	13.0	0.0	0.0	5.9	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.36	0.00	0.35	1.00	0.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	592	0	0	489	0	0	0
V/C Ratio (X)	0.00	0.61	0.00	0.00	0.33	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	592	0	0	501	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.6	0.0	0.0	19.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.4	0.0	0.0	20.2	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.2	0.0	0.0	2.5	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.5	0.0	0.0	2.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.60	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	19	3	0	99	0	0
Future Vol, veh/h	19	3	0	99	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	30	5	0	157	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	190	33
Stage 1	-	-	-	-	33	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1589	-	804	1046
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1589	-	804	1046
Mov Cap-2 Maneuver	-	-	-	-	804	-
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1589	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	464	5	5	555	5	5	5	5	5	5	99
Future Volume (veh/h)	19	464	5	5	555	5	5	5	5	5	5	99
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	21	504	5	5	603	5	5	5	5	5	5	108
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	441	856	8	509	857	7	233	161	105	150	19	279
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.19	0.19	0.19	0.19	0.19	0.19
Ln Grp Delay, s/veh	8.5	0.0	5.8	7.2	0.0	6.6	8.7	0.0	0.0	9.5	0.0	0.0
Ln Grp LOS	A		A	A		A	A			A		
Approach Vol, veh/h		530			613			15			118	
Approach Delay, s/veh		5.9			6.6			8.7			9.5	
Approach LOS		A			A			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		6.0		8.0		6.0
Phs Duration (G+Y+Rc), s		9.5		16.7		9.5		16.7
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		19.5		21.5		19.5		21.5
Max Allow Headway (MAH), s		5.4		5.3		5.5		5.2
Max Q Clear (g_c+I1), s		2.2		9.4		3.7		8.8
Green Ext Time (g_e), s		0.0		2.7		0.5		3.4
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.21		0.00		0.24

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		257		809		34		887

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		842		1841		101		1845

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		549		18		1459		15

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R				L+T+R		

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	15	0	21	0	118	0	5
Grp Sat Flow (s), veh/h/ln	0	1647	0	809	0	1594	0	887
Q Serve Time (g_s), s	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Cycle Q Clear Time (g_c), s	0.0	0.2	0.0	7.4	0.0	1.7	0.0	5.4
Perm LT Sat Flow (s_l), veh/h/ln	0	1300	0	809	0	1427	0	887
Shared LT Sat Flow (s_sh), veh/h/ln	0	1832	0	0	0	1859	0	0
Perm LT Eff Green (g_p), s	0.0	5.0	0.0	12.2	0.0	5.0	0.0	12.2
Perm LT Serve Time (g_u), s	0.0	3.3	0.0	5.4	0.0	4.8	0.0	6.9
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Time to First Blk (g_f), s	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.2	0.0	0.0	0.0	1.7	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.33	0.00	1.00	0.00	0.04	0.00	1.00
Lane Grp Cap (c), veh/h	0	498	0	441	0	448	0	509
V/C Ratio (X)	0.00	0.03	0.00	0.05	0.00	0.26	0.00	0.01
Avail Cap (c_a), veh/h	0	1350	0	730	0	1327	0	825
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	8.6	0.0	8.5	0.0	9.2	0.0	7.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.7	0.0	8.5	0.0	9.5	0.0	7.2
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	0.1	0.0	0.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment				T+R				T+R
Lanes in Grp	0	0	0	1	0	0	0	1
Grp Vol (v), veh/h	0	0	0	509	0	0	0	608
Grp Sat Flow (s), veh/h/ln	0	0	0	1860	0	0	0	1860
Q Serve Time (g_s), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	6.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	6.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.33	0.00	0.01	0.00	0.92	0.00	0.01
Lane Grp Cap (c), veh/h	0	0	0	864	0	0	0	864
V/C Ratio (X)	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.70
Avail Cap (c_a), veh/h	0	0	0	1529	0	0	0	1529
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	5.2	0.0	0.0	0.0	5.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	5.8	0.0	0.0	0.0	6.6
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	2.5	0.0	0.0	0.0	3.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.7	0.0	0.0	0.0	3.6
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.17
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	427	541	5	113	226	441	462	21	1008	121
Future Volume (veh/h)	95	5	427	541	5	113	226	441	462	21	1008	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	104	5	469	595	5	124	248	485	508	23	1108	133
Adj No. of Lanes	1	1	0	2	1	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	586	4	358	595	132	149	252	1514	951	41	1091	1001
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.33	0.23	0.23	0.17	0.07	0.07	0.14	0.42	0.42	0.02	0.31	0.31
Ln Grp Delay, s/veh	27.8	0.0	202.9	84.3	49.9	38.7	100.9	22.2	6.8	67.5	71.2	8.5
Ln Grp LOS	C		F	F	D	D	F	C	A	E	F	A
Approach Vol, veh/h		578			724			1241			1264	
Approach Delay, s/veh		171.4			76.3			31.6			64.5	
Approach LOS		F			E			C			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	4	3	6	5	8	7
Case No	2.0	3.0	4.0	2.0	3.0	2.0	3.0	2.0
Phs Duration (G+Y+Rc), s	7.1	53.2	30.5	24.2	39.6	20.7	12.6	42.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	6.3	45.0	26.0	19.7	35.1	16.2	32.5	13.2
Max Allow Headway (MAH), s	3.8	4.5	5.6	3.8	5.0	3.7	4.1	3.8
Max Q Clear (g_c+I1), s	3.5	12.4	28.0	21.7	37.1	17.9	7.4	6.8
Green Ext Time (g_e), s	0.0	5.4	0.0	0.0	0.0	0.0	0.4	0.1
Prob of Phs Call (p_c)	0.52	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Prob of Max Out (p_x)	1.00	0.01	1.00	1.00	1.00	1.00	0.00	0.06

Left-Turn Movement Data								
Assigned Mvmt	1			3		5		7
Mvmt Sat Flow, veh/h	1792			3476		1792		1792

Through Movement Data								
Assigned Mvmt		2	4		6		8	
Mvmt Sat Flow, veh/h		3574	17		3574		1881	

Right-Turn Movement Data								
Assigned Mvmt		12	14		16		18	
Mvmt Sat Flow, veh/h		1599	1583		1565		1599	

Left Lane Group Data								
Assigned Mvmt	1	0	0	3	0	5	0	7
Lane Assignment	(Prot)			(Prot)		(Prot)		(Prot)

Lanes in Grp	1	0	0	2	0	1	0	1
Grp Vol (v), veh/h	23	0	0	595	0	248	0	104
Grp Sat Flow (s), veh/h/ln	1792	0	0	1738	0	1792	0	1792
Q Serve Time (g_s), s	1.5	0.0	0.0	19.7	0.0	15.9	0.0	4.8
Cycle Q Clear Time (g_c), s	1.5	0.0	0.0	19.7	0.0	15.9	0.0	4.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	41	0	0	595	0	252	0	586
V/C Ratio (X)	0.57	0.00	0.00	1.00	0.00	0.98	0.00	0.18
Avail Cap (c_a), veh/h	98	0	0	595	0	252	0	586
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	55.6	0.0	0.0	47.6	0.0	49.3	0.0	27.6
Incr Delay (d2), s/veh	11.9	0.0	0.0	36.7	0.0	51.6	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	67.5	0.0	0.0	84.3	0.0	100.9	0.0	27.8
1st-Term Q (Q1), veh/ln	0.7	0.0	0.0	9.4	0.0	7.9	0.0	2.4
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	3.0	0.0	3.6	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.9	0.0	0.0	12.5	0.0	11.5	0.0	2.4
%ile Storage Ratio (RQ%)	0.07	0.00	0.00	1.49	0.00	0.50	0.00	0.39
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	6	0	8	0
Lane Assignment		T			T		T	
Lanes in Grp	0	2	0	0	2	0	1	0
Grp Vol (v), veh/h	0	485	0	0	1108	0	5	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	1881	0
Q Serve Time (g_s), s	0.0	10.4	0.0	0.0	35.1	0.0	0.3	0.0
Cycle Q Clear Time (g_c), s	0.0	10.4	0.0	0.0	35.1	0.0	0.3	0.0
Lane Grp Cap (c), veh/h	0	1514	0	0	1091	0	132	0
V/C Ratio (X)	0.00	0.32	0.00	0.00	1.02	0.00	0.04	0.00
Avail Cap (c_a), veh/h	0	1514	0	0	1091	0	532	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	22.1	0.0	0.0	39.9	0.0	49.8	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	31.2	0.0	0.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.2	0.0	0.0	71.2	0.0	49.9	0.0
1st-Term Q (Q1), veh/ln	0.0	5.1	0.0	0.0	17.3	0.0	0.1	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	5.1	0.0	0.0	22.0	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.14	0.00	0.00	0.09	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	14	0	16	0	18	0
Lane Assignment		R	T+R		R		R	
Lanes in Grp	0	1	1	0	1	0	1	0
Grp Vol (v), veh/h	0	508	474	0	133	0	124	0
Grp Sat Flow (s), veh/h/ln	0	1599	1599	0	1565	0	1599	0
Q Serve Time (g_s), s	0.0	3.3	26.0	0.0	0.0	0.0	5.4	0.0
Cycle Q Clear Time (g_c), s	0.0	3.3	26.0	0.0	0.0	0.0	5.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1599.0	0.0	0.0	1599.0	0.0	1599.0	0.0
Prot RT Eff Green (g_R), s	0.0	19.7	0.0	0.0	37.6	0.0	2.6	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.99	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	951	362	0	1001	0	149	0
V/C Ratio (X)	0.00	0.53	1.31	0.00	0.13	0.00	0.83	0.00
Avail Cap (c_a), veh/h	0	951	362	0	1001	0	488	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	6.2	44.5	0.0	8.5	0.0	27.3	0.0
Incr Delay (d2), s/veh	0.0	0.6	158.4	0.0	0.1	0.0	11.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.8	202.9	0.0	8.5	0.0	38.7	0.0
1st-Term Q (Q1), veh/ln	0.0	6.1	11.5	0.0	1.7	0.0	3.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	15.9	0.0	0.0	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	6.2	27.4	0.0	1.7	0.0	4.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.20	1.29	0.00	0.09	0.00	0.49	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	28.1	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	72.3
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	312	179	302	213	263	196	610	635	102	243	162
Future Volume (veh/h)	106	312	179	302	213	263	196	610	635	102	243	162
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	113	332	190	321	227	0	209	649	0	109	259	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	142	347	198	338	1494	0	227	782	350	187	702	314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.31	0.31	0.19	0.42	0.00	0.13	0.22	0.00	0.10	0.20	0.00
Ln Grp Delay, s/veh	55.0	0.0	62.1	76.4	18.2	0.0	82.2	42.9	0.0	46.8	35.2	0.0
Ln Grp LOS	D		E	E	B		F	D		D	D	
Approach Vol, veh/h		635			548			858			368	
Approach Delay, s/veh		60.8			52.3			52.5			38.7	
Approach LOS		E			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	3	4	5	6	7	8
Case No	3.0	2.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	26.4	15.0	23.4	35.5	17.2	24.2	12.5	46.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	26.1	11.0	18.9	31.0	12.7	24.4	13.1	36.8
Max Allow Headway (MAH), s	5.0	3.8	3.8	5.2	3.7	5.1	3.8	5.1
Max Q Clear (g_c+l1), s	19.4	7.8	19.8	31.1	13.6	8.3	8.2	6.0
Green Ext Time (g_e), s	2.2	0.1	0.0	0.0	0.0	1.3	0.1	1.4
Prob of Phs Call (p_c)	1.00	0.95	1.00	1.00	1.00	1.00	0.96	1.00
Prob of Max Out (p_x)	0.68	1.00	1.00	1.00	1.00	0.01	0.32	0.00

Left-Turn Movement Data								
Assigned Mvmt		1	3		5		7	
Mvmt Sat Flow, veh/h		1792	1792		1792		1792	

Through Movement Data								
Assigned Mvmt	2			4		6		8
Mvmt Sat Flow, veh/h	3574			1122		3574		3668

Right-Turn Movement Data								
Assigned Mvmt	12			14		16		18
Mvmt Sat Flow, veh/h	1599			642		1599		0

Left Lane Group Data								
Assigned Mvmt	0	1	3	0	5	0	7	0
Lane Assignment		(Prot)	(Prot)		(Prot)		(Prot)	

Lanes in Grp	0	1	1	0	1	0	1	0
Grp Vol (v), veh/h	0	109	321	0	209	0	113	0
Grp Sat Flow (s), veh/h/ln	0	1792	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	0.0	5.8	17.8	0.0	11.6	0.0	6.2	0.0
Cycle Q Clear Time (g_c), s	0.0	5.8	17.8	0.0	11.6	0.0	6.2	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	187	338	0	227	0	142	0
V/C Ratio (X)	0.00	0.58	0.95	0.00	0.92	0.00	0.80	0.00
Avail Cap (c_a), veh/h	0	196	338	0	227	0	234	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	42.8	40.2	0.0	43.3	0.0	45.4	0.0
Incr Delay (d2), s/veh	0.0	4.0	36.2	0.0	38.9	0.0	9.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.8	76.4	0.0	82.2	0.0	55.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.9	8.8	0.0	5.7	0.0	3.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	3.4	0.0	2.4	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.1	12.2	0.0	8.2	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.28	1.71	0.00	0.98	0.00	0.48	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	0	6	0	8
Lane Assignment	T					T		T
Lanes in Grp	2	0	0	0	0	2	0	2
Grp Vol (v), veh/h	649	0	0	0	0	259	0	227
Grp Sat Flow (s), veh/h/ln	1787	0	0	0	0	1787	0	1787
Q Serve Time (g_s), s	17.4	0.0	0.0	0.0	0.0	6.3	0.0	4.0
Cycle Q Clear Time (g_c), s	17.4	0.0	0.0	0.0	0.0	6.3	0.0	4.0
Lane Grp Cap (c), veh/h	782	0	0	0	0	702	0	1494
V/C Ratio (X)	0.83	0.00	0.00	0.00	0.00	0.37	0.00	0.15
Avail Cap (c_a), veh/h	930	0	0	0	0	869	0	1494
Upstream Filter (I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	37.4	0.0	0.0	0.0	0.0	34.9	0.0	18.1
Incr Delay (d2), s/veh	5.5	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	42.9	0.0	0.0	0.0	0.0	35.2	0.0	18.2
1st-Term Q (Q1), veh/ln	8.6	0.0	0.0	0.0	0.0	3.1	0.0	2.0

2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	9.2	0.0	0.0	0.0	0.0	3.1	0.0	2.0
%ile Storage Ratio (RQ%)	0.09	0.00	0.00	0.00	0.00	0.17	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	0	14	0	16	0	18
Lane Assignment	R			T+R		R		
Lanes in Grp	1	0	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	522	0	0	0	0
Grp Sat Flow (s), veh/h/ln	1599	0	0	1764	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	0.36	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	350	0	0	545	0	314	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	416	0	0	545	0	389	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	34.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	62.1	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	14.2	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	18.5	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.5
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	25.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	973	12	17	759	9	73	18	37	0	2	41
Future Vol, veh/h	3	973	12	17	759	9	73	18	37	0	2	41
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	1058	13	18	825	10	79	20	40	0	2	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	836	0	0	1074	0	0	1524	1946	539	1412	1947	419
Stage 1	-	-	-	-	-	-	1074	1074	-	867	867	-
Stage 2	-	-	-	-	-	-	450	872	-	545	1080	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	794	-	-	645	-	-	81	64	487	98	64	583
Stage 1	-	-	-	-	-	-	235	294	-	314	368	-
Stage 2	-	-	-	-	-	-	558	366	-	490	293	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	793	-	-	643	-	-	~ 69	60	486	64	60	582
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 69	60	-	64	60	-
Stage 1	-	-	-	-	-	-	232	290	-	311	348	-
Stage 2	-	-	-	-	-	-	485	347	-	415	289	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	$ 383.2	14.8
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	89	793	-	-	643	-	-	414
HCM Lane V/C Ratio	1.563	0.004	-	-	0.029	-	-	0.113
HCM Control Delay (s)	$ 383.2	9.6	0	-	10.8	0.3	-	14.8
HCM Lane LOS	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	11	0	-	-	0.1	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	24	45	44	28	33	40	1131	77	42	592	58
Future Volume (veh/h)	68	24	45	44	28	33	40	1131	77	42	592	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	72	25	47	46	29	35	42	1191	81	44	623	61
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	217	79	92	187	113	93	381	1492	101	82	976	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.19	0.18	0.18	0.19	0.18	0.18	0.21	0.44	0.44	0.05	0.27	0.27
Ln Grp Delay, s/veh	19.0	0.0	0.0	18.5	0.0	0.0	16.3	16.6	16.6	29.2	17.0	14.1
Ln Grp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		144			110			1314			728	
Approach Delay, s/veh		19.0			18.5			16.6			17.5	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	8.3	28.4		14.1	19.9	16.8		14.1
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	26.0		32.0	25.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.5	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	3.2	17.4		5.8	9.8	3.0		4.7
Green Ext Time (g_e), s	0.0	4.9		0.8	3.8	0.0		0.6
Prob of Phs Call (p_c)	0.46	1.00		0.98	1.00	0.45		0.98
Prob of Max Out (p_x)	1.00	0.76		0.00	0.11	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			614		1792		481

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3390		440	3574			626

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		230		511	1548			517

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	44	0	0	144	0	42	0	110
Grp Sat Flow (s), veh/h/ln	1792	0	0	1565	0	1792	0	1625
Q Serve Time (g_s), s	1.2	0.0	0.0	1.1	0.0	1.0	0.0	0.0
Cycle Q Clear Time (g_c), s	1.2	0.0	0.0	3.8	0.0	1.0	0.0	2.7
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1340	0	0	0	1332
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1822	0	0	0	1833
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	9.6	0.0	0.0	0.0	9.6
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	6.9	0.0	0.0	0.0	5.8
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	2.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	2.6
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.42
Lane Grp Cap (c), veh/h	82	0	0	403	0	381	0	409
V/C Ratio (X)	0.54	0.00	0.00	0.36	0.00	0.11	0.00	0.27
Avail Cap (c_a), veh/h	176	0	0	1068	0	381	0	1090
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	23.7	0.0	0.0	18.5	0.0	16.1	0.0	18.1
Incr Delay (d2), s/veh	5.4	0.0	0.0	0.5	0.0	0.1	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.2	0.0	0.0	19.0	0.0	16.3	0.0	18.5
1st-Term Q (Q1), veh/ln	0.6	0.0	0.0	1.7	0.0	0.5	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	0.0	1.8	0.0	0.5	0.0	1.3
%ile Storage Ratio (RQ%)	0.08	0.00	0.00	0.04	0.00	0.07	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	627	0	0	623	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	15.4	0.0	0.0	7.8	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.4	0.0	0.0	7.8	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	786	0	0	976	0	0	0
V/C Ratio (X)	0.00	0.80	0.00	0.00	0.64	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	914	0	0	1759	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.3	0.0	0.0	16.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.4	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.6	0.0	0.0	17.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.5	0.0	0.0	3.8	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	1.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.4	0.0	0.0	3.9	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	645	0	0	61	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1833	0	0	1548	0	0	0
Q Serve Time (g_s), s	0.0	15.4	0.0	0.0	1.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.4	0.0	0.0	1.5	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.13	0.00	0.33	1.00	0.00	0.00	0.32
Lane Grp Cap (c), veh/h	0	806	0	0	423	0	0	0
V/C Ratio (X)	0.00	0.80	0.00	0.00	0.14	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	938	0	0	761	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.3	0.0	0.0	14.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.3	0.0	0.0	0.2	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.6	0.0	0.0	14.1	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.7	0.0	0.0	0.6	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.7	0.0	0.0	0.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.15	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.5

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	78	2	0	26	6	0
Future Vol, veh/h	1	78	2	0	26	6	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	124	3	0	41	10	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	128	0	169	127
Stage 1	-	-	-	-	-	127	-
Stage 2	-	-	-	-	-	42	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1470	-	826	929
Stage 1	-	-	-	-	-	904	-
Stage 2	-	-	-	-	-	986	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1469	-	824	928
Mov Cap-2 Maneuver	-	-	-	-	-	824	-
Stage 1	-	-	-	-	-	903	-
Stage 2	-	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s		0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	824	-	-	1469	-
HCM Lane V/C Ratio	0.012	-	-	-	-
HCM Control Delay (s)	9.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	472	5	5	469	5	5	5	5	5	5	25
Future Volume (veh/h)	78	472	5	5	469	5	5	5	5	5	5	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	85	513	5	5	510	5	5	5	5	5	5	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	297	711	7	295	711	7	278	273	221	135	137	484
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41	0.41	0.41	0.41	0.41
Ln Grp Delay, s/veh	18.1	0.0	14.6	16.0	0.0	14.5	7.8	0.0	0.0	8.0	0.0	0.0
Ln Grp LOS	B		B	B		B	A			A		
Approach Vol, veh/h		603			520			15			37	
Approach Delay, s/veh		15.1			14.5			7.8			8.0	
Approach LOS		B			B			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		6.0		8.0		6.0
Phs Duration (G+Y+Rc), s		22.5		21.5		22.5		21.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.4		5.3		5.5		5.2
Max Q Clear (g_c+I1), s		2.2		16.3		2.6		12.6
Green Ext Time (g_e), s		0.0		0.7		0.1		1.6
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		1.00		0.00		0.97

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		413		882		103		880

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		667		1842		335		1842

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		540		18		1182		18

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R				L+T+R		

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	15	0	85	0	37	0	5
Grp Sat Flow (s), veh/h/ln	0	1620	0	882	0	1620	0	880
Q Serve Time (g_s), s	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.2
Cycle Q Clear Time (g_c), s	0.0	0.2	0.0	14.3	0.0	0.6	0.0	10.6
Perm LT Sat Flow (s_l), veh/h/ln	0	1399	0	882	0	1427	0	880
Shared LT Sat Flow (s_sh), veh/h/ln	0	1832	0	0	0	1850	0	0
Perm LT Eff Green (g_p), s	0.0	18.0	0.0	17.0	0.0	18.0	0.0	17.0
Perm LT Serve Time (g_u), s	0.0	17.4	0.0	6.6	0.0	17.8	0.0	6.6
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.2
Time to First Blk (g_f), s	0.0	3.9	0.0	0.0	0.0	9.3	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.2	0.0	0.0	0.0	0.6	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.33	0.00	1.00	0.00	0.14	0.00	1.00
Lane Grp Cap (c), veh/h	0	772	0	297	0	756	0	295
V/C Ratio (X)	0.00	0.02	0.00	0.29	0.00	0.05	0.00	0.02
Avail Cap (c_a), veh/h	0	772	0	317	0	756	0	315
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.7	0.0	17.5	0.0	7.9	0.0	16.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	7.8	0.0	18.1	0.0	8.0	0.0	16.0
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	1.0	0.0	0.3	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	1.0	0.0	0.3	0.0	0.1
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment				T+R				T+R
Lanes in Grp	0	0	0	1	0	0	0	1
Grp Vol (v), veh/h	0	0	0	518	0	0	0	515
Grp Sat Flow (s), veh/h/ln	0	0	0	1860	0	0	0	1860
Q Serve Time (g_s), s	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.3
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.33	0.00	0.01	0.00	0.73	0.00	0.01
Lane Grp Cap (c), veh/h	0	0	0	718	0	0	0	718
V/C Ratio (X)	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.72
Avail Cap (c_a), veh/h	0	0	0	761	0	0	0	761
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	11.5	0.0	0.0	0.0	11.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	3.2	0.0	0.0	0.0	3.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	14.6	0.0	0.0	0.0	14.5
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.3	0.0	0.0	0.0	5.2
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	6.0	0.0	0.0	0.0	5.8
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.28
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	113	469	5	20	167	1365	425	124	384	92
Future Volume (veh/h)	50	5	113	469	5	20	167	1365	425	124	384	92
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	55	5	124	515	5	22	184	1500	467	136	422	101
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	652	23	581	539	708	602	473	1644	732	146	1644	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.46	0.46	0.46	0.46	0.46	0.46
Ln Grp Delay, s/veh	11.2	0.0	11.8	48.5	10.7	10.9	13.5	22.0	13.2	80.6	9.2	8.7
Ln Grp LOS	B		B	D	B	B	B	C	B	F	A	A
Approach Vol, veh/h		184			542			2151			659	
Approach Delay, s/veh		11.6			46.6			19.3			23.8	
Approach LOS		B			D			B			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		5.0		6.0		5.0		5.0
Phs Duration (G+Y+Rc), s		29.8		25.2		29.8		25.2
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		25.3		20.7		25.3		20.7
Max Allow Headway (MAH), s		4.8		5.0		7.5		4.1
Max Q Clear (g_c+I1), s		23.5		5.0		27.3		22.7
Green Ext Time (g_e), s		1.6		0.7		0.0		0.0
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		1.00		0.00		1.00		1.00

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		882		1391		224		1267

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		62		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1590		1544		1556		1599

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment								

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	184	0	55	0	136	0	515
Grp Sat Flow (s), veh/h/ln	0	882	0	1391	0	224	0	1267
Q Serve Time (g_s), s	0.0	8.9	0.0	1.4	0.0	3.8	0.0	17.7
Cycle Q Clear Time (g_c), s	0.0	12.8	0.0	1.5	0.0	25.3	0.0	20.7
Perm LT Sat Flow (s_l), veh/h/ln	0	882	0	1391	0	224	0	1267
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	25.3	0.0	20.7	0.0	25.3	0.0	20.7
Perm LT Serve Time (g_u), s	0.0	21.3	0.0	20.6	0.0	3.8	0.0	17.7
Perm LT Q Serve Time (g_ps), s	0.0	8.9	0.0	1.4	0.0	3.8	0.0	17.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	473	0	652	0	146	0	539
V/C Ratio (X)	0.00	0.39	0.00	0.08	0.00	0.93	0.00	0.96
Avail Cap (c_a), veh/h	0	473	0	652	0	146	0	539
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.0	0.0	11.2	0.0	27.3	0.0	20.5
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.1	0.0	53.4	0.0	28.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.5	0.0	11.2	0.0	80.6	0.0	48.5
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	0.5	0.0	2.0	0.0	7.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	2.2	0.0	4.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.2	0.0	0.5	0.0	4.2	0.0	11.9
%ile Storage Ratio (RQ%)	0.00	0.10	0.00	0.09	0.00	0.32	0.00	1.43
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	1500	0	0	0	422	0	5
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	21.5	0.0	0.0	0.0	4.0	0.0	0.1
Cycle Q Clear Time (g_c), s	0.0	21.5	0.0	0.0	0.0	4.0	0.0	0.1
Lane Grp Cap (c), veh/h	0	1644	0	0	0	1644	0	708
V/C Ratio (X)	0.00	0.91	0.00	0.00	0.00	0.26	0.00	0.01
Avail Cap (c_a), veh/h	0	1644	0	0	0	1644	0	708
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.8	0.0	0.0	0.0	9.1	0.0	10.7
Incr Delay (d2), s/veh	0.0	8.1	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.0	0.0	0.0	0.0	9.2	0.0	10.7
1st-Term Q (Q1), veh/ln	0.0	10.4	0.0	0.0	0.0	1.9	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	12.3	0.0	0.0	0.0	2.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.32	0.00	0.00	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	467	0	129	0	101	0	22
Grp Sat Flow (s), veh/h/ln	0	1590	0	1606	0	1556	0	1599
Q Serve Time (g_s), s	0.0	12.3	0.0	3.0	0.0	2.1	0.0	0.5
Cycle Q Clear Time (g_c), s	0.0	12.3	0.0	3.0	0.0	2.1	0.0	0.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.96	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	732	0	604	0	716	0	602
V/C Ratio (X)	0.00	0.64	0.00	0.21	0.00	0.14	0.00	0.04
Avail Cap (c_a), veh/h	0	732	0	604	0	716	0	602
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	11.4	0.0	11.6	0.0	8.6	0.0	10.8
Incr Delay (d2), s/veh	0.0	1.9	0.0	0.2	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.2	0.0	11.8	0.0	8.7	0.0	10.9
1st-Term Q (Q1), veh/ln	0.0	5.3	0.0	1.3	0.0	0.9	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.7	0.0	1.4	0.0	0.9	0.0	0.2
%ile Storage Ratio (RQ%)	0.00	0.18	0.00	0.06	0.00	0.05	0.00	0.03
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	126	196	546	178	54	314	312	212	153	665	130
Future Volume (veh/h)	36	126	196	546	178	54	314	312	212	153	665	130
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	38	134	209	581	189	0	334	332	0	163	707	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	77	141	220	538	885	752	315	920	412	188	666	298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.21	0.21	0.30	0.47	0.00	0.18	0.26	0.00	0.10	0.19	0.00
Ln Grp Delay, s/veh	72.5	0.0	90.1	113.0	22.7	0.0	127.0	44.3	0.0	80.8	111.4	0.0
Ln Grp LOS	E		F	F	C		F	D		F	F	
Approach Vol, veh/h		381			770			666			870	
Approach Delay, s/veh		88.3			90.9			85.8			105.7	
Approach LOS		F			F			F			F	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	19.7	41.8	48.0	35.4	30.0	31.5	10.8	72.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	22.6	29.9	43.5	31.0	25.5	27.0	8.6	65.9
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	15.0	13.0	45.5	30.9	27.5	29.0	5.0	10.6
Green Ext Time (g_e), s	0.2	1.8	0.0	0.0	0.0	0.0	0.0	1.1
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	1.00
Prob of Max Out (p_x)	0.03	0.01	1.00	1.00	1.00	1.00	1.00	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		662		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		1033		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	163	0	581	0	334	0	38	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	13.0	0.0	43.5	0.0	25.5	0.0	3.0	0.0
Cycle Q Clear Time (g_c), s	13.0	0.0	43.5	0.0	25.5	0.0	3.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	188	0	538	0	315	0	77	0
V/C Ratio (X)	0.87	0.00	1.08	0.00	1.06	0.00	0.49	0.00
Avail Cap (c_a), veh/h	279	0	538	0	315	0	106	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	63.9	0.0	50.7	0.0	59.7	0.0	67.8	0.0
Incr Delay (d2), s/veh	17.0	0.0	62.3	0.0	67.3	0.0	4.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	80.8	0.0	113.0	0.0	127.0	0.0	72.5	0.0
1st-Term Q (Q1), veh/ln	6.4	0.0	21.5	0.0	12.6	0.0	1.5	0.0
2nd-Term Q (Q2), veh/ln	0.9	0.0	9.3	0.0	5.9	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.3	0.0	30.8	0.0	18.5	0.0	1.6	0.0
%ile Storage Ratio (RQ%)	0.66	0.00	4.31	0.00	2.22	0.00	0.22	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	10.8	0.0	4.7	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	332	0	0	0	707	0	189
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	11.0	0.0	0.0	0.0	27.0	0.0	8.6
Cycle Q Clear Time (g_c), s	0.0	11.0	0.0	0.0	0.0	27.0	0.0	8.6
Lane Grp Cap (c), veh/h	0	920	0	0	0	666	0	885
V/C Ratio (X)	0.00	0.36	0.00	0.00	0.00	1.06	0.00	0.21
Avail Cap (c_a), veh/h	0	920	0	0	0	666	0	885
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	44.1	0.0	0.0	0.0	59.0	0.0	22.6
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	52.4	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.3	0.0	0.0	0.0	111.4	0.0	22.7
1st-Term Q (Q1), veh/ln	0.0	5.4	0.0	0.0	0.0	13.3	0.0	4.5

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.0	18.2	0.0	4.5
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.00	0.00	0.98	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	343	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1695	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	28.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	28.9	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.61	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	412	0	362	0	298	0	752
V/C Ratio (X)	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	412	0	363	0	298	0	752
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	56.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	33.9	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	90.1	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.9	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	94.0
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑↑			↑↑↑	
Traffic Vol, veh/h	7	398	114	65	705	29	19	12	32	12	15	2
Future Vol, veh/h	7	398	114	65	705	29	19	12	32	12	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	433	124	71	766	32	21	13	35	13	16	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	798	0	0	557	0	0	1044	1451	280	1164	1497	399
Stage 1	-	-	-	-	-	-	511	511	-	924	924	-
Stage 2	-	-	-	-	-	-	533	940	-	240	573	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	820	-	-	1010	-	-	183	130	717	150	121	601
Stage 1	-	-	-	-	-	-	514	535	-	290	346	-
Stage 2	-	-	-	-	-	-	498	340	-	742	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	820	-	-	1010	-	-	144	112	716	116	104	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	144	112	-	116	104	-
Stage 1	-	-	-	-	-	-	507	528	-	286	302	-
Stage 2	-	-	-	-	-	-	410	297	-	678	495	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.2	28.3	47.2
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	222	820	-	-	1010	-	-	116
HCM Lane V/C Ratio	0.308	0.009	-	-	0.07	-	-	0.272
HCM Control Delay (s)	28.3	9.4	0.1	-	8.8	0.5	-	47.2
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	1.3	0	-	-	0.2	-	-	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	89	92	159	126	33	116	642	123	86	1112	141
Future Volume (veh/h)	86	89	92	159	126	33	116	642	123	86	1112	141
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.98		0.95	0.97		0.95	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	91	94	97	167	133	35	122	676	129	91	1171	148
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	196	200	178	278	206	49	153	1158	221	117	1321	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.35	0.34	0.34	0.35	0.34	0.34	0.09	0.39	0.39	0.07	0.37	0.37
Ln Grp Delay, s/veh	22.6	0.0	0.0	25.9	0.0	0.0	59.4	21.7	21.8	49.4	32.2	18.9
Ln Grp LOS	C			C			E	C	C	D	C	B
Approach Vol, veh/h		282			335			927			1410	
Approach Delay, s/veh		22.6			25.9			26.7			31.9	
Approach LOS		C			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	11.6	39.1		34.3	37.4	13.3		34.3
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	10.0	31.0		32.0	33.0	8.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.5	5.0	3.7		5.7
Max Q Clear (g_c+I1), s	6.2	17.3		14.3	28.1	7.7		20.6
Green Ext Time (g_e), s	0.1	4.1		1.7	3.3	0.0		1.7
Prob of Phs Call (p_c)	0.88	1.00		1.00	1.00	0.94		1.00
Prob of Max Out (p_x)	1.00	0.25		0.01	1.00	1.00		0.18

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			406		1792		623

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		2975		580	3574			596

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		567		517	1571			142

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	91	0	0	282	0	122	0	335
Grp Sat Flow (s), veh/h/ln	1792	0	0	1503	0	1792	0	1361
Q Serve Time (g_s), s	4.2	0.0	0.0	0.0	0.0	5.7	0.0	6.3
Cycle Q Clear Time (g_c), s	4.2	0.0	0.0	12.3	0.0	5.7	0.0	18.6
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1206	0	0	0	1178
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1448	0	0	0	1190
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	29.8	0.0	0.0	0.0	29.8
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	11.2	0.0	0.0	0.0	17.5
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
Time to First Blk (g_f), s	0.0	0.0	0.0	4.2	0.0	0.0	0.0	1.8
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	4.2	0.0	0.0	0.0	1.8
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.32	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	117	0	0	583	0	153	0	541
V/C Ratio (X)	0.78	0.00	0.00	0.48	0.00	0.80	0.00	0.62
Avail Cap (c_a), veh/h	211	0	0	631	0	169	0	586
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	39.1	0.0	0.0	22.0	0.0	38.1	0.0	24.2
Incr Delay (d2), s/veh	10.4	0.0	0.0	0.6	0.0	21.3	0.0	1.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.4	0.0	0.0	22.6	0.0	59.4	0.0	25.9
1st-Term Q (Q1), veh/ln	2.1	0.0	0.0	5.2	0.0	2.8	0.0	6.8
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.1	0.0	0.9	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.4	0.0	0.0	5.3	0.0	3.7	0.0	7.0
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.13	0.00	0.55	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	406	0	0	1171	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	15.2	0.0	0.0	26.1	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.2	0.0	0.0	26.1	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	696	0	0	1321	0	0	0
V/C Ratio (X)	0.00	0.58	0.00	0.00	0.89	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	696	0	0	1388	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.5	0.0	0.0	25.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.0	7.1	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.7	0.0	0.0	32.2	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.4	0.0	0.0	12.8	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	1.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	7.7	0.0	0.0	14.1	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.14	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	399	0	0	148	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1755	0	0	1571	0	0	0
Q Serve Time (g_s), s	0.0	15.3	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.3	0.0	0.0	5.6	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.32	0.00	0.34	1.00	0.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	683	0	0	581	0	0	0
V/C Ratio (X)	0.00	0.58	0.00	0.00	0.25	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	683	0	0	610	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.5	0.0	0.0	18.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	0.0	0.0	0.2	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.8	0.0	0.0	18.9	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.3	0.0	0.0	2.4	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	7.6	0.0	0.0	2.5	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.56	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	3	0	0	0	0
Future Vol, veh/h	2	3	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	5	0	0	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	8	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	2	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1625	-	1018	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1625	-	1018	1083
Mov Cap-2 Maneuver	-	-	-	-	1018	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1625	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	104	427	235	624	1185	121
Future Volume (veh/h)	104	427	235	624	1185	121
Number	7	14	5	2	6	16
Initial Q, veh	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00	1.00	1.00			0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	114	469	258	686	1302	133
Adj No. of Lanes	1	1	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1
Opposing Right Turn Influence	Yes		Yes			
Cap, veh/h	423	645	300	2308	1498	656
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.24	0.24	0.17	0.65	0.42	0.42
Ln Grp Delay, s/veh	24.1	23.3	48.6	6.0	25.4	14.2
Ln Grp LOS	C	C	D	A	C	B
Approach Vol, veh/h	583			944	1435	
Approach Delay, s/veh	23.4			17.6	24.4	
Approach LOS	C			B	C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Case No		4.0		9.0	2.0	7.0		
Phs Duration (G+Y+Rc), s		53.7		22.5	17.3	36.4		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green (Gmax), s		53.0		18.0	14.5	34.0		
Max Allow Headway (MAH), s		5.0		4.0	3.7	5.0		
Max Q Clear (g_c+I1), s		8.4		20.0	12.7	27.4		
Green Ext Time (g_e), s		5.0		0.0	0.1	4.6		
Prob of Phs Call (p_c)		1.00		1.00	1.00	1.00		
Prob of Max Out (p_x)		0.00		1.00	1.00	0.89		
Left-Turn Movement Data								
Assigned Mvmt				7	5	1		
Mvmt Sat Flow, veh/h				1792	1792	0		
Through Movement Data								
Assigned Mvmt		2		4		6		
Mvmt Sat Flow, veh/h		3668		0		3668		
Right-Turn Movement Data								
Assigned Mvmt		12		14		16		
Mvmt Sat Flow, veh/h		0		1599		1566		
Left Lane Group Data								
Assigned Mvmt	0	0	0	7	5	1	0	0
Lane Assignment					(Prot)			

Lanes in Grp	0	0	0	1	1	0	0	0
Grp Vol (v), veh/h	0	0	0	114	258	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1792	1792	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	4.0	10.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	4.0	10.7	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1792	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	31.9	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	423	300	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.27	0.86	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	423	341	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	23.7	30.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	17.8	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	24.1	48.6	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	2.0	5.3	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.0	6.8	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.33	0.30	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	0
Lane Assignment		T				T		
Lanes in Grp	0	2	0	0	0	2	0	0
Grp Vol (v), veh/h	0	686	0	0	0	1302	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	0
Q Serve Time (g_s), s	0.0	6.4	0.0	0.0	0.0	25.4	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.4	0.0	0.0	0.0	25.4	0.0	0.0
Lane Grp Cap (c), veh/h	0	2308	0	0	0	1498	0	0
V/C Ratio (X)	0.00	0.30	0.00	0.00	0.00	0.87	0.00	0.00
Avail Cap (c_a), veh/h	0	2486	0	0	0	1595	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	5.9	0.0	0.0	0.0	20.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	5.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.0	0.0	0.0	0.0	25.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.1	0.0	0.0	0.0	12.5	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.2	0.0	0.0	0.0	13.6	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Grp	0	0	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	469	0	133	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1599	0	1566	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	18.0	0.0	4.1	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	18.0	0.0	4.1	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1599.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	12.8	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	645	0	656	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.73	0.00	0.20	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	645	0	699	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	19.2	0.0	14.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	4.1	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	23.3	0.0	14.2	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	15.8	0.0	4.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.6	0.0	4.5	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.78	0.00	0.25	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	105	145	235	121	163	293	610	553	75	321	205
Future Volume (veh/h)	60	105	145	235	121	163	293	610	553	75	321	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	64	112	154	250	129	0	312	649	0	80	341	0
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	143	153	210	294	560	476	358	906	405	217	625	279
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.21	0.21	0.16	0.30	0.00	0.20	0.25	0.00	0.12	0.17	0.00
Ln Grp Delay, s/veh	34.1	0.0	29.6	45.0	19.5	0.0	43.4	25.8	0.0	30.4	28.1	0.0
Ln Grp LOS	C		C	D	B		D	C		C	C	
Approach Vol, veh/h		330			379			961			421	
Approach Delay, s/veh		30.4			36.3			31.5			28.6	
Approach LOS		C			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	13.3	22.9	16.4	20.0	19.0	17.2	10.3	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	30.8	14.2	31.0	17.5	24.3	9.3	35.9
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+l1), s	5.0	14.0	11.9	12.6	14.3	8.3	4.5	5.8
Green Ext Time (g_e), s	0.1	3.8	0.2	1.4	0.3	1.8	0.0	0.7
Prob of Phs Call (p_c)	0.80	1.00	0.99	1.00	1.00	1.00	0.73	1.00
Prob of Max Out (p_x)	0.07	0.07	1.00	0.00	1.00	0.01	0.26	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		716		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		984		1599		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	80	0	250	0	312	0	64	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	3.0	0.0	9.9	0.0	12.3	0.0	2.5	0.0
Cycle Q Clear Time (g_c), s	3.0	0.0	9.9	0.0	12.3	0.0	2.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	217	0	294	0	358	0	143	0
V/C Ratio (X)	0.37	0.00	0.85	0.00	0.87	0.00	0.45	0.00
Avail Cap (c_a), veh/h	271	0	350	0	431	0	229	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	29.4	0.0	29.5	0.0	28.2	0.0	31.9	0.0
Incr Delay (d2), s/veh	1.0	0.0	15.5	0.0	15.2	0.0	2.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.4	0.0	45.0	0.0	43.4	0.0	34.1	0.0
1st-Term Q (Q1), veh/ln	1.5	0.0	4.9	0.0	6.1	0.0	1.2	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	1.3	0.0	1.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.5	0.0	6.1	0.0	7.6	0.0	1.3	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.86	0.00	0.91	0.00	0.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	649	0	0	0	341	0	129
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	12.0	0.0	0.0	0.0	6.3	0.0	3.8
Cycle Q Clear Time (g_c), s	0.0	12.0	0.0	0.0	0.0	6.3	0.0	3.8
Lane Grp Cap (c), veh/h	0	906	0	0	0	625	0	560
V/C Ratio (X)	0.00	0.72	0.00	0.00	0.00	0.55	0.00	0.23
Avail Cap (c_a), veh/h	0	1514	0	0	0	1194	0	929
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	24.8	0.0	0.0	0.0	27.4	0.0	19.2
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.0	0.0	0.7	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	25.8	0.0	0.0	0.0	28.1	0.0	19.5
1st-Term Q (Q1), veh/ln	0.0	5.9	0.0	0.0	0.0	3.1	0.0	1.9

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.1	0.0	0.0	0.0	3.2	0.0	2.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.00	0.00	0.17	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	0	0	266	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1699	0	1599	0	1599
Q Serve Time (g_s), s	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.58	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	405	0	363	0	279	0	476
V/C Ratio (X)	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	677	0	724	0	534	0	789
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	29.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	672	12	17	446	29	73	18	37	0	6	38
Future Vol, veh/h	1	672	12	17	446	29	73	18	37	0	6	38
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	730	13	18	485	32	79	20	40	0	7	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	518	0	0	746	0	0	1024	1296	375	915	1286	260
Stage 1	-	-	-	-	-	-	742	742	-	538	538	-
Stage 2	-	-	-	-	-	-	282	554	-	377	748	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1044	-	-	858	-	-	190	161	623	228	163	739
Stage 1	-	-	-	-	-	-	374	420	-	495	521	-
Stage 2	-	-	-	-	-	-	701	512	-	616	418	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1043	-	-	856	-	-	169	155	621	188	157	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	169	155	-	188	157	-
Stage 1	-	-	-	-	-	-	372	418	-	494	505	-
Stage 2	-	-	-	-	-	-	634	496	-	548	416	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	50	13.1
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	211	1043	-	-	856	-	-	490
HCM Lane V/C Ratio	0.659	0.001	-	-	0.022	-	-	0.098
HCM Control Delay (s)	50	8.5	0	-	9.3	0.1	-	13.1
HCM Lane LOS	F	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	4	0	-	-	0.1	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	24	45	44	28	33	40	1242	77	42	612	58
Future Volume (veh/h)	69	24	45	44	28	33	40	1242	77	42	612	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	73	25	47	46	29	35	42	1307	81	44	644	61
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	202	74	88	174	106	90	465	1675	104	78	984	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.18	0.17	0.17	0.18	0.17	0.17	0.26	0.49	0.49	0.04	0.28	0.28
Ln Grp Delay, s/veh	22.2	0.0	0.0	21.5	0.0	0.0	16.4	15.0	15.0	33.4	19.4	16.0
Ln Grp LOS	C			C			B	B	B	C	B	B
Approach Vol, veh/h		145			110			1430			749	
Approach Delay, s/veh		22.2			21.5			15.0			19.9	
Approach LOS		C			C			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	8.5	34.5		15.0	22.0	21.1		15.0
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	36.0		32.0	35.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.5	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	3.4	20.4		6.5	11.3	3.0		5.1
Green Ext Time (g_e), s	0.0	8.1		0.8	4.6	0.0		0.6
Prob of Phs Call (p_c)	0.51	1.00		0.99	1.00	0.49		0.99
Prob of Max Out (p_x)	1.00	0.51		0.00	0.02	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			632		1792		499

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3413		428	3574			615

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		211		509	1548			520

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	44	0	0	145	0	42	0	110
Grp Sat Flow (s), veh/h/ln	1792	0	0	1569	0	1792	0	1633
Q Serve Time (g_s), s	1.4	0.0	0.0	1.3	0.0	1.0	0.0	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	0.0	4.5	0.0	1.0	0.0	3.1
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1340	0	0	0	1332
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1822	0	0	0	1832
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	10.5	0.0	0.0	0.0	10.5
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	7.4	0.0	0.0	0.0	6.1
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.6
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.42
Lane Grp Cap (c), veh/h	78	0	0	378	0	465	0	384
V/C Ratio (X)	0.56	0.00	0.00	0.38	0.00	0.09	0.00	0.29
Avail Cap (c_a), veh/h	154	0	0	935	0	465	0	957
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	27.2	0.0	0.0	21.5	0.0	16.3	0.0	21.1
Incr Delay (d2), s/veh	6.2	0.0	0.0	0.6	0.0	0.1	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.4	0.0	0.0	22.2	0.0	16.4	0.0	21.5
1st-Term Q (Q1), veh/ln	0.7	0.0	0.0	2.0	0.0	0.5	0.0	1.5
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.8	0.0	0.0	2.1	0.0	0.5	0.0	1.6
%ile Storage Ratio (RQ%)	0.09	0.00	0.00	0.05	0.00	0.08	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	683	0	0	644	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	18.3	0.0	0.0	9.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	18.3	0.0	0.0	9.3	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	877	0	0	984	0	0	0
V/C Ratio (X)	0.00	0.78	0.00	0.00	0.65	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	1107	0	0	2153	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.2	0.0	0.0	18.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.0	0.0	0.0	19.4	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	8.9	0.0	0.0	4.6	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.6	0.0	0.0	4.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.05	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	705	0	0	61	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1837	0	0	1548	0	0	0
Q Serve Time (g_s), s	0.0	18.4	0.0	0.0	1.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	18.4	0.0	0.0	1.7	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.11	0.00	0.32	1.00	0.00	0.00	0.32
Lane Grp Cap (c), veh/h	0	902	0	0	426	0	0	0
V/C Ratio (X)	0.00	0.78	0.00	0.00	0.14	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	1138	0	0	932	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.2	0.0	0.0	15.9	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.0	0.0	0.2	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.0	0.0	0.0	16.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	9.2	0.0	0.0	0.7	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.9	0.0	0.0	0.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.17	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	5.3

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	0	2	0	1	6	0
Future Vol, veh/h	1	0	2	0	1	6	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	0	3	0	2	10	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	4	0	6	3
Stage 1	-	-	-	-	-	3	-
Stage 2	-	-	-	-	-	3	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1631	-	1021	1087
Stage 1	-	-	-	-	-	1025	-
Stage 2	-	-	-	-	-	1025	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1629	-	1019	1086
Mov Cap-2 Maneuver	-	-	-	-	-	1019	-
Stage 1	-	-	-	-	-	1024	-
Stage 2	-	-	-	-	-	1024	-

Approach	EB	WB	NB
HCM Control Delay, s		0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1629	-
HCM Lane V/C Ratio	0.009	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	139	200	1322	558	88
Future Volume (veh/h)	50	139	200	1322	558	88
Number	7	14	5	2	6	16
Initial Q, veh	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00	1.00	1.00			0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	55	153	220	1453	613	97
Adj No. of Lanes	1	1	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1
Opposing Right Turn Influence	Yes		Yes			
Cap, veh/h	230	206	605	2277	2277	993
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.13	0.64	0.64	0.64	0.64
Ln Grp Delay, s/veh	15.6	29.5	5.6	4.6	3.1	2.7
Ln Grp LOS	B	C	A	A	A	A
Approach Vol, veh/h	208			1673	710	
Approach Delay, s/veh	25.8			4.7	3.1	
Approach LOS	C			A	A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Case No		6.0		9.0		7.0		
Phs Duration (G+Y+Rc), s		29.0		9.4		29.0		
Change Period (Y+Rc), s		4.5		4.5		4.5		
Max Green (Gmax), s		33.0		5.0		33.0		
Max Allow Headway (MAH), s		5.1		4.0		5.0		
Max Q Clear (g_c+I1), s		12.0		5.5		4.9		
Green Ext Time (g_e), s		12.5		0.0		4.7		
Prob of Phs Call (p_c)		1.00		0.89		1.00		
Prob of Max Out (p_x)		0.48		1.00		0.01		
Left-Turn Movement Data								
Assigned Mvmt		5		7		1		
Mvmt Sat Flow, veh/h		743		1792		0		
Through Movement Data								
Assigned Mvmt		2		4		6		
Mvmt Sat Flow, veh/h		3668		0		3668		
Right-Turn Movement Data								
Assigned Mvmt		12		14		16		
Mvmt Sat Flow, veh/h		0		1599		1559		
Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	0
Lane Assignment								

Lanes in Grp	0	1	0	1	0	0	0	0
Grp Vol (v), veh/h	0	220	0	55	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	743	0	1792	0	0	0	0
Q Serve Time (g_s), s	0.0	7.1	0.0	1.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.0	0.0	1.1	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	743	0	1792	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	24.5	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	21.6	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	24.5	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	605	0	230	0	0	0	0
V/C Ratio (X)	0.00	0.36	0.00	0.24	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	769	0	233	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	5.2	0.0	15.1	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.5	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.6	0.0	15.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.4	0.0	0.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.5	0.0	0.6	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.09	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	0
Lane Assignment		T				T		
Lanes in Grp	0	2	0	0	0	2	0	0
Grp Vol (v), veh/h	0	1453	0	0	0	613	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	0
Q Serve Time (g_s), s	0.0	9.5	0.0	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	9.5	0.0	0.0	0.0	2.9	0.0	0.0
Lane Grp Cap (c), veh/h	0	2277	0	0	0	2277	0	0
V/C Ratio (X)	0.00	0.64	0.00	0.00	0.00	0.27	0.00	0.00
Avail Cap (c_a), veh/h	0	3070	0	0	0	3070	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	4.3	0.0	0.0	0.0	3.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.6	0.0	0.0	0.0	3.1	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	4.4	0.0	0.0	0.0	1.4	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.5	0.0	0.0	0.0	1.4	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.12	0.00	0.00	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Grp	0	0	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	153	0	97	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1599	0	1559	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	3.5	0.0	0.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	3.5	0.0	0.9	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	206	0	993	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.74	0.00	0.10	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	208	0	1339	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	16.1	0.0	2.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	29.5	0.0	2.7	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	1.5	0.0	1.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.3	0.0	1.4	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.11	0.00	0.08	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A

E. CUMULATIVE PLUS SUBSEQUENT CONDITIONS SYNCHRO OUTPUT SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	270	81	543	320	85	206	312	291	234	616	136
Future Volume (veh/h)	45	270	81	543	320	85	206	312	291	234	616	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	48	287	86	578	340	0	219	332	0	249	655	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	90	307	92	573	1755	0	225	648	290	255	708	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.05	0.22	0.22	0.32	0.49	0.00	0.13	0.18	0.00	0.14	0.20	0.00
Ln Grp Delay, s/veh	66.5	0.0	78.0	85.0	19.1	0.0	109.9	49.7	0.0	106.6	70.1	0.0
Ln Grp LOS	E		E	F	B		F	D		F	E	
Approach Vol, veh/h		421			918			551			904	
Approach Delay, s/veh		76.7			60.6			73.7			80.1	
Approach LOS		E			E			E			F	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	23.4	28.6	47.0	33.9	21.2	30.8	11.1	69.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	18.9	24.6	42.5	31.0	16.7	26.8	9.2	64.3
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.2	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	20.4	13.1	44.5	28.9	18.2	25.9	5.5	9.1
Green Ext Time (g_e), s	0.0	1.5	0.0	0.5	0.0	0.4	0.0	2.4
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	0.83	1.00
Prob of Max Out (p_x)	1.00	0.07	1.00	1.00	1.00	1.00	1.00	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		1390		3574		3668

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		416		1599		0

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	249	0	578	0	219	0	48	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	18.4	0.0	42.5	0.0	16.2	0.0	3.5	0.0
Cycle Q Clear Time (g_c), s	18.4	0.0	42.5	0.0	16.2	0.0	3.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	255	0	573	0	225	0	90	0
V/C Ratio (X)	0.98	0.00	1.01	0.00	0.97	0.00	0.54	0.00
Avail Cap (c_a), veh/h	255	0	573	0	225	0	124	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	56.8	0.0	45.2	0.0	57.9	0.0	61.6	0.0
Incr Delay (d2), s/veh	49.9	0.0	39.8	0.0	52.1	0.0	4.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	106.6	0.0	85.0	0.0	109.9	0.0	66.5	0.0
1st-Term Q (Q1), veh/ln	9.1	0.0	20.8	0.0	8.0	0.0	1.7	0.0
2nd-Term Q (Q2), veh/ln	3.5	0.0	6.3	0.0	3.3	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	12.6	0.0	27.2	0.0	11.2	0.0	1.8	0.0
%ile Storage Ratio (RQ%)	1.13	0.00	3.81	0.00	1.35	0.00	0.26	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	2
Grp Vol (v), veh/h	0	332	0	0	0	655	0	340
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1787
Q Serve Time (g_s), s	0.0	11.1	0.0	0.0	0.0	23.9	0.0	7.1
Cycle Q Clear Time (g_c), s	0.0	11.1	0.0	0.0	0.0	23.9	0.0	7.1
Lane Grp Cap (c), veh/h	0	648	0	0	0	708	0	1755
V/C Ratio (X)	0.00	0.51	0.00	0.00	0.00	0.93	0.00	0.19
Avail Cap (c_a), veh/h	0	662	0	0	0	721	0	1755
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.1	0.0	0.0	0.0	52.3	0.0	19.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	17.7	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	49.7	0.0	0.0	0.0	70.1	0.0	19.1
1st-Term Q (Q1), veh/ln	0.0	5.5	0.0	0.0	0.0	11.8	0.0	3.5

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	1.7	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.0	13.6	0.0	3.5
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.00	0.00	0.75	0.00	0.04
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	373	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1806	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.23	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	290	0	399	0	317	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	296	0	421	0	322	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	50.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.2	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	78.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.5	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	71.9
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	660	115	65	1101	16	20	12	32	9	15	6
Future Vol, veh/h	19	660	115	65	1101	16	20	12	32	9	15	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	717	125	71	1197	17	22	13	35	10	16	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1214	0	0	842	0	0	1571	2178	422	1756	2232	607
Stage 1	-	-	-	-	-	-	822	822	-	1348	1348	-
Stage 2	-	-	-	-	-	-	749	1356	-	408	884	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	570	-	-	789	-	-	75	46	580	54	42	439
Stage 1	-	-	-	-	-	-	334	386	-	159	218	-
Stage 2	-	-	-	-	-	-	370	216	-	591	362	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	570	-	-	789	-	-	31	31	579	26	28	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	31	31	-	26	28	-
Stage 1	-	-	-	-	-	-	310	359	-	148	157	-
Stage 2	-	-	-	-	-	-	236	156	-	497	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.7	290.7	$ 331.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	59	570	-	-	789	-	-	33
HCM Lane V/C Ratio	1.179	0.036	-	-	0.09	-	-	0.988
HCM Control Delay (s)	290.7	11.6	0.4	-	10	1.2	-	$ 331.7
HCM Lane LOS	F	B	A	-	B	A	-	F
HCM 95th %tile Q(veh)	5.8	0.1	-	-	0.3	-	-	3.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	84	92	159	126	33	130	571	124	86	958	153
Future Volume (veh/h)	89	84	92	159	126	33	130	571	124	86	958	153
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.98		0.96	0.97		0.96	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	94	88	97	167	133	35	137	601	131	91	1008	161
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	222	206	194	309	232	55	167	986	214	117	1116	489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.09	0.34	0.34	0.07	0.31	0.31
Ln Grp Delay, s/veh	18.4	0.0	0.0	20.1	0.0	0.0	59.9	22.4	22.5	54.0	34.7	20.2
Ln Grp LOS	B			C			E	C	C	D	C	C
Approach Vol, veh/h		279			335			869			1260	
Approach Delay, s/veh		18.4			20.1			28.3			34.2	
Approach LOS		B			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	10.9	31.5		32.6	29.4	13.0		32.6
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	6.0	25.0		32.0	24.0	7.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.6	5.0	3.7		5.7
Max Q Clear (g_c+I1), s	5.8	15.0		12.1	22.3	7.6		16.4
Green Ext Time (g_e), s	0.0	3.1		1.7	1.2	0.0		2.0
Prob of Phs Call (p_c)	0.85	1.00		1.00	1.00	0.94		1.00
Prob of Max Out (p_x)	1.00	0.41		0.01	1.00	1.00		0.05

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			430		1792		644

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		2896		561	3574			631

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		629		528	1566			149

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	91	0	0	279	0	137	0	335
Grp Sat Flow (s), veh/h/ln	1792	0	0	1518	0	1792	0	1424
Q Serve Time (g_s), s	3.8	0.0	0.0	0.0	0.0	5.6	0.0	4.4
Cycle Q Clear Time (g_c), s	3.8	0.0	0.0	10.1	0.0	5.6	0.0	14.4
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1206	0	0	0	1185
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1489	0	0	0	1330
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	28.1	0.0	0.0	0.0	28.1
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	13.7	0.0	0.0	0.0	18.1
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
Time to First Blk (g_f), s	0.0	0.0	0.0	3.9	0.0	0.0	0.0	2.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	3.9	0.0	0.0	0.0	2.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.34	0.00	1.00	0.00	0.50
Lane Grp Cap (c), veh/h	117	0	0	633	0	167	0	605
V/C Ratio (X)	0.78	0.00	0.00	0.44	0.00	0.82	0.00	0.55
Avail Cap (c_a), veh/h	143	0	0	719	0	167	0	688
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	34.5	0.0	0.0	18.0	0.0	33.4	0.0	19.3
Incr Delay (d2), s/veh	19.4	0.0	0.0	0.5	0.0	26.5	0.0	0.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	54.0	0.0	0.0	18.4	0.0	59.9	0.0	20.1
1st-Term Q (Q1), veh/ln	1.8	0.0	0.0	4.3	0.0	2.8	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.1	0.0	1.2	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.5	0.0	0.0	4.4	0.0	4.0	0.0	5.7
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.11	0.00	0.59	0.00	0.04
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	370	0	0	1008	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	12.9	0.0	0.0	20.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	12.9	0.0	0.0	20.3	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	608	0	0	1116	0	0	0
V/C Ratio (X)	0.00	0.61	0.00	0.00	0.90	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	608	0	0	1143	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.6	0.0	0.0	24.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.0	0.0	10.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.4	0.0	0.0	34.7	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.4	0.0	0.0	9.9	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	1.5	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.7	0.0	0.0	11.5	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.11	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	362	0	0	161	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1739	0	0	1566	0	0	0
Q Serve Time (g_s), s	0.0	13.0	0.0	0.0	5.9	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	13.0	0.0	0.0	5.9	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.36	0.00	0.35	1.00	0.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	592	0	0	489	0	0	0
V/C Ratio (X)	0.00	0.61	0.00	0.00	0.33	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	592	0	0	501	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.6	0.0	0.0	19.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.5	0.0	0.0	20.2	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.2	0.0	0.0	2.5	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.5	0.0	0.0	2.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.60	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	21	6	0	99	1	0
Future Vol, veh/h	21	6	0	99	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	33	10	0	157	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	195	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1579	-	798	1040
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1579	-	798	1040
Mov Cap-2 Maneuver	-	-	-	-	798	-
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	798	-	-	1579	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	9.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	464	5	5	555	6	5	5	5	5	5	99
Future Volume (veh/h)	19	464	5	5	555	6	5	5	5	5	5	99
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	21	504	5	5	603	7	5	5	5	5	5	108
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	448	879	9	517	877	10	227	157	103	146	19	272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.19	0.19	0.19	0.19	0.19	0.19
Ln Grp Delay, s/veh	8.4	0.0	5.6	7.0	0.0	6.4	9.0	0.0	0.0	9.9	0.0	0.0
Ln Grp LOS	A		A	A		A	A			A		
Approach Vol, veh/h		530			615			15			118	
Approach Delay, s/veh		5.7			6.4			9.0			9.9	
Approach LOS		A			A			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		6.0		8.0		6.0
Phs Duration (G+Y+Rc), s		9.5		17.3		9.5		17.3
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		19.5		26.5		19.5		26.5
Max Allow Headway (MAH), s		5.4		5.3		5.5		5.2
Max Q Clear (g_c+I1), s		2.2		9.4		3.7		8.8
Green Ext Time (g_e), s		0.0		3.2		0.5		3.9
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.07		0.00		0.09

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		257		808		34		887

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		841		1841		101		1838

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		549		18		1459		21

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R				L+T+R		

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	15	0	21	0	118	0	5
Grp Sat Flow (s), veh/h/ln	0	1647	0	808	0	1594	0	887
Q Serve Time (g_s), s	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Cycle Q Clear Time (g_c), s	0.0	0.2	0.0	7.4	0.0	1.7	0.0	5.4
Perm LT Sat Flow (s_l), veh/h/ln	0	1300	0	808	0	1427	0	887
Shared LT Sat Flow (s_sh), veh/h/ln	0	1832	0	0	0	1859	0	0
Perm LT Eff Green (g_p), s	0.0	5.0	0.0	12.8	0.0	5.0	0.0	12.8
Perm LT Serve Time (g_u), s	0.0	3.3	0.0	5.9	0.0	4.8	0.0	7.5
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Time to First Blk (g_f), s	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.2	0.0	0.0	0.0	1.7	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.33	0.00	1.00	0.00	0.04	0.00	1.00
Lane Grp Cap (c), veh/h	0	487	0	448	0	438	0	517
V/C Ratio (X)	0.00	0.03	0.00	0.05	0.00	0.27	0.00	0.01
Avail Cap (c_a), veh/h	0	1319	0	862	0	1296	0	972
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	8.9	0.0	8.3	0.0	9.6	0.0	7.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.0	0.0	8.4	0.0	9.9	0.0	7.0
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	0.1	0.0	0.8	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	0.1	0.0	0.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment				T+R				T+R
Lanes in Grp	0	0	0	1	0	0	0	1
Grp Vol (v), veh/h	0	0	0	509	0	0	0	610
Grp Sat Flow (s), veh/h/ln	0	0	0	1860	0	0	0	1859
Q Serve Time (g_s), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	6.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	5.3	0.0	0.0	0.0	6.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.33	0.00	0.01	0.00	0.92	0.00	0.01
Lane Grp Cap (c), veh/h	0	0	0	887	0	0	0	887
V/C Ratio (X)	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.69
Avail Cap (c_a), veh/h	0	0	0	1840	0	0	0	1840
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	5.6	0.0	0.0	0.0	6.4
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	2.5	0.0	0.0	0.0	3.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.7	0.0	0.0	0.0	3.6
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.18
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	427	541	5	113	226	442	462	21	1008	121
Future Volume (veh/h)	95	5	427	541	5	113	226	442	462	21	1008	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	104	5	469	595	5	124	248	486	508	23	1108	133
Adj No. of Lanes	1	1	0	2	1	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	130	4	358	595	611	556	252	1514	951	41	1091	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.07	0.23	0.23	0.17	0.32	0.32	0.14	0.42	0.42	0.02	0.31	0.31
Ln Grp Delay, s/veh	63.6	0.0	202.9	84.3	26.3	26.7	100.9	22.2	14.4	67.5	71.2	24.5
Ln Grp LOS	E		F	F	C	C	F	C	B	E	F	C
Approach Vol, veh/h		578			724			1242			1264	
Approach Delay, s/veh		177.8			74.1			34.7			66.2	
Approach LOS		F			E			C			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	3.0
Phs Duration (G+Y+Rc), s	7.1	53.2	24.2	30.5	20.7	39.6	12.8	41.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	6.3	45.0	19.7	26.0	16.2	35.1	13.2	32.5
Max Allow Headway (MAH), s	3.8	4.5	3.8	5.6	3.7	5.0	3.8	4.1
Max Q Clear (g_c+I1), s	3.5	23.7	21.7	28.0	17.9	37.1	8.6	8.3
Green Ext Time (g_e), s	0.0	5.0	0.0	0.0	0.0	0.0	0.1	0.4
Prob of Phs Call (p_c)	0.52	1.00	1.00	1.00	1.00	1.00	0.96	1.00
Prob of Max Out (p_x)	1.00	0.06	1.00	1.00	1.00	1.00	0.42	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		3476		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		17		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		1583		1565		1599

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	23	0	595	0	248	0	104	0
Grp Sat Flow (s), veh/h/ln	1792	0	1738	0	1792	0	1792	0
Q Serve Time (g_s), s	1.5	0.0	19.7	0.0	15.9	0.0	6.6	0.0
Cycle Q Clear Time (g_c), s	1.5	0.0	19.7	0.0	15.9	0.0	6.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	41	0	595	0	252	0	130	0
V/C Ratio (X)	0.57	0.00	1.00	0.00	0.98	0.00	0.80	0.00
Avail Cap (c_a), veh/h	98	0	595	0	252	0	206	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	55.6	0.0	47.6	0.0	49.3	0.0	52.5	0.0
Incr Delay (d2), s/veh	11.9	0.0	36.7	0.0	51.6	0.0	11.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	67.5	0.0	84.3	0.0	100.9	0.0	63.6	0.0
1st-Term Q (Q1), veh/ln	0.7	0.0	9.4	0.0	7.9	0.0	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	3.0	0.0	3.6	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.9	0.0	12.5	0.0	11.5	0.0	3.7	0.0
%ile Storage Ratio (RQ%)	0.07	0.00	1.49	0.00	0.50	0.00	0.60	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	486	0	0	0	1108	0	5
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	10.4	0.0	0.0	0.0	35.1	0.0	0.2
Cycle Q Clear Time (g_c), s	0.0	10.4	0.0	0.0	0.0	35.1	0.0	0.2
Lane Grp Cap (c), veh/h	0	1514	0	0	0	1091	0	611
V/C Ratio (X)	0.00	0.32	0.00	0.00	0.00	1.02	0.00	0.01
Avail Cap (c_a), veh/h	0	1514	0	0	0	1091	0	611
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	22.1	0.0	0.0	0.0	39.9	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	31.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.2	0.0	0.0	0.0	71.2	0.0	26.3
1st-Term Q (Q1), veh/ln	0.0	5.1	0.0	0.0	0.0	17.3	0.0	0.1

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.2	0.0	0.0	0.0	22.0	0.0	0.1
%ile Storage Ratio (RQ%)	0.00	0.14	0.00	0.00	0.00	0.09	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	508	0	474	0	133	0	124
Grp Sat Flow (s), veh/h/ln	0	1599	0	1599	0	1565	0	1599
Q Serve Time (g_s), s	0.0	21.7	0.0	26.0	0.0	6.6	0.0	6.3
Cycle Q Clear Time (g_c), s	0.0	21.7	0.0	26.0	0.0	6.6	0.0	6.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1599.0	0.0	0.0	0.0	1599.0	0.0	1599.0
Prot RT Eff Green (g_R), s	0.0	19.7	0.0	0.0	0.0	8.3	0.0	2.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.99	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	951	0	362	0	594	0	556
V/C Ratio (X)	0.00	0.53	0.00	1.31	0.00	0.22	0.00	0.22
Avail Cap (c_a), veh/h	0	951	0	362	0	594	0	556
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.8	0.0	44.5	0.0	24.3	0.0	26.5
Incr Delay (d2), s/veh	0.0	0.6	0.0	158.4	0.0	0.2	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	14.4	0.0	202.9	0.0	24.5	0.0	26.7
1st-Term Q (Q1), veh/ln	0.0	9.5	0.0	11.5	0.0	2.9	0.0	2.8
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	15.9	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.7	0.0	27.4	0.0	2.9	0.0	2.8
%ile Storage Ratio (RQ%)	0.00	0.31	0.00	1.29	0.00	0.16	0.00	0.34
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	74.4
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	312	179	302	213	266	196	610	635	103	243	162
Future Volume (veh/h)	106	312	179	302	213	266	196	610	635	103	243	162
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	113	332	190	321	227	0	209	649	0	110	259	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	142	347	198	337	1494	0	227	782	350	187	703	314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.31	0.31	0.19	0.42	0.00	0.13	0.22	0.00	0.10	0.20	0.00
Ln Grp Delay, s/veh	55.0	0.0	62.2	76.5	18.2	0.0	82.2	42.9	0.0	47.0	35.2	0.0
Ln Grp LOS	D		E	E	B		F	D		D	D	
Approach Vol, veh/h		635			548			858			369	
Approach Delay, s/veh		60.9			52.3			52.5			38.7	
Approach LOS		E			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	15.0	26.4	23.4	35.5	17.2	24.2	12.5	46.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	26.1	18.9	31.0	12.7	24.4	13.1	36.8
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.2	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	7.9	19.4	19.8	31.1	13.6	8.3	8.2	6.0
Green Ext Time (g_e), s	0.1	2.2	0.0	0.0	0.0	1.3	0.1	1.4
Prob of Phs Call (p_c)	0.95	1.00	1.00	1.00	1.00	1.00	0.96	1.00
Prob of Max Out (p_x)	1.00	0.68	1.00	1.00	1.00	0.01	0.32	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		1122		3574		3668

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		642		1599		0

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	110	0	321	0	209	0	113	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	5.9	0.0	17.8	0.0	11.6	0.0	6.2	0.0
Cycle Q Clear Time (g_c), s	5.9	0.0	17.8	0.0	11.6	0.0	6.2	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	187	0	337	0	227	0	142	0
V/C Ratio (X)	0.59	0.00	0.95	0.00	0.92	0.00	0.80	0.00
Avail Cap (c_a), veh/h	196	0	337	0	227	0	234	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	42.9	0.0	40.3	0.0	43.3	0.0	45.4	0.0
Incr Delay (d2), s/veh	4.2	0.0	36.2	0.0	38.9	0.0	9.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.0	0.0	76.5	0.0	82.2	0.0	55.0	0.0
1st-Term Q (Q1), veh/ln	2.9	0.0	8.8	0.0	5.7	0.0	3.1	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	3.4	0.0	2.5	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.1	0.0	12.2	0.0	8.2	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.28	0.00	1.71	0.00	0.98	0.00	0.48	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	2
Grp Vol (v), veh/h	0	649	0	0	0	259	0	227
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1787
Q Serve Time (g_s), s	0.0	17.4	0.0	0.0	0.0	6.3	0.0	4.0
Cycle Q Clear Time (g_c), s	0.0	17.4	0.0	0.0	0.0	6.3	0.0	4.0
Lane Grp Cap (c), veh/h	0	782	0	0	0	703	0	1494
V/C Ratio (X)	0.00	0.83	0.00	0.00	0.00	0.37	0.00	0.15
Avail Cap (c_a), veh/h	0	930	0	0	0	869	0	1494
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	37.4	0.0	0.0	0.0	34.9	0.0	18.1
Incr Delay (d2), s/veh	0.0	5.5	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	42.9	0.0	0.0	0.0	35.2	0.0	18.2
1st-Term Q (Q1), veh/ln	0.0	8.6	0.0	0.0	0.0	3.1	0.0	2.0

2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.2	0.0	0.0	0.0	3.1	0.0	2.0
%ile Storage Ratio (RQ%)	0.00	0.09	0.00	0.00	0.00	0.17	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	522	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1764	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.36	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	350	0	545	0	314	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	416	0	545	0	389	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	34.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	62.2	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	14.2	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	18.5	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.6
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	27.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	973	13	17	759	9	76	18	37	0	2	41
Future Vol, veh/h	3	973	13	17	759	9	76	18	37	0	2	41
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	1058	14	18	825	10	83	20	40	0	2	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	836	0	0	1075	0	0	1524	1946	539	1412	1948	419
Stage 1	-	-	-	-	-	-	1074	1074	-	867	867	-
Stage 2	-	-	-	-	-	-	450	872	-	545	1081	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	794	-	-	644	-	-	~ 81	64	487	98	64	583
Stage 1	-	-	-	-	-	-	235	294	-	314	368	-
Stage 2	-	-	-	-	-	-	558	366	-	490	292	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	793	-	-	642	-	-	~ 69	60	486	64	60	582
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 69	60	-	64	60	-
Stage 1	-	-	-	-	-	-	232	290	-	311	348	-
Stage 2	-	-	-	-	-	-	485	347	-	415	288	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	$ 398	14.8
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	89	793	-	-	642	-	-	414
HCM Lane V/C Ratio	1.6	0.004	-	-	0.029	-	-	0.113
HCM Control Delay (s)	$ 398	9.6	0	-	10.8	0.3	-	14.8
HCM Lane LOS	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	11.4	0	-	-	0.1	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	24	45	45	28	33	40	1131	78	42	592	58
Future Volume (veh/h)	68	24	45	45	28	33	40	1131	78	42	592	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	72	25	47	47	29	35	42	1191	82	44	623	61
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	217	79	92	189	112	92	381	1490	102	82	976	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.19	0.18	0.18	0.19	0.18	0.18	0.21	0.44	0.44	0.05	0.27	0.27
Ln Grp Delay, s/veh	19.0	0.0	0.0	18.5	0.0	0.0	16.3	16.7	16.7	29.2	17.0	14.2
Ln Grp LOS	B			B			B	B	B	C	B	B
Approach Vol, veh/h		144			111			1315			728	
Approach Delay, s/veh		19.0			18.5			16.7			17.5	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	8.3	28.4		14.2	19.9	16.8		14.2
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	26.0		32.0	25.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.5	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	3.2	17.5		5.8	9.8	3.0		4.8
Green Ext Time (g_e), s	0.0	4.9		0.8	3.8	0.0		0.6
Prob of Phs Call (p_c)	0.46	1.00		0.98	1.00	0.45		0.98
Prob of Max Out (p_x)	1.00	0.76		0.00	0.11	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			614		1792		491

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3386		440	3574			620

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		233		511	1548			512

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	44	0	0	144	0	42	0	111
Grp Sat Flow (s), veh/h/ln	1792	0	0	1565	0	1792	0	1623
Q Serve Time (g_s), s	1.2	0.0	0.0	1.1	0.0	1.0	0.0	0.0
Cycle Q Clear Time (g_c), s	1.2	0.0	0.0	3.8	0.0	1.0	0.0	2.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1341	0	0	0	1332
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1822	0	0	0	1832
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	9.7	0.0	0.0	0.0	9.7
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	6.9	0.0	0.0	0.0	5.8
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	2.5
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	2.5
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.42
Lane Grp Cap (c), veh/h	82	0	0	404	0	381	0	409
V/C Ratio (X)	0.54	0.00	0.00	0.36	0.00	0.11	0.00	0.27
Avail Cap (c_a), veh/h	176	0	0	1067	0	381	0	1088
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	23.8	0.0	0.0	18.5	0.0	16.2	0.0	18.1
Incr Delay (d2), s/veh	5.4	0.0	0.0	0.5	0.0	0.1	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.2	0.0	0.0	19.0	0.0	16.3	0.0	18.5
1st-Term Q (Q1), veh/ln	0.6	0.0	0.0	1.7	0.0	0.5	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	0.0	1.8	0.0	0.5	0.0	1.4
%ile Storage Ratio (RQ%)	0.08	0.00	0.00	0.04	0.00	0.07	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	628	0	0	623	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	15.4	0.0	0.0	7.8	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.4	0.0	0.0	7.8	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	786	0	0	976	0	0	0
V/C Ratio (X)	0.00	0.80	0.00	0.00	0.64	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	913	0	0	1756	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.3	0.0	0.0	16.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.4	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.7	0.0	0.0	17.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.5	0.0	0.0	3.8	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	1.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.5	0.0	0.0	3.9	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	645	0	0	61	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1832	0	0	1548	0	0	0
Q Serve Time (g_s), s	0.0	15.5	0.0	0.0	1.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.5	0.0	0.0	1.5	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.13	0.00	0.33	1.00	0.00	0.00	0.32
Lane Grp Cap (c), veh/h	0	806	0	0	423	0	0	0
V/C Ratio (X)	0.00	0.80	0.00	0.00	0.14	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	936	0	0	761	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.3	0.0	0.0	14.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.4	0.0	0.0	0.2	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.7	0.0	0.0	14.2	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.7	0.0	0.0	0.6	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.7	0.0	0.0	0.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.15	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.2
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.9

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	78	5	0	26	11	0
Future Vol, veh/h	1	78	5	0	26	11	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	124	8	0	41	17	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	133	0	171	129
Stage 1	-	-	-	-	-	129	-
Stage 2	-	-	-	-	-	42	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1464	-	824	926
Stage 1	-	-	-	-	-	902	-
Stage 2	-	-	-	-	-	986	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1463	-	822	925
Mov Cap-2 Maneuver	-	-	-	-	-	822	-
Stage 1	-	-	-	-	-	901	-
Stage 2	-	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s		0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	822	-	-	1463	-
HCM Lane V/C Ratio	0.021	-	-	-	-
HCM Control Delay (s)	9.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	472	5	5	469	6	5	5	5	6	5	25
Future Volume (veh/h)	78	472	5	5	469	6	5	5	5	6	5	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	85	513	5	5	510	7	5	5	5	7	5	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	296	712	7	296	709	10	278	273	221	163	136	456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41	0.41	0.41	0.41	0.41
Ln Grp Delay, s/veh	18.1	0.0	14.6	16.0	0.0	14.6	7.8	0.0	0.0	8.0	0.0	0.0
Ln Grp LOS	B		B	B		B	A			A		
Approach Vol, veh/h		603			522			15			39	
Approach Delay, s/veh		15.1			14.6			7.8			8.0	
Approach LOS		B			B			A			A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		8.0		6.0		8.0		6.0
Phs Duration (G+Y+Rc), s		22.5		21.5		22.5		21.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.4		5.3		5.5		5.2
Max Q Clear (g_c+I1), s		2.2		16.4		2.6		12.6
Green Ext Time (g_e), s		0.0		0.6		0.1		1.6
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		1.00		0.00		0.97

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		413		881		163		880

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		667		1842		332		1833

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		540		18		1116		25

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T+R				L+T+R		

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	15	0	85	0	39	0	5
Grp Sat Flow (s), veh/h/ln	0	1620	0	881	0	1612	0	880
Q Serve Time (g_s), s	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.2
Cycle Q Clear Time (g_c), s	0.0	0.2	0.0	14.4	0.0	0.6	0.0	10.6
Perm LT Sat Flow (s_l), veh/h/ln	0	1399	0	881	0	1427	0	880
Shared LT Sat Flow (s_sh), veh/h/ln	0	1832	0	0	0	1846	0	0
Perm LT Eff Green (g_p), s	0.0	18.0	0.0	17.0	0.0	18.0	0.0	17.0
Perm LT Serve Time (g_u), s	0.0	17.4	0.0	6.6	0.0	17.8	0.0	6.6
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.2
Time to First Blk (g_f), s	0.0	3.9	0.0	0.0	0.0	7.6	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.2	0.0	0.0	0.0	0.6	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.33	0.00	1.00	0.00	0.18	0.00	1.00
Lane Grp Cap (c), veh/h	0	771	0	296	0	755	0	296
V/C Ratio (X)	0.00	0.02	0.00	0.29	0.00	0.05	0.00	0.02
Avail Cap (c_a), veh/h	0	771	0	315	0	755	0	315
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.8	0.0	17.6	0.0	7.9	0.0	16.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	7.8	0.0	18.1	0.0	8.0	0.0	16.0
1st-Term Q (Q1), veh/ln	0.0	0.1	0.0	1.0	0.0	0.3	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.1	0.0	1.0	0.0	0.3	0.0	0.1
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.17	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment				T+R				T+R
Lanes in Grp	0	0	0	1	0	0	0	1
Grp Vol (v), veh/h	0	0	0	518	0	0	0	517
Grp Sat Flow (s), veh/h/ln	0	0	0	1860	0	0	0	1858
Q Serve Time (g_s), s	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.4
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.33	0.00	0.01	0.00	0.69	0.00	0.01
Lane Grp Cap (c), veh/h	0	0	0	719	0	0	0	719
V/C Ratio (X)	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.72
Avail Cap (c_a), veh/h	0	0	0	760	0	0	0	760
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	11.5	0.0	0.0	0.0	11.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	14.6	0.0	0.0	0.0	14.6
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.3	0.0	0.0	0.0	5.3
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	6.0	0.0	0.0	0.0	5.9
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.27
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	113	469	5	20	167	1366	425	124	385	92
Future Volume (veh/h)	50	5	113	469	5	20	167	1366	425	124	385	92
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	55	5	124	515	5	22	184	1501	467	136	423	101
Adj No. of Lanes	1	1	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	652	23	581	539	708	602	473	1644	732	146	1644	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.46	0.46	0.46	0.46	0.46	0.46
Ln Grp Delay, s/veh	11.2	0.0	11.8	48.5	10.7	10.9	13.6	22.0	13.2	80.9	9.2	8.7
Ln Grp LOS	B		B	D	B	B	B	C	B	F	A	A
Approach Vol, veh/h		184			542			2152			660	
Approach Delay, s/veh		11.6			46.6			19.4			23.9	
Approach LOS		B			D			B			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		5.0		6.0		5.0		5.0
Phs Duration (G+Y+Rc), s		29.8		25.2		29.8		25.2
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		25.3		20.7		25.3		20.7
Max Allow Headway (MAH), s		4.8		5.0		7.5		4.1
Max Q Clear (g_c+I1), s		23.5		5.0		27.3		22.7
Green Ext Time (g_e), s		1.6		0.7		0.0		0.0
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		1.00		0.00		1.00		1.00

Left-Turn Movement Data								
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		882		1391		223		1267

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		62		3574		1881

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1590		1544		1556		1599

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment								

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	184	0	55	0	136	0	515
Grp Sat Flow (s), veh/h/ln	0	882	0	1391	0	223	0	1267
Q Serve Time (g_s), s	0.0	8.9	0.0	1.4	0.0	3.8	0.0	17.7
Cycle Q Clear Time (g_c), s	0.0	12.9	0.0	1.5	0.0	25.3	0.0	20.7
Perm LT Sat Flow (s_l), veh/h/ln	0	882	0	1391	0	223	0	1267
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	25.3	0.0	20.7	0.0	25.3	0.0	20.7
Perm LT Serve Time (g_u), s	0.0	21.3	0.0	20.6	0.0	3.8	0.0	17.7
Perm LT Q Serve Time (g_ps), s	0.0	8.9	0.0	1.4	0.0	3.8	0.0	17.7
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	473	0	652	0	146	0	539
V/C Ratio (X)	0.00	0.39	0.00	0.08	0.00	0.93	0.00	0.96
Avail Cap (c_a), veh/h	0	473	0	652	0	146	0	539
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.0	0.0	11.2	0.0	27.3	0.0	20.5
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.1	0.0	53.6	0.0	28.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.6	0.0	11.2	0.0	80.9	0.0	48.5
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	0.5	0.0	2.0	0.0	7.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	2.2	0.0	4.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.2	0.0	0.5	0.0	4.2	0.0	11.9
%ile Storage Ratio (RQ%)	0.00	0.10	0.00	0.09	0.00	0.32	0.00	1.43
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	1
Grp Vol (v), veh/h	0	1501	0	0	0	423	0	5
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1881
Q Serve Time (g_s), s	0.0	21.5	0.0	0.0	0.0	4.0	0.0	0.1
Cycle Q Clear Time (g_c), s	0.0	21.5	0.0	0.0	0.0	4.0	0.0	0.1
Lane Grp Cap (c), veh/h	0	1644	0	0	0	1644	0	708
V/C Ratio (X)	0.00	0.91	0.00	0.00	0.00	0.26	0.00	0.01
Avail Cap (c_a), veh/h	0	1644	0	0	0	1644	0	708
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.8	0.0	0.0	0.0	9.1	0.0	10.7
Incr Delay (d2), s/veh	0.0	8.2	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.0	0.0	0.0	0.0	9.2	0.0	10.7
1st-Term Q (Q1), veh/ln	0.0	10.4	0.0	0.0	0.0	1.9	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	12.3	0.0	0.0	0.0	2.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.33	0.00	0.00	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	467	0	129	0	101	0	22
Grp Sat Flow (s), veh/h/ln	0	1590	0	1606	0	1556	0	1599
Q Serve Time (g_s), s	0.0	12.3	0.0	3.0	0.0	2.1	0.0	0.5
Cycle Q Clear Time (g_c), s	0.0	12.3	0.0	3.0	0.0	2.1	0.0	0.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.96	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	732	0	604	0	716	0	602
V/C Ratio (X)	0.00	0.64	0.00	0.21	0.00	0.14	0.00	0.04
Avail Cap (c_a), veh/h	0	732	0	604	0	716	0	602
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	11.4	0.0	11.6	0.0	8.6	0.0	10.8
Incr Delay (d2), s/veh	0.0	1.9	0.0	0.2	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.2	0.0	11.8	0.0	8.7	0.0	10.9
1st-Term Q (Q1), veh/ln	0.0	5.3	0.0	1.3	0.0	0.9	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.7	0.0	1.4	0.0	0.9	0.0	0.2
%ile Storage Ratio (RQ%)	0.00	0.18	0.00	0.06	0.00	0.05	0.00	0.03
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	126	196	546	178	55	314	312	212	154	665	130
Future Volume (veh/h)	36	126	196	546	178	55	314	312	212	154	665	130
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	38	134	209	581	189	0	334	332	0	164	707	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	77	141	220	538	1681	0	315	918	411	189	666	298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.04	0.21	0.21	0.30	0.47	0.00	0.18	0.26	0.00	0.11	0.19	0.00
Ln Grp Delay, s/veh	72.5	0.0	90.1	113.0	21.5	0.0	127.0	44.4	0.0	80.8	111.4	0.0
Ln Grp LOS	E		F	F	C		F	D		F	F	
Approach Vol, veh/h		381			770			666			871	
Approach Delay, s/veh		88.3			90.6			85.8			105.6	
Approach LOS		F			F			F			F	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	19.8	41.7	48.0	35.4	30.0	31.5	10.8	72.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	22.7	29.8	43.5	31.0	25.5	27.0	8.6	65.9
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	15.1	13.0	45.5	30.9	27.5	29.0	5.0	6.3
Green Ext Time (g_e), s	0.2	1.8	0.0	0.0	0.0	0.0	0.0	1.3
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	1.00
Prob of Max Out (p_x)	0.03	0.01	1.00	1.00	1.00	1.00	1.00	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		662		3574		3668

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		1033		1599		0

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	164	0	581	0	334	0	38	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	13.1	0.0	43.5	0.0	25.5	0.0	3.0	0.0
Cycle Q Clear Time (g_c), s	13.1	0.0	43.5	0.0	25.5	0.0	3.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	189	0	538	0	315	0	77	0
V/C Ratio (X)	0.87	0.00	1.08	0.00	1.06	0.00	0.49	0.00
Avail Cap (c_a), veh/h	281	0	538	0	315	0	106	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	63.8	0.0	50.7	0.0	59.7	0.0	67.8	0.0
Incr Delay (d2), s/veh	17.0	0.0	62.3	0.0	67.3	0.0	4.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	80.8	0.0	113.0	0.0	127.0	0.0	72.5	0.0
1st-Term Q (Q1), veh/ln	6.5	0.0	21.5	0.0	12.6	0.0	1.5	0.0
2nd-Term Q (Q2), veh/ln	0.9	0.0	9.3	0.0	5.9	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.4	0.0	30.8	0.0	18.5	0.0	1.6	0.0
%ile Storage Ratio (RQ%)	0.66	0.00	4.31	0.00	2.22	0.00	0.22	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	10.8	0.0	4.7	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	2
Grp Vol (v), veh/h	0	332	0	0	0	707	0	189
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1787
Q Serve Time (g_s), s	0.0	11.0	0.0	0.0	0.0	27.0	0.0	4.3
Cycle Q Clear Time (g_c), s	0.0	11.0	0.0	0.0	0.0	27.0	0.0	4.3
Lane Grp Cap (c), veh/h	0	918	0	0	0	666	0	1681
V/C Ratio (X)	0.00	0.36	0.00	0.00	0.00	1.06	0.00	0.11
Avail Cap (c_a), veh/h	0	918	0	0	0	666	0	1681
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	44.1	0.0	0.0	0.0	59.0	0.0	21.5
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	52.4	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.4	0.0	0.0	0.0	111.4	0.0	21.5
1st-Term Q (Q1), veh/ln	0.0	5.4	0.0	0.0	0.0	13.3	0.0	2.1

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.5	0.0	0.0	0.0	18.2	0.0	2.1
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.00	0.00	1.01	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	343	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1695	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	28.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	28.9	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.61	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	411	0	362	0	298	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	411	0	363	0	298	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	56.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	33.9	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	90.1	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.9	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	94.0
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	398	115	66	705	29	20	12	32	12	15	2
Future Vol, veh/h	7	398	115	66	705	29	20	12	32	12	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	433	125	72	766	32	22	13	35	13	16	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	798	0	0	558	0	0	1047	1454	280	1166	1500	399
Stage 1	-	-	-	-	-	-	512	512	-	926	926	-
Stage 2	-	-	-	-	-	-	535	942	-	240	574	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	820	-	-	1009	-	-	182	129	717	149	121	601
Stage 1	-	-	-	-	-	-	513	535	-	289	346	-
Stage 2	-	-	-	-	-	-	497	340	-	742	501	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	820	-	-	1009	-	-	143	111	716	115	104	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	111	-	115	104	-
Stage 1	-	-	-	-	-	-	506	528	-	285	301	-
Stage 2	-	-	-	-	-	-	408	296	-	678	494	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.2	28.9	47.7
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	820	-	-	1009	-	-	115
HCM Lane V/C Ratio	0.318	0.009	-	-	0.071	-	-	0.274
HCM Control Delay (s)	28.9	9.4	0.1	-	8.8	0.5	-	47.7
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	1.3	0	-	-	0.2	-	-	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	89	92	159	126	33	116	642	124	86	1112	141
Future Volume (veh/h)	86	89	92	159	126	33	116	642	124	86	1112	141
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.98		0.95	0.97		0.95	1.00		0.96	1.00		0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	91	94	97	167	133	35	122	676	131	91	1171	148
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	196	200	178	278	206	49	153	1155	224	117	1321	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.35	0.34	0.34	0.35	0.34	0.34	0.09	0.39	0.39	0.07	0.37	0.37
Ln Grp Delay, s/veh	22.6	0.0	0.0	25.9	0.0	0.0	59.4	21.8	21.8	49.4	32.2	18.9
Ln Grp LOS	C			C			E	C	C	D	C	B
Approach Vol, veh/h		282			335			929			1410	
Approach Delay, s/veh		22.6			25.9			26.7			31.9	
Approach LOS		C			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Case No	2.0	4.0		8.0	2.0	3.0		8.0
Phs Duration (G+Y+Rc), s	11.6	39.1		34.3	13.3	37.4		34.3
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	10.0	31.0		32.0	8.0	33.0		32.0
Max Allow Headway (MAH), s	3.8	5.1		5.5	3.7	5.0		5.7
Max Q Clear (g_c+I1), s	6.2	17.3		14.3	7.7	28.1		20.6
Green Ext Time (g_e), s	0.1	4.1		1.7	0.0	3.3		1.7
Prob of Phs Call (p_c)	0.88	1.00		1.00	0.94	1.00		1.00
Prob of Max Out (p_x)	1.00	0.25		0.01	1.00	1.00		0.18

Left-Turn Movement Data								
Assigned Mvmt	1			7	5			3
Mvmt Sat Flow, veh/h	1792			406	1792			623

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		2966		580		3574		596

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		574		517		1571		142

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	5	0	0	3
Lane Assignment	(Prot)			L+T+R	(Prot)			L+T+R

Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	91	0	0	282	122	0	0	335
Grp Sat Flow (s), veh/h/ln	1792	0	0	1503	1792	0	0	1361
Q Serve Time (g_s), s	4.2	0.0	0.0	0.0	5.7	0.0	0.0	6.3
Cycle Q Clear Time (g_c), s	4.2	0.0	0.0	12.3	5.7	0.0	0.0	18.6
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1206	0	0	0	1178
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1448	0	0	0	1190
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	29.8	0.0	0.0	0.0	29.8
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	11.2	0.0	0.0	0.0	17.5
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
Time to First Blk (g_f), s	0.0	0.0	0.0	4.2	0.0	0.0	0.0	1.8
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	4.2	0.0	0.0	0.0	1.8
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.32	1.00	0.00	0.00	0.50
Lane Grp Cap (c), veh/h	117	0	0	583	153	0	0	541
V/C Ratio (X)	0.78	0.00	0.00	0.48	0.80	0.00	0.00	0.62
Avail Cap (c_a), veh/h	211	0	0	631	169	0	0	586
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	39.1	0.0	0.0	22.0	38.1	0.0	0.0	24.2
Incr Delay (d2), s/veh	10.4	0.0	0.0	0.6	21.3	0.0	0.0	1.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.4	0.0	0.0	22.6	59.4	0.0	0.0	25.9
1st-Term Q (Q1), veh/ln	2.1	0.0	0.0	5.2	2.8	0.0	0.0	6.8
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.1	0.9	0.0	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.4	0.0	0.0	5.3	3.7	0.0	0.0	7.0
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.13	0.55	0.00	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		
Lanes in Grp	0	1	0	0	0	2	0	0
Grp Vol (v), veh/h	0	407	0	0	0	1171	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	0
Q Serve Time (g_s), s	0.0	15.3	0.0	0.0	0.0	26.1	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.3	0.0	0.0	0.0	26.1	0.0	0.0
Lane Grp Cap (c), veh/h	0	696	0	0	0	1321	0	0
V/C Ratio (X)	0.00	0.58	0.00	0.00	0.00	0.89	0.00	0.00
Avail Cap (c_a), veh/h	0	696	0	0	0	1388	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.5	0.0	0.0	0.0	25.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	0.0	0.0	0.0	7.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.8	0.0	0.0	0.0	32.2	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.5	0.0	0.0	0.0	12.8	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	1.3	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	7.7	0.0	0.0	0.0	14.1	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.00	0.14	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		T+R				R		
Lanes in Grp	0	1	0	0	0	1	0	0
Grp Vol (v), veh/h	0	400	0	0	0	148	0	0
Grp Sat Flow (s), veh/h/ln	0	1753	0	0	0	1571	0	0
Q Serve Time (g_s), s	0.0	15.3	0.0	0.0	0.0	5.6	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.3	0.0	0.0	0.0	5.6	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.33	0.00	0.34	0.00	1.00	0.00	0.10
Lane Grp Cap (c), veh/h	0	683	0	0	0	581	0	0
V/C Ratio (X)	0.00	0.59	0.00	0.00	0.00	0.25	0.00	0.00
Avail Cap (c_a), veh/h	0	683	0	0	0	610	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	20.5	0.0	0.0	0.0	18.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.8	0.0	0.0	0.0	18.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	7.3	0.0	0.0	0.0	2.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	7.6	0.0	0.0	0.0	2.5	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.00	0.56	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	6	0	0	1	0
Future Vol, veh/h	2	6	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	10	0	0	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	10	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	2	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1619	-	1015	1080
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	1015	1080
Mov Cap-2 Maneuver	-	-	-	-	1015	-
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1015	-	-	1619	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	104	427	235	625	1185	121
Future Volume (veh/h)	104	427	235	625	1185	121
Number	7	14	5	2	6	16
Initial Q, veh	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00	1.00	1.00			0.98
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	114	469	258	687	1302	133
Adj No. of Lanes	1	1	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1
Opposing Right Turn Influence	Yes		Yes			
Cap, veh/h	423	645	300	2308	1498	656
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.24	0.24	0.17	0.65	0.42	0.42
Ln Grp Delay, s/veh	24.1	23.3	48.6	6.0	25.4	14.2
Ln Grp LOS	C	C	D	A	C	B
Approach Vol, veh/h	583			945	1435	
Approach Delay, s/veh	23.4			17.6	24.4	
Approach LOS	C			B	C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Case No		4.0		9.0	2.0	7.0		
Phs Duration (G+Y+Rc), s		53.7		22.5	17.3	36.4		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green (Gmax), s		53.0		18.0	14.5	34.0		
Max Allow Headway (MAH), s		5.0		4.0	3.7	5.0		
Max Q Clear (g_c+I1), s		8.4		20.0	12.7	27.4		
Green Ext Time (g_e), s		5.0		0.0	0.1	4.6		
Prob of Phs Call (p_c)		1.00		1.00	1.00	1.00		
Prob of Max Out (p_x)		0.00		1.00	1.00	0.89		
Left-Turn Movement Data								
Assigned Mvmt				7	5	1		
Mvmt Sat Flow, veh/h				1792	1792	0		
Through Movement Data								
Assigned Mvmt		2		4		6		
Mvmt Sat Flow, veh/h		3668		0		3668		
Right-Turn Movement Data								
Assigned Mvmt		12		14		16		
Mvmt Sat Flow, veh/h		0		1599		1566		
Left Lane Group Data								
Assigned Mvmt	0	0	0	7	5	1	0	0
Lane Assignment					(Prot)			

Lanes in Grp	0	0	0	1	1	0	0	0
Grp Vol (v), veh/h	0	0	0	114	258	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1792	1792	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	4.0	10.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	4.0	10.7	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1792	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	31.9	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	423	300	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.27	0.86	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	423	341	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	23.7	30.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	17.8	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	24.1	48.6	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	2.0	5.3	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.0	6.8	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.33	0.30	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	0
Lane Assignment		T				T		
Lanes in Grp	0	2	0	0	0	2	0	0
Grp Vol (v), veh/h	0	687	0	0	0	1302	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	0
Q Serve Time (g_s), s	0.0	6.4	0.0	0.0	0.0	25.4	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.4	0.0	0.0	0.0	25.4	0.0	0.0
Lane Grp Cap (c), veh/h	0	2308	0	0	0	1498	0	0
V/C Ratio (X)	0.00	0.30	0.00	0.00	0.00	0.87	0.00	0.00
Avail Cap (c_a), veh/h	0	2486	0	0	0	1595	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	5.9	0.0	0.0	0.0	20.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	5.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.0	0.0	0.0	0.0	25.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	3.1	0.0	0.0	0.0	12.5	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.2	0.0	0.0	0.0	13.6	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Grp	0	0	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	469	0	133	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1599	0	1566	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	18.0	0.0	4.1	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	18.0	0.0	4.1	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1599.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	12.8	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	645	0	656	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.73	0.00	0.20	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	645	0	699	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	19.2	0.0	14.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	4.1	0.0	0.2	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	23.3	0.0	14.2	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	15.8	0.0	4.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	16.6	0.0	4.5	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.78	0.00	0.25	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	105	145	235	121	166	293	610	553	76	321	205
Future Volume (veh/h)	60	105	145	235	121	166	293	610	553	76	321	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	64	112	154	250	129	0	312	649	0	81	341	0
Adj No. of Lanes	1	1	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	143	153	210	294	1065	0	358	906	405	218	626	280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.21	0.21	0.16	0.30	0.00	0.20	0.25	0.00	0.12	0.18	0.00
Ln Grp Delay, s/veh	34.2	0.0	29.6	45.1	18.7	0.0	43.5	25.9	0.0	30.5	28.1	0.0
Ln Grp LOS	C		C	D	B		D	C		C	C	
Approach Vol, veh/h		330			379			961			422	
Approach Delay, s/veh		30.5			36.1			31.6			28.6	
Approach LOS		C			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Case No	2.0	3.0	2.0	4.0	2.0	3.0	2.0	4.0
Phs Duration (G+Y+Rc), s	13.4	23.0	16.5	20.0	19.1	17.3	10.3	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green (Gmax), s	11.0	30.8	14.2	31.0	17.5	24.3	9.3	35.9
Max Allow Headway (MAH), s	3.8	5.0	3.8	5.3	3.7	5.1	3.8	5.1
Max Q Clear (g_c+I1), s	5.0	14.1	11.9	12.6	14.3	8.3	4.5	3.9
Green Ext Time (g_e), s	0.1	3.8	0.2	1.4	0.3	1.8	0.0	0.8
Prob of Phs Call (p_c)	0.81	1.00	0.99	1.00	1.00	1.00	0.73	1.00
Prob of Max Out (p_x)	0.08	0.07	1.00	0.00	1.00	0.01	0.27	0.00

Left-Turn Movement Data								
Assigned Mvmt	1		3		5		7	
Mvmt Sat Flow, veh/h	1792		1792		1792		1792	

Through Movement Data								
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		3574		716		3574		3668

Right-Turn Movement Data								
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1599		984		1599		0

Left Lane Group Data								
Assigned Mvmt	1	0	3	0	5	0	7	0
Lane Assignment	(Prot)		(Prot)		(Prot)		(Prot)	

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	81	0	250	0	312	0	64	0
Grp Sat Flow (s), veh/h/ln	1792	0	1792	0	1792	0	1792	0
Q Serve Time (g_s), s	3.0	0.0	9.9	0.0	12.3	0.0	2.5	0.0
Cycle Q Clear Time (g_c), s	3.0	0.0	9.9	0.0	12.3	0.0	2.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	218	0	294	0	358	0	143	0
V/C Ratio (X)	0.37	0.00	0.85	0.00	0.87	0.00	0.45	0.00
Avail Cap (c_a), veh/h	271	0	349	0	431	0	229	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	29.4	0.0	29.6	0.0	28.2	0.0	32.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	15.5	0.0	15.3	0.0	2.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.5	0.0	45.1	0.0	43.5	0.0	34.2	0.0
1st-Term Q (Q1), veh/ln	1.5	0.0	4.9	0.0	6.1	0.0	1.2	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	1.3	0.0	1.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.5	0.0	6.1	0.0	7.6	0.0	1.3	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.86	0.00	0.91	0.00	0.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T				T		T
Lanes in Grp	0	2	0	0	0	2	0	2
Grp Vol (v), veh/h	0	649	0	0	0	341	0	129
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	1787
Q Serve Time (g_s), s	0.0	12.1	0.0	0.0	0.0	6.3	0.0	1.9
Cycle Q Clear Time (g_c), s	0.0	12.1	0.0	0.0	0.0	6.3	0.0	1.9
Lane Grp Cap (c), veh/h	0	906	0	0	0	626	0	1065
V/C Ratio (X)	0.00	0.72	0.00	0.00	0.00	0.54	0.00	0.12
Avail Cap (c_a), veh/h	0	1512	0	0	0	1193	0	1762
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	24.8	0.0	0.0	0.0	27.4	0.0	18.6
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.0	0.0	0.7	0.0	0.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	25.9	0.0	0.0	0.0	28.1	0.0	18.7
1st-Term Q (Q1), veh/ln	0.0	5.9	0.0	0.0	0.0	3.1	0.0	0.9

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	6.1	0.0	0.0	0.0	3.2	0.0	1.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.00	0.00	0.18	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		T+R		R		
Lanes in Grp	0	1	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	266	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1599	0	1699	0	1599	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.58	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	405	0	363	0	280	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	676	0	723	0	534	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	29.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	672	13	18	446	29	76	18	38	0	6	38
Future Vol, veh/h	1	672	13	18	446	29	76	18	38	0	6	38
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	730	14	20	485	32	83	20	41	0	7	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	518	0	0	747	0	0	1028	1300	375	919	1291	260
Stage 1	-	-	-	-	-	-	742	742	-	542	542	-
Stage 2	-	-	-	-	-	-	286	558	-	377	749	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1044	-	-	857	-	-	188	160	623	226	162	739
Stage 1	-	-	-	-	-	-	374	420	-	492	518	-
Stage 2	-	-	-	-	-	-	697	510	-	616	417	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1043	-	-	855	-	-	167	154	621	185	156	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	167	154	-	185	156	-
Stage 1	-	-	-	-	-	-	372	418	-	491	500	-
Stage 2	-	-	-	-	-	-	628	493	-	547	415	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	53.7	13.2
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	1043	-	-	855	-	-	489
HCM Lane V/C Ratio	0.69	0.001	-	-	0.023	-	-	0.098
HCM Control Delay (s)	53.7	8.5	0	-	9.3	0.1	-	13.2
HCM Lane LOS	F	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	4.3	0	-	-	0.1	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	24	45	45	28	33	40	1242	78	42	612	58
Future Volume (veh/h)	69	24	45	45	28	33	40	1242	78	42	612	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.98	0.99		0.98	1.00		0.97	1.00		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	73	25	47	47	29	35	42	1307	82	44	644	61
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	202	74	88	176	105	89	465	1674	105	78	983	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.18	0.17	0.17	0.18	0.17	0.17	0.26	0.49	0.49	0.04	0.28	0.28
Ln Grp Delay, s/veh	22.2	0.0	0.0	21.5	0.0	0.0	16.4	15.0	15.1	33.4	19.4	16.1
Ln Grp LOS	C			C			B	B	B	C	B	B
Approach Vol, veh/h		145			111			1431			749	
Approach Delay, s/veh		22.2			21.5			15.1			19.9	
Approach LOS		C			C			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	6	5		8
Case No	2.0	4.0		8.0	3.0	2.0		8.0
Phs Duration (G+Y+Rc), s	8.5	34.6		15.1	22.0	21.1		15.1
Change Period (Y+Rc), s	6.0	6.0		5.0	6.0	6.0		5.0
Max Green (Gmax), s	5.0	36.0		32.0	35.0	6.0		32.0
Max Allow Headway (MAH), s	3.8	5.0		5.5	5.0	3.7		5.6
Max Q Clear (g_c+I1), s	3.4	20.5		6.5	11.3	3.0		5.2
Green Ext Time (g_e), s	0.0	8.1		0.8	4.6	0.0		0.6
Prob of Phs Call (p_c)	0.51	1.00		0.99	1.00	0.49		0.99
Prob of Max Out (p_x)	1.00	0.51		0.00	0.02	1.00		0.00

Left-Turn Movement Data								
Assigned Mvmt	1			7		5		3
Mvmt Sat Flow, veh/h	1792			632		1792		509

Through Movement Data								
Assigned Mvmt		2		4	6			8
Mvmt Sat Flow, veh/h		3410		429	3574			609

Right-Turn Movement Data								
Assigned Mvmt		12		14	16			18
Mvmt Sat Flow, veh/h		213		509	1548			515

Left Lane Group Data								
Assigned Mvmt	1	0	0	7	0	5	0	3
Lane Assignment	(Prot)			L+T+R		(Prot)		L+T+R

Lanes in Grp	1	0	0	1	0	1	0	1
Grp Vol (v), veh/h	44	0	0	145	0	42	0	111
Grp Sat Flow (s), veh/h/ln	1792	0	0	1570	0	1792	0	1632
Q Serve Time (g_s), s	1.4	0.0	0.0	1.3	0.0	1.0	0.0	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	0.0	4.5	0.0	1.0	0.0	3.2
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	1340	0	0	0	1332
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1822	0	0	0	1832
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	10.6	0.0	0.0	0.0	10.6
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	7.4	0.0	0.0	0.0	6.1
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.6
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	0.50	0.00	1.00	0.00	0.42
Lane Grp Cap (c), veh/h	78	0	0	378	0	465	0	385
V/C Ratio (X)	0.56	0.00	0.00	0.38	0.00	0.09	0.00	0.29
Avail Cap (c_a), veh/h	154	0	0	934	0	465	0	955
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	27.3	0.0	0.0	21.5	0.0	16.3	0.0	21.1
Incr Delay (d2), s/veh	6.2	0.0	0.0	0.6	0.0	0.1	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.4	0.0	0.0	22.2	0.0	16.4	0.0	21.5
1st-Term Q (Q1), veh/ln	0.7	0.0	0.0	2.1	0.0	0.5	0.0	1.5
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.8	0.0	0.0	2.1	0.0	0.5	0.0	1.6
%ile Storage Ratio (RQ%)	0.10	0.00	0.00	0.05	0.00	0.08	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	6	0	0	8
Lane Assignment		T			T			
Lanes in Grp	0	1	0	0	2	0	0	0
Grp Vol (v), veh/h	0	684	0	0	644	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	1787	0	0	0
Q Serve Time (g_s), s	0.0	18.3	0.0	0.0	9.3	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	18.3	0.0	0.0	9.3	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	877	0	0	983	0	0	0
V/C Ratio (X)	0.00	0.78	0.00	0.00	0.66	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	1106	0	0	2150	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.2	0.0	0.0	18.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.0	0.0	0.0	19.4	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	8.9	0.0	0.0	4.6	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.6	0.0	0.0	4.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.05	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	0	14	16	0	0	18
Lane Assignment		T+R			R			
Lanes in Grp	0	1	0	0	1	0	0	0
Grp Vol (v), veh/h	0	705	0	0	61	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1836	0	0	1548	0	0	0
Q Serve Time (g_s), s	0.0	18.5	0.0	0.0	1.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	18.5	0.0	0.0	1.7	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.12	0.00	0.32	1.00	0.00	0.00	0.32
Lane Grp Cap (c), veh/h	0	902	0	0	426	0	0	0
V/C Ratio (X)	0.00	0.78	0.00	0.00	0.14	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	1136	0	0	931	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.2	0.0	0.0	15.9	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.8	0.0	0.0	0.2	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.1	0.0	0.0	16.1	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	9.2	0.0	0.0	0.7	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.9	0.0	0.0	0.7	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.17	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	5.3

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	0	5	0	1	11	0
Future Vol, veh/h	1	0	5	0	1	11	0
Conflicting Peds, #/hr	0	0	1	1	0	1	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	92	63	63	63	63	63	63
Heavy Vehicles, %	2	0	0	0	0	0	0
Mvmt Flow	1	0	8	0	2	17	0

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	-	0	0	9	0	8	5
Stage 1	-	-	-	-	-	5	-
Stage 2	-	-	-	-	-	3	-
Critical Hdwy	-	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	-	1624	-	1018	1084
Stage 1	-	-	-	-	-	1023	-
Stage 2	-	-	-	-	-	1025	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	-	-	-	1622	-	1016	1083
Mov Cap-2 Maneuver	-	-	-	-	-	1016	-
Stage 1	-	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	1024	-

Approach	EB	WB	NB
HCM Control Delay, s		0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1016	-	-	1622	-
HCM Lane V/C Ratio	0.017	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	139	200	1323	559	88
Future Volume (veh/h)	50	139	200	1323	559	88
Number	7	14	5	2	6	16
Initial Q, veh	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00	1.00	1.00			0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	55	153	220	1454	614	97
Adj No. of Lanes	1	1	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1
Opposing Right Turn Influence	Yes		Yes			
Cap, veh/h	230	206	604	2278	2278	994
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.13	0.64	0.64	0.64	0.64
Ln Grp Delay, s/veh	15.6	29.5	5.6	4.6	3.1	2.7
Ln Grp LOS	B	C	A	A	A	A
Approach Vol, veh/h	208			1674	711	
Approach Delay, s/veh	25.8			4.7	3.1	
Approach LOS	C			A	A	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Case No		6.0		9.0		7.0		
Phs Duration (G+Y+Rc), s		29.0		9.4		29.0		
Change Period (Y+Rc), s		4.5		4.5		4.5		
Max Green (Gmax), s		33.0		5.0		33.0		
Max Allow Headway (MAH), s		5.1		4.0		5.0		
Max Q Clear (g_c+I1), s		12.0		5.5		4.9		
Green Ext Time (g_e), s		12.5		0.0		4.7		
Prob of Phs Call (p_c)		1.00		0.89		1.00		
Prob of Max Out (p_x)		0.48		1.00		0.01		
Left-Turn Movement Data								
Assigned Mvmt		5		7		1		
Mvmt Sat Flow, veh/h		742		1792		0		
Through Movement Data								
Assigned Mvmt		2		4		6		
Mvmt Sat Flow, veh/h		3668		0		3668		
Right-Turn Movement Data								
Assigned Mvmt		12		14		16		
Mvmt Sat Flow, veh/h		0		1599		1559		
Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	0
Lane Assignment								

Lanes in Grp	0	1	0	1	0	0	0	0
Grp Vol (v), veh/h	0	220	0	55	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	742	0	1792	0	0	0	0
Q Serve Time (g_s), s	0.0	7.1	0.0	1.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.0	0.0	1.1	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	742	0	1792	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	24.5	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	21.6	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	24.5	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	604	0	230	0	0	0	0
V/C Ratio (X)	0.00	0.36	0.00	0.24	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	768	0	233	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	5.2	0.0	15.1	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.5	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.6	0.0	15.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.4	0.0	0.5	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.5	0.0	0.6	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.09	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	0
Lane Assignment		T				T		
Lanes in Grp	0	2	0	0	0	2	0	0
Grp Vol (v), veh/h	0	1454	0	0	0	614	0	0
Grp Sat Flow (s), veh/h/ln	0	1787	0	0	0	1787	0	0
Q Serve Time (g_s), s	0.0	9.6	0.0	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	9.6	0.0	0.0	0.0	2.9	0.0	0.0
Lane Grp Cap (c), veh/h	0	2278	0	0	0	2278	0	0
V/C Ratio (X)	0.00	0.64	0.00	0.00	0.00	0.27	0.00	0.00
Avail Cap (c_a), veh/h	0	3068	0	0	0	3068	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	4.3	0.0	0.0	0.0	3.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.6	0.0	0.0	0.0	3.1	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	4.4	0.0	0.0	0.0	1.4	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.5	0.0	0.0	0.0	1.4	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.12	0.00	0.00	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Grp	0	0	0	1	0	1	0	0
Grp Vol (v), veh/h	0	0	0	153	0	97	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	1599	0	1559	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	3.5	0.0	0.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	3.5	0.0	0.9	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	206	0	994	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.74	0.00	0.10	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	208	0	1338	0	0
Upstream Filter (I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	16.1	0.0	2.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	13.4	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	29.5	0.0	2.7	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	1.6	0.0	1.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.3	0.0	1.4	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.11	0.00	0.08	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A

F. TRAFFIC IMPACT ASSESSMENT FOR CALIFORNIA CENTRAL COAST VETERANS CEMETERY PREPARED BY KD ANDERSON & ASSOCIATES, INC.

KD Anderson & Associates, Inc.
Transportation Engineers

May 30, 2014

Mr. Chris Stabenfeldt, Senior Environmental Planner / Project Manager
ECORP CONSULTING, INC.
2525 Warren Drive
Rocklin, CA 95677

RE: TRAFFIC IMPACT ASSESSMENT FOR CALIFORNIA CENTRAL COST VETERANS CEMETERY (CCCVC) PHASE 1 PROJECT, SEASIDE, CA

Dear Mr. Stabenfeldt:

Thank you for contacting our firm regarding Phase 1 of the California Central Coast Veterans Cemetery (CCCVC) Project. This letter summarizes our focused traffic impact assessment for the project.

Overview. The CCCVC Master Plan involves development of roughly 84 acres within the former Fort Ord base in Monterey County. Phase 1 covers the westerly 16.9 acres located within the limits of the City of Seaside near the intersection of Normandy Road and Parker Flats Road, as noted in Figure 1. Phase 1 is anticipated to accommodate burials for the next 10 years. Phase 1 would include burial facilities, administration and maintenance facilities, a committal shelter for burial services, and additional elements to honor veterans, including a memorial walk, flag plaza, and ceremonial entry. Access to Phase 1 parking areas will be via a new intersection on Parker Flats Road.

PROJECT CHARACTERISTICS

The characteristics of the project have been identified in terms of activities associated with project construction, with regular operation of the project and with special events.

Trip Generation / Distribution

Construction Trip Generation. The project will be constructed over a 14 month period, with 20 to 25 construction employees on the site at various times. Typical construction equipment associated with the building trades would be transported to the site at various times depending on the nature of construction occurring at any time. On a daily basis, construction could generate 40 to 50 vehicle trips per day, with most of that activity concentrated into the beginning and ending of the work day.



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Transportation Engineers

PROJECT LOCATION

2610-19 LT 4/29/2014

California Central Coast Veteran's Cemetery Project Phase 1
Traffic Assessment Study

figure 1

Trip Generation with Regular Operation. Traffic to and from the site would also occur on a regular basis when the project is in operation, and the amount of traffic will vary from day to day.

The amount of vehicular traffic associate with the regular use of a cemetery can be estimated based on data obtained at similar facilities. The Institute of Transportation Engineers (ITE) publication, *Trip Generation Manual, 9th Edition* identifies trip generation rates for cemeteries based on acreage. As noted in Table 1, the proposed project is expected to generate 80 weekday trips (i.e., ½ inbound and ½ outbound) with three trips occurring during the typical a.m. peak commute hour and 14 trips generated during the weekday p.m. commute hour. ITE data indicates that forecasts for weekends are slightly higher, with 100 trips generated on Saturdays and 130 trips generating on Sundays.

Table 1
Trip Generation

Land Use	Quantity	Trips						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Cemetery	acre	4.73	50%	50%	0.17	50%	50%	0.84
Phase 1	16.9 acres	80	2	1	3	7	7	14

Trip Generation with Special Events. The project is expected to host special events several times during the year, and these events would attract appreciable numbers of people to the site. Events would be expected to occur on Memorial Day, Veterans Day, and Independence Day, and an average of approximately 1,000 visitors per event are expected. Special events would generate an appreciable number of vehicle trips, and assuming typical vehicle occupancy rates achieved for public events (i.e., 2.5 persons per vehicle) 800 daily trips (i.e., ½ inbound and ½ outbound) could occur. The project description notes that these special events would be organized by the local community, and off-site parking with shuttle service would be required. During major events, off-site parking within the former Fort Ord property would be utilized to accommodate the increased parking demand. Shuttle service would be provided to the project site.

Trip Distribution. The project would be expected to attract visitors from counties within a 75-mile radius, ranging from the San Francisco Bay Area to San Luis Obispo. As a result, State Route 1 and its interchange at Lightfighter Drive, General Jim Road, Gigling Road, Parker Flats Road and Normandy Road are the likely routes to the site.

Road Improvements. Road frontage improvements, including drain and gutter installation, would be constructed on the south side of Parker Flats Road adjacent to the project site. The road frontage improvements would extend west from the proposed main entrance to the northwestern corner of the project site, near the Normandy Road and Parker Flats Cut-Off intersection.

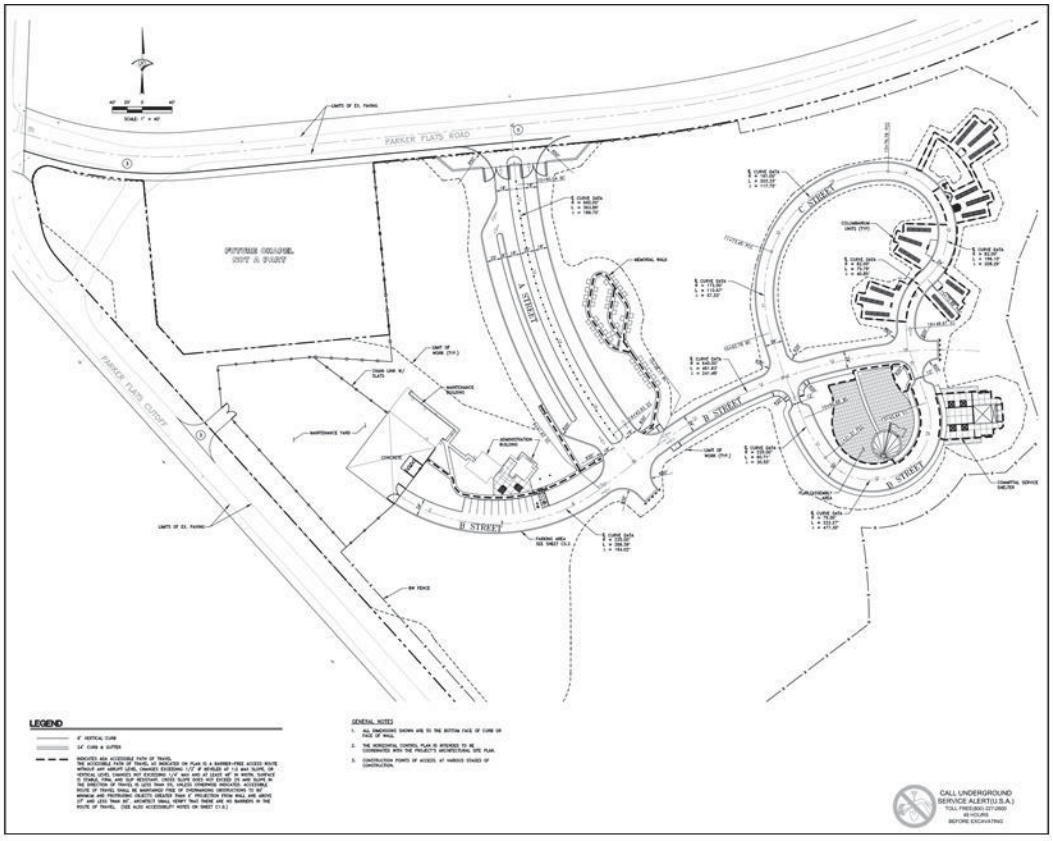
On-site Circulation and Parking. As noted in Figure 2, the main entry street from Parker Flats Road, 'A' Street, is proposed as a one-lane (18 feet wide) roadway in each direction with a center median. The west side of 'A' Street includes a two-lane cortege assembly, which could accommodate up to 30 vehicles. 'B' Street would be the access road that would lead to the columbarium, committal shelter, and flag/assembly areas. B Street would consist of a 28-foot wide-two lane roadway with parking allowed on one side. 'C' Street is the loop road that would serve the columbarium area. 'C' Street would consist of a 30-foot wide-one lane (one-way) roadway which could accommodate up to 60 vehicles on one side. 'D' Street is the loop road that would serve the committal shelter and flag/assembly areas. It would consist of a 30-foot-wide one-lane (one way) roadway, which could accommodate 30 vehicles (15 vehicles on each side).

The visitor/employee parking area for the administration and maintenance complex would include 10 standard parking spaces and one accessible parking space, in addition to providing access to the maintenance yard.

The total number of parking spaces available on-site along planned streets and in designated parking areas totals 131 spaces.

The maintenance yard would have secondary access via Parker Flats Cut-Off, which would normally be utilized for large delivery vehicles only. The secondary access would also serve as an Emergency Vehicle Access for the project site.

Sidewalks would be provided between the visitor/employee parking and cortege assembly areas and the administration and maintenance buildings. Sidewalks would also be constructed along 'B' Street to connect the administration building to the memorial walk, flag/assembly area, and committal shelter area.



SITE PLAN

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2610-19 LT 4/29/2014

California Central Coast Veteran's Cemetery Project Phase 1
Traffic Assessment Study

figure 2

ENVIRONMENTAL SETTING

Existing Roadway Network

The project would be developed adjoining local streets that in turn link the site with the arterial street network in the northern Seaside area.

State Route 1 (SR 1). SR 1 is a north-south state highway within Monterey County, providing access to Santa Cruz County to the north and San Luis Obispo County to the south. In the general area of the proposed project SR 1 varies from a four-lane to six-lane freeway with a posted speed limit of 65 miles per hour (mph). The most recent data published by Caltrans indicates the highway carries an Average Annual Daily Traffic (AADT) volume for 70,000 vehicles per day south of the Fremont Blvd – Del Monte Blvd interchange and 82,000 AADT south of the main Fort Ord interchange.

Lightfighter Drive. Lightfighter Drive is a four-lane, divided arterial that originates at an interchange on SR 1 and continues easterly across General Jim Moore Blvd to Colonel Durham Street. No bike facilities are provided on Lightfighter Drive, however sidewalk is provided on both sides of the roadway. The posted speed limit is 35 mph.

General Jim Moore Boulevard. General Jim Moore Boulevard is a two-lane, undivided arterial roadway, running north-south from Divarty Street south to Lightfighter Road. South of Lightfighter Road the route widens to a four-lane, divided arterial to SR-218. A Class I and Class II bike facility are provided on the northbound and southbound sides respectively from Normandy Road to Eucalyptus Road. A Class II bike facility is provided from Normandy Road to S Boundary Road in both directions. The posted speed limit is 35 mph.

Available information from the Transportation Planning Agency for Monterey County (TAMC) indicates that in the peak month (August) General Jim Moore Blvd carries a daily traffic volume of 6,217 vehicles per day between Coe Avenue and McClure Avenue and 8,873 vehicles per day between Lightfighter Drive and Gigling Road.

Gigling Road. Gigling Road is a two-lane, undivided arterial, running east-west from Noumea Road across General Jim Moore Blvd to 8th Avenue. No bike facilities are provided on Gigling Road, however sidewalks are provided intermittently on one or both sides of the road. The posted speed limit is 35 mph. Gigling Road currently carries 5,500 to 5,650 ADT in the area between General Jim Moore Blvd and Parker Flats Road.

Parker Flats Road. Parker Flats Road is a two-lane, local roadway, running north-south from Colonel Durham Street to its current terminus south of Normandy Road. Neither sidewalks nor bicycle facilities are provided along Parker Flats Road.

Normandy Road. Normandy Road is a two-lane, local roadway that runs east-west from the area west of Monterey Road across General Jim Moore Blvd to Parker Flats Road. Sidewalks are provided on the north side of Normandy Road from General Jim Moore Blvd to a point just west of Park Flats Road. Bicycle facilities are not provided. Normandy Road provides access to a Monterey Peninsula Unified School District (MPUSD) school, George C. Marshall E.S. which is located on the south side of the street just east of General Jim Moore Blvd and a charter school, Chartwell E.S. which is located south of Normandy Road off of Numa Watson Road. MPUSD schools begin at 8:00 a.m. and dismiss at 2:25 p.m. (noon on Wednesdays). All-way stop controls and school zone crosswalks have been installed at four intersections on Normandy Road between General Jim Moore Blvd and Parker Flats Road, including three locations in the ¼ mile segment along the George C. Marshall E.S. frontage. The posted speed limit is 25 mph on Normandy Road.

Parker Flats Cut-off Road. Parker Flats Cut-off Road is a local two-lane street that runs south from Normandy Road to Eucalyptus Road. Access to Parker Flats Cut-off Road is gated at each end to prohibit public access.

Eucalyptus Road. Eucalyptus Road is an east-west facility south of the project area that extends east from the General Jim Moore Blvd / Coe Avenue intersection for roughly 5 miles through the southern Fort Ord area. The first 1½ miles is an improved road with class 2 bicycle lanes and sidewalks. This section ends just west of the Parker Flats Cut-off Road intersection and the balance of the roadway has two travel lanes but no sidewalks or bicycle lanes. Future circulation plans noted in the Fort Ord Re-Use Master Plan indicate that the Eastside Parkway will extend the improved section northerly through the area east of the proposed project.

Transit Service

The Monterey-Salinas Transit (MST) agency currently provides regular transit service throughout Monterey County and in the general vicinity of the project site. Two standard transit routes and one specialized transit route (e.g. paratransit) currently provide transit services in this area. Route 12 connects the Dunes Shopping Center / CSUMB with the City of Monterey and travels in a circuitous route along Gigling Road, 8th Avenue, Colonel Durham Street, and 6th Avenue. Route 12 operates on weekdays only and includes eight daily runs between 7:00 to 9:30 a.m. and 12:45 to 5:00 p.m. Route 74 provides transit service between the City of Monterey, CSUMB and the Toro Park Community and travels along Gigling Road, 7th Avenue, and Inter- Garrison Road. Route 74 operates on weekdays only and includes two runs between 6:00 and 8:00 a.m. and two runs from 4:15 to 6:00 p.m. There are no bus stops directly adjacent to the project site. The nearest bus stop is located on Gigling Road between Parker Flats Road and 6th Avenue.

Traffic Operational Analysis

Methodology. Quantitative Level of Service (LOS) analysis was performed for study area roadway segments based on the methodologies contained in the *2000 Highway Capacity Manual (2000 HCM)* published by the Transportation Research Board. LOS analysis is used to identify the relative delay experienced by motorists. A grading scale of LOS "A" to LOS "F" is used to describe the quality of traffic flow, with LOS A representing free-flowing and LOS F indicative of appreciable congestion and near gridlock conditions.

Existing Traffic Operations. The quality of traffic flow in urban areas is typically governed by the operation of key signalized intersections. In the area of the proposed project two signalized intersections on General Jim Moore Blvd are the key locations on routes to the project:

General Jim Moore Blvd / Gigling Road
General Jim Moore Blvd / Normandy Road

Information regarding current traffic volumes at these intersections was obtained from the City of Seaside (attached). These locations operate at LOS B-C during peak traffic hours, which satisfies the City of Seaside's minimum LOS C standard during both the a.m. and p.m. peak hour. However, as with any location providing primary access to schools, the General Jim Moore Blvd / Normandy Road intersection does experience short periods of congestion during the periods immediately before and after the school day.

REGULATORY BACKGROUND

California Department of Transportation (Caltrans)

Caltrans has jurisdiction over SR 1 and the balance of the state highway system. According to the Caltrans' *Guide for the Preparation* of *Traffic Impact Studies* (Caltrans, 2002), Caltrans aims to maintain a target Level of Service (LOS) at the transition between C and D on state highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the Lead Agency consult with Caltrans to determine the appropriate target LOS. If an existing state highway facility is operating below the appropriate target LOS, the existing LOS should be maintained.

Caltrans' *Transportation Concept Report for State Route 1 in District 5* (TCR; California Department of Transportation 2006) identifies long-range improvements and establishes the concept (desired) LOS for specific corridor segments. The report identifies long- range improvements needed to bring an existing facility up to expected standards needed to adequately serve 20-year traffic forecasts. Additionally, it identifies the ultimate design concept for

conditions beyond the immediate 20-year design period. The TCR establishes LOS D as the acceptable threshold for SR- 1 in Monterey County.

Transportation Agency for Monterey County (TAMC)

TAMC's *2010 Monterey County Regional Transportation Plan* (RTP) provide a basis for the planning and programming of local, state, and federal transportation funds to transportation projects in Monterey County. The *RTP* identifies existing and future transportation related needs, considers all modes of travel, and identifies what can be completed with anticipated available funding for projects and programs. The Regional Transportation Plan was prepared in consultation with FORA, and it reflects FORA's programs and transportation priorities within the former Fort Ord.

One objective of the RTP is to "design facilities included in TAMC's expenditure plan program of regional transportation projects to operate at LOS C, achieve at least LOS D on the regional roadway network by 2020, and maintain at least LOS D on regional roadways thereafter." The RTP also introduces the Regional Development Impact Fee Program (Fee Program), which applies to development project throughout the county based on their impact on the regional transportation system.

The *Regional Impact Fee Nexus Study Update* (Transportation Agency for Monterey County 2008), outlines a development fee program for Monterey County.

TAMC's *Regional Transportation Improvement Program* (RTIP) is a 4-year program of transportation projects for Monterey County that includes federally funded transportation projects, and projects nominated for inclusion in the State Transportation Improvement Program (STIP). The RTIP is adopted by TAMC and is submitted to Caltrans and the California Transportation Commission by December 15 of every odd year. Projects in the RTIP must be consistent with the adopted RTP to be programmed into the STIP.

Fort Ord Re-use Authority

The Fort Ord Reuse Plan was adopted in June 1997. The following transportation policies are applicable to the proposed project.

Streets and Roads

- **Objective A:** An efficient regional network of roadways that provides access to the former Fort Ord.

- **Streets and Roads Policy A-1:** Fort Ord Reuse Authority (FORA) and each jurisdiction with lands at former Fort Ord shall coordinate with and assist TAMC in providing

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funding for an efficient regional transportation network to access former Fort Ord and implement FORA's Development and Resource Management Plan (DRMP).

- **Program A-1.1:** Each jurisdiction through FORA's DRMP, shall fund its "fair share" of "on-site," "off-site" and "regional" roadway improvements based on the nexus analysis of the TAMC regional transportation model. The nexus is described in the Public Facilities Improvement Plan, Volume 3 of the Reuse Plan, as amended from time to time. The nexus has been updated to reflect TAMC's re-prioritizing of improvements in the network and is reported in the *Fort Ord Regional Transportation Study,* prepared by TAMC, January 6, 1997.

- **Program A-1.2:** FORA will retain the flexibility to build roadway improvements to the "on-site" and "off-site" network, as described in the Reuse Plan to serve development activities at the former Fort Ord. FORA will participate in reimbursement programs to recover expenses beyond Fort Ord's fair share when alternative programs for financing roadway and transit improvements are established.

- **Program A-1.3:** Each jurisdiction, through FORA's DRMP shall participate in a regional transportation financing mechanism if adopted by TAMC, as provided in 3.1 I .5.3(a) of the DRMP. If not, FORA will collect and contribute Fort Ord's "fair share" to construction of a roadway arterial network in and around the former Fort Ord. FORA's participation in the regional improvements program constitutes mitigation of FORA's share of cumulative impacts.

- **Program A-1.4:** In order for FORA to monitor the transportation improvements and to prevent development from exceeding FORA's level of service standards, each jurisdiction shall annually provide information to TAMC and FORA on approved projects and building permits within their jurisdiction (both on the former Fort Ord and outside the former base), including traffic model runs, traffic reports, and environmental documents.

- **Objective B:** Provide direct and efficient linkages from former Fort Ord lands to the regional transportation system.

- **Streets and Roads Policy B-1:** FORA and each jurisdiction with lands at former Fort Ord shall design all major arterials within former Fort Ord to have direct connections to the regional network (or to another major arterial that has a direct connection to the regional network) consistent with the Reuse Plan circulation framework.

- **Program B-1.1:** Each jurisdiction shall coordinate with FORA to design and provide an efficient system of arterials consistent with Figures 4.2-2 (in the 2015 scenario) and Figure 4.2-3 (in the buildout scenario) in order to connect to the regional transportation network.

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- **Program B-1.2:** Each jurisdiction shall identify and coordinate with FORA to designate local truck routes to have direct access to regional and national truck routes and to provide adequate movement of goods into and out of former Fort Ord.

- **Objective C:** Provide a safe and efficient street system at the former Fort Ord.

- **Streets and Roads Policy C-1:** Each jurisdiction shall identify the functional purpose of all roadways and design the street system in conformance with Reuse Plan design standards.

- **Program C-1.1:** Each jurisdiction shall assign classifications (arterial, collector, local) for each street and design and construct roadways in conformance with the standards provided by the Reuse Plan (Table 4.2-4 and Figure 4.2-4).

- **Program C-1.2:** Each jurisdiction shall preserve sufficient right-of-way for anticipated future travel demands based on buildout of the FORA Reuse Plan.

- **Program C-1.3:** Each jurisdiction shall assign an appropriate threshold performance standard for its roadway system in order to measure the impacts of future growth on the system.

- **Program C-1.4:** Each jurisdiction shall design and construct the roadway network consistent with the phasing program identified in the Fort Ord Business and Operations Plan (Appendix B of the Reuse Plan).

- **Program C-1.5:** Each jurisdiction shall designate arterials and roadways in commercially zoned areas as truck routes.

- **Streets and Roads Policy C-2:** Each jurisdiction shall provide improvements to the roadway network to address high accident locations.

- **Program C-2.1:** Each jurisdiction shall collect accident data, identify and assess potential remedies at high accident locations and implement improvements to lower the identified high accident rates.

- **Objective D:** Provide an adequate supply of on-street parking.

- **Streets and Roads Policy D-1**: Each jurisdiction shall provide a program of on-street parking.

- **Program D-1.1:** Each jurisdiction shall provide on-street parking, as appropriate, with design and construction of all urban roadways.

- **Program D-1.2:** Each jurisdiction shall provide adequate parking in urban areas for persons with disabilities, either as on-street parking on urban roadways or as on-site parking.

- **Program D-1.3:** Each jurisdiction shall evaluate all new development proposals for the need to provide on-street parking as a part of the overall on-street parking program.

Transit Policies and Programs

- **Objective A:** Provide convenient and comprehensive bus service.

- **Transit Policy A-1:** Each jurisdiction with lands at former Fort Ord shall coordinate with MST to provide regional bus service and facilities to serve the key activity centers and key corridors within former Fort Ord.

- **Program A-1.1:** Each jurisdiction shall identify key activity centers and key corridors, coordinate with MST to identify bus routes that could serve former Fort Ord and support MST to provide service responsive to the local needs.

- **Program A-1.2:** Each jurisdiction shall develop a program to identify locations for bus facilities, including shelters and turnouts. These facilities shall be funded and constructed through new development and/or other programs in order to support convenient and comprehensive bus service.

- **Objective B:** Promote passenger rail service that addresses transportation needs for the former Fort Ord.

- **Transit Policy B-1:** Each jurisdiction shall support TAMC and other agencies to provide passenger rail service that addresses transportation needs for former Fort Ord.

- **Objective C:** Promote intermodal connections that address the transportation needs for the former Fort Ord.

- **Transit Policy C-1:** Each jurisdiction shall support the establishment of intermodal centers and connections that address the transportation needs at former Fort Ord.

- **Program C-1.1:** Each jurisdiction shall coordinate with and support TAMC and MST to identify the need, location, and physical design of inter-modal centers and regional and local transportation routes to connect with the inter-modal centers.

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Pedestrians and Bicycles Policies and Programs

- **Objective A:** Provide a pedestrian system that supports the needs of Fort Ord residents, employees, students, and visitors.

- **Pedestrian and Bicycles Policy A-1:** Each jurisdiction shall provide and maintain an attractive, safe and comprehensive pedestrian system.

- **Program A-1.1:** Each land use jurisdiction shall prepare a Pedestrian System Plan that includes the construction of sidewalks along both sides of urban roadways, sidewalks and pedestrian walkways in all new developments and public facilities, crosswalks at all signalized intersections and other major intersections, where warranted, and school safety features . This plan shall be coordinated with adjacent land use jurisdictions, FORA, and appropriate school entities.

- **Objective B:** Provide a bicycle system that supports the needs of Fort Ord residents, employees, students, and visitors.

- **Pedestrian and Bicycles Policy B-1:** Each jurisdiction shall provide and maintain an attractive, safe and comprehensive bicycle system.

- **Program B-1.2:** Each jurisdiction shall review new development to provide bicycle system facilities consistent with the Reuse Plan and the Bicycle System Plan concurrently with development approval.

Transportation Demand Management

- **Objective A:** Deemphasize the need for vehicle travel to and within the former Fort Ord.

- **Transportation Demand Management Policy A-1**: TDM programs shall be encouraged.

- **Program A-1.1:** Promote TDM programs at work sites. Specific measures that can be pursued at the work site include: compressed work weeks, staggered/flexible work hours, telecommuting, on-site ridesharing, public transit subsidies, guaranteed ride home, bicycle facilities, and parking pricing.

- **Program A-1.2:** Promote TDM programs in residential developments, retail centers, and other activity centers.

- **Program A-1.3:** Require new development to incorporate design features that will strengthen TDM programs.

- **Program A-1.4:** Enforce CMP trip reduction programs.

Land Use and Transportation Policies and Programs

- **Objective A:** A transportation system that supports the planned land use development patterns.

- **Land Use and Transportation Policy A.1:** Each jurisdiction with lands at former Fort Ord shall coordinate land use and transportation planning both internally and with adjacent jurisdictions consistent with the Reuse Plan circulation framework.

- **Program A-1.2:** Each jurisdiction with lands at former Fort Ord shall require new developments to conduct a traffic analysis to determine impacts on traffic conditions require measures such as TDM programs and traffic impact fees to mitigate these impacts.

- **Land Use and Transportation Policy A.2:** The transportation system to serve former Fort Ord lands shall be designed to reflect the needs of surrounding land uses, proposed densities of development, and shall include streets, pedestrian access, bikeways and landscaping as appropriate.

- **Program A.2-1:** Each jurisdiction with lands at former Fort Ord shall develop transportation standards for implementation of the transportation system, including but not limited to, rights-of-way widths, roadway capacity needs, design speeds, safety requirements, etc. Pedestrian and bicycle access shall be considered for all incorporation in all roadway designs.

Monterey County

The Circulation Element of the *2010 Monterey County General Plan* (County of Monterey, 2010) provides policy direction for the transportation systems that serve the unincorporated lands of Monterey County and describes how the County intends to serve transportation needs for the next 20 years as its population grows. According to Policy C-1.1, the acceptable LOS for county roads and intersections will be LOS D, except as follows:

a. Acceptable level of service for County roads in Community Areas may be reduced below LOS D through the Community Plan process.

b. County roads operating at LOS D or below at the time of adopting this General Plan shall not be allowed to be degraded further except in Community Areas where a lower LOS may be approved through the Community Plan process.

c. Area Plans and Land Use Plans may establish an acceptable Level of Service for County roads other than LOS D. The benefits which justify less than LOS D shall be identified in the Area Plan. Where an Area Plan does not establish a separate LOS, the standard LOS D shall apply."

Policy C-1.8 states that "the County, in consultation with TAMC and Monterey County cities, shall, within 18 months of adoption of the General Plan, develop a County Traffic Impact Fee that addresses impacts of development in cities and unincorporated areas on major County roads. From the time of adoption of the General Plan until the time of adoption of a County Traffic Impact Fee, the County shall impose an ad hoc fee on its applicants based upon a fair share traffic impact fee study." This County Traffic Impact Fee program has not been adopted yet.

City of Seaside General Plan

The City of Seaside General Plan was adopted in August 2003. The Circulation Element includes the vision for the buildout of the City including roadway classifications, bicycle and pedestrian treatments and access to transit. The following transportation policies are applicable to the proposed project.

Circulation Element

Goal C-1: Provide and maintain a City circulation system that promotes safety and satisfies the demand created by new development and redevelopment in Seaside.

Policy C-1.1: Design roadway capacities and ensure transportation facilities that adequately serve planned land uses.

Policy C-1.2: Improve the Seaside circulation system in concert with public and private land development and redevelopment projects to maintain the City standard of Level of 933 Service "C".

Implementation Plan C-1.2.1 Traffic Studies and Impact Assessments. Review development proposals for potential impacts to the transportation system. Require a traffic study for projects that generate 100 or more peak hour trips or that have the potential to impact adjacent roadway segments and intersections. The Level of Service Standards established in the Circulation Element will be used to determine the significance of impacts. Intersection level of service will be determined by the Vehicle Delay and the Highway Capacity Manual calculations. Mitigation in the form of physical

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improvements and/or impact fees will be required for significant impacts. Adequate right-of-way along new roadways will be required to permit pedestrian and bicycle facilities. Proper roadway drainage must be provided to ensure a safe system. The Seaside Public Works Director, upon consultation with the California Department of Transportation, may require a traffic study for a project that generates additional trips on the State highway or Congestion Management Plan (CMP) system.

Implementation Plan C-1.2.2 Transportation Financing and Traffic Fee Ordinance. Identify available funding sources and establish a financing plan to guide construction and funding of transportation system improvements. Require new development projects to construct and/or fund in whole or in part necessary traffic improvements associated with the proposed project. Transportation improvements should include both automotive, as well as alternative means of transportation. Consider adopting a Traffic Fee Ordinance to reflect projected circulation needs and apply the ordinance to applicable developments. Consider including alternative modes of transportation (bicycle and pedestrian) and public parking as projects eligible for use of Traffic Impact Fees. Consider the improvements identified in the City of Seaside General Plan Traffic Study (Higgins Associates 2003) when developing the Traffic Fee Ordinance.

Policy C-1.3: Coordinate improvements to and maintenance of the City circulation system with other major transportation and infrastructure improvement programs.

Implementation Plan C-1.3.1 During development of the CIP and prior to implementation of any major transportation project, coordinate with Caltrans, TAMC, MST, water and sewer service providers, the fire department, and developers to ensure all major infrastructure improvements are constructed efficiently and simultaneously, with as little delay and traffic and environmental disruption as possible.

Policy C-1.4: Provide adequate access to the University, golf courses, and other uses in North Seaside.

Implementation Plan C-1.4.1 North Seaside Transportation Improvements. Require public and private development projects to install or pay their fair share of the improvements in North Seaside identified on Figure C-4 and Table C-1. Major improvements (per Figure C-4 and Table C-1) that will improve access in North Seaside include:

- A-7: SR-1 /Fremont Boulevard Interchange
- A-8: Fremont Boulevard/Del Monte Boulevard/Military Avenue
- A-9: General Jim Moore Boulevard/ Coe Avenue-Eucalyptus Road
- A-13: 1st Avenue/Lightfighter Drive
- A-14: 2nd Avenue/Lightfighter Drive

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- A-15: 2nd Avenue/Campus Soccer Field Driveway
- A-16: 2nd Avenue/ 1st Street
- B-4: Lightfighter Drive
- B-5: Second Avenue north of Lightfighter Drive
- B-6: Gigling Road
- B-7: Eucalyptus Road
- D-1: SR-1 from SR-218 to Fremont Boulevard
- D-2: 8th Street

Policy C-1.5: Use traffic calming methods within residential and mixed use areas where necessary to create a pedestrian-friendly circulation system.

> Implementation Plan C-1.5.1 Pedestrian-Friendly Circulation. Implement pedestrian friendly traffic improvements and development projects such as the Broadway Avenue Improvement Plan and Pedestrian Improvement C-1 as identified on Figure C-4 and Table C-1 of this Element.

Policy C-1.6: Apply creative approaches to increase safety and reduce congestion in areas with unique problems, such as: neighborhoods with narrow, one-way streets; areas around schools; neighborhoods with non-essential alleys, businesses with drive-through access; and other special situations.

Policy C-1.7: Reduce impacts on residential neighborhoods from truck traffic and related noise.

Goal C-2: Provide a local circulation system that is integrated with the larger regional transportation system to ensure the economic well-being of the community.

Policy C-2.2: Support programs that help reduce congestion and encourage alternative modes of transportation.

Policy C-3.1: Support the provision and expansion of regional transit services and support facilities to serve the City.

> Implementation Plan C-3.1.1 Improved Bus Service. Work with MST to enhance transit service and encourage ridership through the following actions:

- Encourage MST to improve existing transit service by providing more bus stop locations and more frequent stops
- Coordinate with MST to expand transit routes to North Seaside
- Work with MST to identify and receive additional funding sources for expanded transit services.

Policy C-3.3: Promote mixed use, higher density residential, and employment-generating development in areas where public transit is convenient and desirable.

> Implementation Plan 3.3.1 Transit-Oriented Development. Through the Specific Plan process, encourage transit-oriented development in the Gigling Specific Plan area (near CSUMB), the Broadway Corridor, the North and South Gateways, and other appropriate areas.

Policy C-3.4: Support alternative modes of transportation that encourage physical activity, such as biking and walking.

Policy C-4.1: Require off-street parking in new development and redevelopment projects.

> Implementation Plan C-4.1.1 Zoning Ordinance Parking Requirements. Require all public and private projects to provide adequate parking facilities and meet the parking standards contained within the Zoning Ordinance.

Policy C-4.2: Support the development of well-designed and aesthetically pleasing parking facilities in areas where current parking deficiencies exist or where substantial traffic-generating uses are planned.

Policy C-4.3: Ensure well-landscaped parking lots that facilitate pedestrian movement and screen unattractive structures.

> Implementation Plan C-4.3.1 Parking Lot Landscaping Standards. Require parking areas that facing streets or adjoining properties to be landscaped per specific requirements in the Zoning Ordinance and/or through the Specific Plan process.

Mitigation Fee Programs

There are development impact fee programs applicable to the proposed project.

Fort Ord Reuse Authority (FORA)

FORA collects development impact fees on projects built within the former Fort Ord. The fees provide funding for various traffic infrastructure improvements, both on the former army base and regionally. Payment of the impact fees would mitigate the proposed project's share of impacts on regional roadways within the former Fort Ord. Examples of former Fort Ord roadways that would have improvements funded by the FORA fee include General Jim Moore Boulevard and South Boundary Road. Payment of the fees would also mitigate the project's cumulative impacts towards regional improvements, such as SR 1, SR 68 and SR 156. The

FORA project list and fee schedule were updated based on a 2005 nexus study. The following current FORA capital improvement program projects are located near the project site:

Fully Funded Improvements:

- Widening of Davis Road from two to four lanes between Reservation Road and Blanco Road, including reconstruction of the existing bridge over the Salinas River;
- Widening of Reservation Road from two to four lanes between the East Garrison development and Davis Road;
- Widening Inter-Garrison Road from two to four lanes between the future Eastside Parkway and Reservation Road;
- Widening Gigling Road from two to four lanes between General Jim Moore Boulevard and the future Eastside Parkway;
- Construct Eastside Parkway between Eucalyptus Road and Inter-Garrison Road; and

It should be recognized that the FORA capital improvement program focuses on improvements to the higher order access and mobility routes as listed above. The specific local network improvements will be identified with each of the FORA project developments. The FORA capital improvement program also contributes some money towards, but does not fully fund, other regional improvements, specifically the following:

Partially Funded Improvements:

- Widening of SR 1 to three lanes in each direction between Fremont Boulevard and Del Monte Avenue in Seaside/Sand City;
- Construction of the SR 1 /Monterey Road interchange, to be located between the Light Fighter Drive and Fremont Boulevard interchanges;
- State Route 68 improvements at the intersections of Laureles Grade, San Benancio Road, and Corral De Tierra Road, including left turn lanes and signal timing improvements; and State Route 156 widening to a four-lane freeway and construction of new interchanges.

<u>TAMC / Monterey County</u>

TAMC established a development impact fee in August 2008. Through agreement between TAMC and FORA, development projects that are subject to the FORA transportation fee are exempt from the T AMC development impact fee because the FORA fee covers regional impacts outside Fort Ord (TAMC 2009). Monterey County does not have a separate traffic impact fee.

City of Seaside

The City of Seaside does not have a traffic impact fee. Any necessary monetary contributions towards impacts in the City of Seaside would involve fair-share payments towards the implementation of necessary improvements.

Caltrans

Caltrans does not have a traffic impact fee. Any necessary monetary contributions towards impacts to the state highway system would need to go through another funding mechanism, such as FORA. Impacted roadway facilities not covered by any fee program may be subject to a fair-share contribution towards needed improvements

PROJECT IMPACTS

The impacts of the proposed project have been assessed based on Level of Service and safety.

Construction Activities

Construction Truck Traffic. The project could generate construction trucks on the routes to and from the site. While the number of trucks would not have an appreciable effect on the quality of traffic flow on surrounding streets, adding trucks to Normandy Road could create safety conflicts between school age pedestrians and motor vehicles. Truck noise could be an issue due to the presence of several all-way stops adjoining the school. These issues could be addressed by directing contractors to use other streets for construction truck traffic, particularly during school hours.

Regular Operations

Level of Service. The project may add 3 to 14 peak hour trips to the circulation system proving access to the site. This traffic contribution would be too small to have a measurable impact on the operation of signalized intersections. Thus, the project's impacts are not significant from the standpoint of minimum Level of Service standards.

Safety. The project could add a small amount of traffic to Normandy Road during times when students are traveling to and from school. Project trips could incremental contribute to before and after school congestion, and increased conflicts between school age pedestrians and motor vehicles is a potential safety impact.

Measures to address this issue include:

1. Identifying and publicizing preferred routes to the project which do not make use of Normandy Road between General Jim Moore Blvd and Parker Flats Road;
2. Scheduling internment activities at times avoid automobile travel during the periods before and after the school day.

Special Events

Traffic. Trips would be attracted to the site by special events a few times each year. Travel to and from the site would be spread throughout the day, but there would be peak traffic periods immediately before and after scheduled events. Special events would likely occur on holidays or weekends when background traffic volumes are lower than on typical weekdays. Because special event traffic only occurs occasionally each year, traffic impacts associated with special events are not significant.

Parking. Special events will attract an appreciable number of vehicles to the site that will need to be parked. Assuming that all attendees were at the site at one time, a 1,000 person event could create a demand for 400 parking spaces. This demand would clearly exceed the capacity of on-site parking facilities, and would result in overflow parking onto adjoining streets and to other areas of Fort Ord.

As noted in the project description, accommodating special events will require a management strategy that makes use of parking resources that are already available at Fort Ord. Paved parking is prevalent in existing paved areas off of Gigling Road north and east of the site. Because of the distances involved and the age of most attendees, a system of shuttle vehicles will be needed to transport attendees to the project site, and a transportation management plan will need to be implemented to direct motorists to the identified parking facilities.

CUMULATIVE IMPACTS

Cumulative traffic impacts would consider the ramifications of completion of the balance of the Veterans Cemetery project, other development under the Fort Ord Re-use plan, background traffic growth and the completion of regional circulation system improvements.

Balance of the Veterans Cemetery Project

The Veterans Cemetery would continue to expand in the future after the current project is filled and new are used for internment. The amount of vehicular traffic associated with day to day internment activities would not be appreciably different, but a large facility could incrementally attract a greater number of visitors. However, the relative traffic impacts and mitigation requirements for the Veterans Cemetery at full build out would not be appreciably different from those associated with the proposed phase 1.

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Regional Circulation System Improvements

Regional Highway Improvements:

- SR-1: Widen from 4 lanes to 6 lanes in Seaside and Sand City between Fremont Avenue and Del Monte Interchanges (TAMC RTP, FORA CIP)
- SR-1 / Imjin Parkway Interchange: Reconstruct the interchange. (TAMC RTP, FORA CIP)
- SR- 1 / Monterey Road Interchange: Construct a new interchange at Monterey Road (TAMC RTP, FORA CIP)
- SR-156: Widen from 2 lanes to 4 lanes and upgrade the highway to freeway status with appropriate interchanges modifications as needed between SR-156 in 48 Castroville to US-101 in Prunedale. (TAMC RTP, FORA CIP)
- Multi-Modal Corridor: Construct new 11.5 mile multimodal corridor between the City of Marina and Salinas along 9th Street, 5th Avenue, Inter-Garrison Road, Reservation, and Davis Road. The corridor will include dedicated BRT lanes, bike lanes, wide sidewalks, and with connections to the Salinas Transit Center and a new Marina Transit Center on the east side of SR-1 and the 9th Street Bridge within the future Marina Dunes project area. (TAMC RTP)
- Davis Road: Widen from 2 lanes to 4 lanes from Blanco Road to Reservation Road (TAMC RTP, FORA CIP)
- Reservation Road: Widen from 2 lanes to 4 lanes between East Garrison Road and Davis Road (TAMC RTP, FORA CIP)

FORA Fort Ord Roadway Segment Improvements (funding through FORA fee program):

- Inter-Garrison Road: Widen from 2 lanes to 4 lanes between Eastside Parkway and Reservation Road.
- Eastside Parkway: Construct new 4 lane arterial between Inter-Garrison Road and General Jim Moore Boulevard.
- Davis Road: Widen from 2 lanes to 4 lanes between Blanco Road and Reservation Road.
- Gigling Road: Widen from 2 lanes to 4 lanes between Eastside Parkway and General Jim Moore Boulevard.

Future Traffic Volumes Conditions

The Transportation Agency for Monterey County (TAMC) maintains a regional travel demand forecasting model that is be best available source of information regarding long term traffic conditions in the area of the project. TAMC is in the process of updating the traffic model, but preliminary information regarding long term traffic volumes on General Jim Moore Blvd were

made available for this assessment. According to TAMC staff, the volume of traffic on General Jim Moore Blvd is expected to be in the range of 6,500 to 7,000 vehicles per day in the area south of Gigling Road. This forecast is similar to or less than the current reported daily traffic volumes in this area. As a result, it is reasonable to conclude that long term traffic conditions at intersections on Normandy Road and General Jim Moore Blvd in the vicinity of the proposed project would be similar to those occurring today.

Thus, because cumulative traffic conditions are expected to meet minimum standards and the project contributes a negligible amount of peak hour traffic, the cumulative impact of the proposed project is not significant. The project would pay adopted impact mitigation fees which would contribute its fair share towards regional improvements.

Please feel free to contact me at (916) 660-1555 if you have any questions.

Sincerely yours,

KD Anderson & Associates, Inc.

Kenneth D. Anderson, P.E.
President

Attachments

ECORP CCCVC Ft Ord.ltr

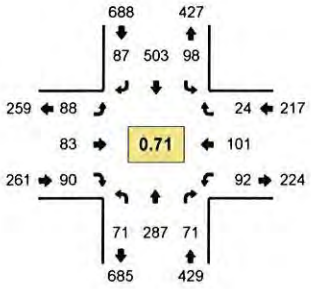
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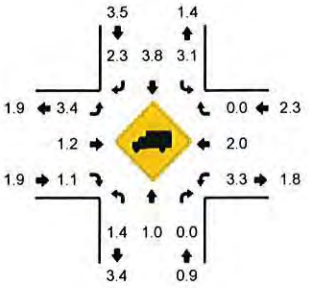
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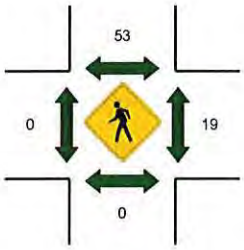
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CITY/STATE: Marina, CA

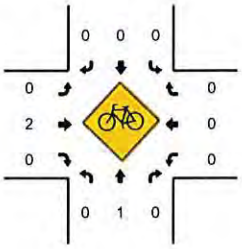
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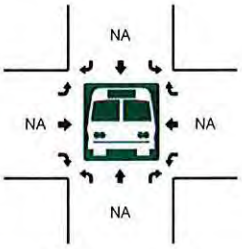
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:45 AM -- 8:00 AM











5-Min Count Period Beginning At	Gen Jim Moore Blvd (Northbound)				Gen Jim Moore Blvd (Southbound)				Normandy Rd (Eastbound)				Normandy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	10	2	0	5	12	1	0	3	1	1	0	2	1	0	0	40	
7:05 AM	3	14	1	0	1	12	1	0	1	1	1	0	0	4	2	0	41	
7:10 AM	2	12	1	0	2	14	3	0	1	0	2	0	1	2	1	0	41	
7:15 AM	0	24	1	0	8	20	5	0	4	5	2	0	3	1	0	0	73	
7:20 AM	1	15	3	0	6	22	5	1	4	1	3	0	3	0	3	0	67	
7:25 AM	3	19	3	0	5	26	5	1	7	5	4	0	5	3	3	0	89	
7:30 AM	3	11	2	0	7	39	3	0	4	7	7	0	5	3	1	0	92	
7:35 AM	1	26	10	0	3	58	4	1	5	7	2	0	5	8	3	0	133	
7:40 AM	5	22	11	0	15	59	8	2	7	10	4	0	8	7	3	0	161	
7:45 AM	2	30	8	0	9	62	5	4	7	18	8	0	15	15	5	0	188	
7:50 AM	11	53	12	0	6	53	6	8	6	7	4	0	2	18	1	0	187	
7:55 AM	16	32	11	0	7	32	14	9	13	11	8	0	10	20	3	0	186	1298
8:00 AM	10	24	3	0	3	37	16	1	13	6	12	0	11	12	1	0	149	1407
8:05 AM	10	16	1	0	1	32	6	2	9	5	17	0	17	9	2	0	127	1493
8:10 AM	4	22	2	0	2	34	8	0	11	2	20	0	9	4	1	0	119	1571
8:15 AM	3	21	4	0	4	29	10	0	5	4	4	0	4	0	0	0	88	1586
8:20 AM	3	11	4	0	8	42	2	0	1	1	0	0	1	2	1	0	76	1595
8:25 AM	6	11	1	0	3	41	6	0	4	3	7	0	1	1	2	0	86	1592
8:30 AM	3	22	2	0	0	36	4	0	2	2	3	0	3	4	0	0	81	1581
8:35 AM	3	16	2	0	5	38	5	0	8	1	5	0	3	2	0	0	88	1536
8:40 AM	4	22	0	0	2	52	3	0	3	3	4	0	2	5	0	0	100	1475
8:45 AM	2	12	2	0	0	53	6	1	5	1	6	0	1	4	0	0	93	1380
8:50 AM	2	8	2	0	2	74	4	0	1	1	3	0	5	0	2	0	104	1297
8:55 AM	2	12	3	0	1	72	8	0	2	1	1	0	4	1	2	0	109	1220

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	460	124	0	88	588	100	84	104	144	80	0	108	212	36	0	2244
Heavy Trucks	0	0	0		4	12	8		4	0	0		8	0	0		36
Pedestrians		0				168				0				40			208
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

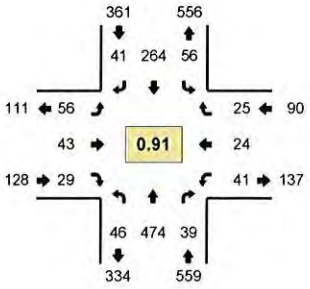
Type of peak hour being reported: Intersection Peak

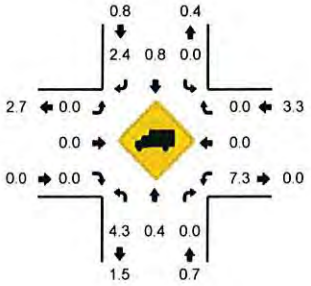
Method for determining peak hour: Total Entering Volume

LOCATION: Gen Jim Moore Blvd -- Normandy Rd
CITY/STATE: Marina, CA

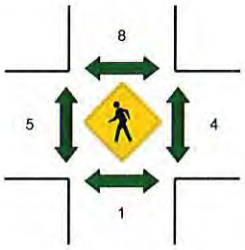
QC JOB #: 10721508
DATE: Wed, Mar 07 2012

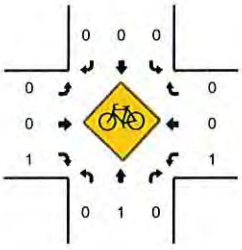
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Peak 15-Min: 5:00 PM -- 5:15 PM

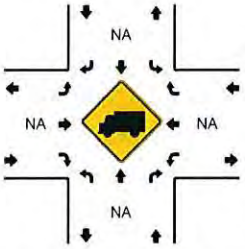


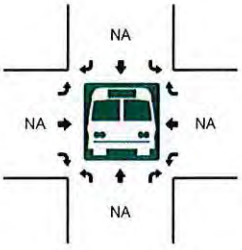


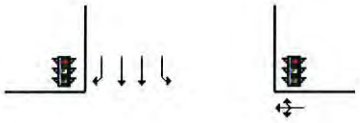
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

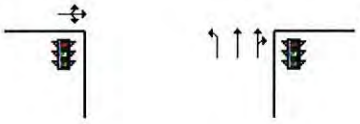












5-Min Count Period Beginning At	Gen Jim Moore Blvd (Northbound)				Gen Jim Moore Blvd (Southbound)				Normandy Rd (Eastbound)				Normandy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	24	1	0	4	24	2	0	5	0	5	0	4	0	3	0	77	
4:05 PM	6	31	5	0	3	11	4	1	3	4	4	0	3	0	6	0	81	
4:10 PM	3	31	2	0	2	24	3	0	5	0	0	0	3	5	0	0	78	
4:15 PM	2	29	3	0	3	10	4	0	1	2	2	0	2	3	1	0	62	
4:20 PM	4	30	4	0	6	21	1	0	4	2	1	0	3	4	1	0	81	
4:25 PM	2	25	1	0	2	20	4	0	5	3	5	0	2	1	5	0	75	
4:30 PM	5	19	3	0	3	14	4	1	4	2	0	0	3	2	0	0	60	
4:35 PM	2	27	1	0	3	19	4	1	4	4	4	0	7	1	4	0	81	
4:40 PM	3	31	3	0	3	29	3	0	4	4	3	0	1	0	3	0	87	
4:45 PM	3	31	6	0	7	20	4	0	7	6	1	0	2	4	3	0	94	
4:50 PM	7	33	1	0	1	22	4	0	4	3	4	0	5	2	0	0	86	
4:55 PM	3	35	6	0	3	22	4	0	6	3	4	0	9	1	1	0	97	959
5:00 PM	4	43	2	0	6	21	8	0	5	3	3	0	2	3	3	0	103	985
5:05 PM	2	44	2	0	6	21	2	0	7	3	5	0	2	4	1	0	99	1003
5:10 PM	3	58	4	0	5	25	1	0	4	2	1	0	3	3	0	0	109	1034
5:15 PM	5	41	7	0	7	22	5	0	4	3	1	0	4	2	2	0	103	1075
5:20 PM	2	39	1	0	7	15	6	0	3	2	3	0	4	2	5	0	89	1083
5:25 PM	3	41	1	0	6	16	3	0	4	6	3	0	3	1	2	0	89	1097
5:30 PM	2	39	3	0	2	26	0	0	3	5	0	0	4	1	4	0	89	1126
5:35 PM	9	39	3	0	2	25	1	1	5	3	1	0	2	1	1	0	93	1138
5:40 PM	5	27	7	0	5	16	4	0	4	0	4	0	3	3	1	0	79	1130
5:45 PM	2	39	2	0	4	16	3	1	3	2	3	0	4	2	1	0	82	1118
5:50 PM	2	23	2	0	5	12	3	0	8	0	4	0	7	2	2	0	70	1102
5:55 PM	6	24	4	0	5	13	2	0	2	11	2	0	3	1	1	0	74	1079

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	580	32	0	68	268	44	0	64	32	36	0	28	40	16	0	1244
Heavy Trucks	4	0	0		0	0	0		0	0	0		0	0	0		4
Pedestrians		4				8				4				4			20
Bicycles	0	0	0		0	0	0		0	0	0		1	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

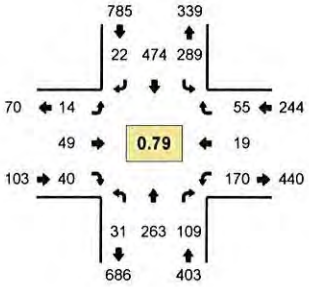
Type of peak hour being reported: Intersection Peak

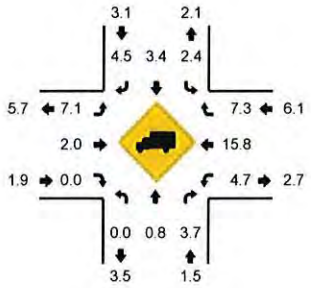
Method for determining peak hour: Total Entering Volume

LOCATION: Gen Jim Moore Blvd -- Gigling Rd
CITY/STATE: Marina, CA

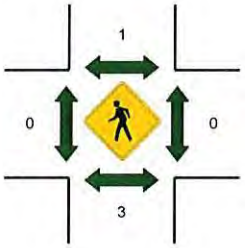
QC JOB #: 10721505
DATE: Thu, Mar 08 2012

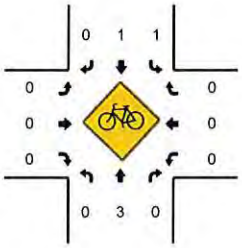
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Peak 15-Min: 7:45 AM -- 8:00 AM

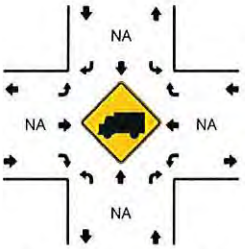


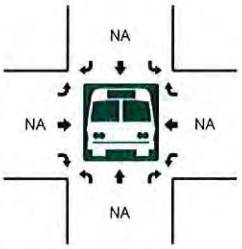


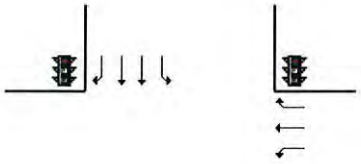
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

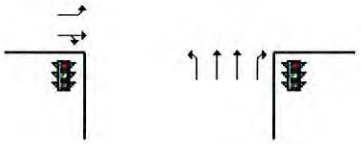












5-Min Count Period Beginning At	Gen Jim Moore Blvd (Northbound)				Gen Jim Moore Blvd (Southbound)				Gigling Rd (Eastbound)				Gigling Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	15	2	0	7	12	2	0	1	2	0	0	4	0	4	0	50	
7:05 AM	0	18	1	0	11	11	2	0	0	3	0	0	7	3	5	0	61	
7:10 AM	0	11	6	0	11	15	3	0	1	1	0	0	9	1	4	0	62	
7:15 AM	4	20	6	0	10	27	1	1	3	1	1	0	4	0	3	0	81	
7:20 AM	1	15	8	0	14	26	3	2	0	7	1	0	12	0	9	0	98	
7:25 AM	1	23	9	0	17	27	3	0	0	0	2	0	11	4	3	0	100	
7:30 AM	1	15	7	0	13	28	4	0	2	2	5	0	11	0	6	0	94	
7:35 AM	0	25	8	0	29	44	0	1	1	3	1	0	25	2	2	0	141	
7:40 AM	1	14	11	0	28	68	1	2	0	8	2	0	18	3	1	0	157	
7:45 AM	3	25	6	0	43	59	4	0	0	13	4	0	16	0	4	0	177	
7:50 AM	3	22	20	0	27	35	0	0	4	7	9	0	16	2	5	0	150	
7:55 AM	4	31	13	0	29	41	0	0	3	5	8	0	20	2	3	0	159	1330
8:00 AM	5	31	7	1	34	37	2	2	0	3	2	0	10	1	10	0	145	1425
8:05 AM	6	22	11	1	15	27	1	0	0	4	0	0	16	0	6	0	109	1473
8:10 AM	3	26	6	0	20	27	1	0	1	0	0	0	10	2	6	0	102	1513
8:15 AM	2	15	7	0	13	34	1	1	2	2	5	0	7	2	7	0	98	1530
8:20 AM	0	14	4	0	14	47	5	1	1	2	2	0	10	1	2	0	103	1535
8:25 AM	0	14	10	0	10	37	3	1	1	1	6	0	6	1	1	0	91	1526
8:30 AM	5	17	6	0	6	20	2	1	1	1	3	0	8	2	6	0	78	1510
8:35 AM	3	25	6	0	7	53	1	2	0	2	4	0	3	0	1	0	107	1476
8:40 AM	7	14	3	0	10	39	3	1	0	0	4	0	7	0	1	0	89	1408
8:45 AM	3	16	3	0	4	59	0	0	0	1	3	0	12	1	3	0	105	1336
8:50 AM	1	15	0	0	12	67	2	1	0	0	4	0	4	2	0	0	108	1294
8:55 AM	3	10	6	0	11	71	3	0	2	1	3	0	3	2	6	0	121	1256

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	312	156	0	396	540	16	0	28	100	84	0	208	16	48	0	1944
Heavy Trucks	0	0	8		4	12	0		0	0	0		8	0	4		36
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

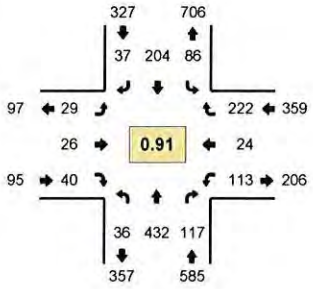
Type of peak hour being reported: Intersection Peak

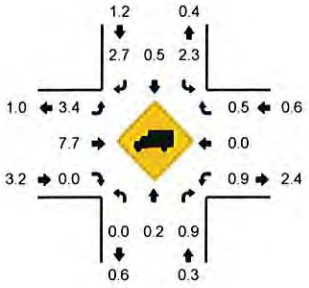
Method for determining peak hour: Total Entering Volume

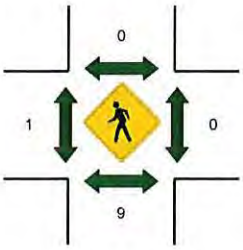
LOCATION: Gen Jim Moore Blvd -- Gigling Rd
CITY/STATE: Marina, CA

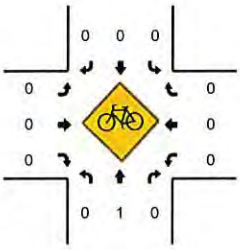
QC JOB #: 10721506
DATE: Wed, Mar 07 2012

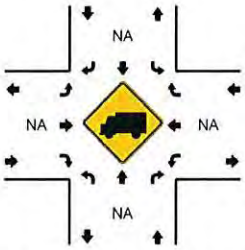
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

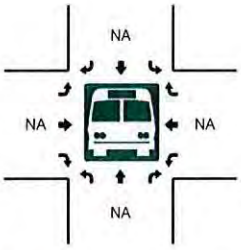












5-Min Count Period Beginning At	Gen Jim Moore Blvd (Northbound)				Gen Jim Moore Blvd (Southbound)				Gigling Rd (Eastbound)				Gigling Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	19	4	0	9	20	1	1	1	3	3	0	7	1	13	0	86	
4:05 PM	1	30	7	0	6	15	4	2	6	4	1	0	4	1	12	0	93	
4:10 PM	3	28	9	0	7	19	7	0	3	1	1	0	8	2	14	0	102	
4:15 PM	3	24	12	0	3	17	2	2	1	3	2	0	3	4	14	0	90	
4:20 PM	3	24	5	0	4	21	5	0	2	5	3	0	6	1	10	0	89	
4:25 PM	1	28	4	0	3	17	2	0	3	2	1	0	3	0	4	0	68	
4:30 PM	3	18	6	0	4	12	8	1	0	4	5	0	11	4	21	0	97	
4:35 PM	3	25	8	0	8	13	4	2	0	4	3	0	6	3	20	0	99	
4:40 PM	2	22	11	0	3	18	2	2	2	2	4	0	18	5	20	0	111	
4:45 PM	1	40	10	0	2	12	2	2	1	2	2	0	7	1	19	0	101	
4:50 PM	1	32	8	0	7	17	5	1	6	1	1	0	14	0	24	0	117	
4:55 PM	4	31	13	0	2	16	2	3	2	3	6	0	5	3	16	0	106	1159
5:00 PM	2	50	4	0	3	18	6	1	3	1	3	0	11	3	21	0	126	1199
5:05 PM	5	36	8	0	5	19	2	4	0	4	2	0	14	2	14	0	115	1221
5:10 PM	0	48	13	0	8	16	3	2	2	2	6	0	10	1	23	0	134	1253
5:15 PM	5	38	10	0	4	16	2	2	4	3	4	0	10	0	12	0	110	1273
5:20 PM	9	29	12	0	7	18	5	1	2	4	3	0	8	1	18	0	117	1301
5:25 PM	5	34	12	0	5	18	3	3	1	1	5	0	5	1	14	0	107	1340
5:30 PM	2	37	11	0	8	19	3	0	4	2	0	0	4	2	22	0	114	1357
5:35 PM	0	35	5	0	9	17	2	2	2	1	4	0	7	5	19	0	108	1366
5:40 PM	4	31	7	0	8	17	0	2	0	2	4	0	3	2	12	0	92	1347
5:45 PM	2	36	5	0	5	17	2	0	0	0	4	0	3	2	10	0	86	1332
5:50 PM	2	30	8	0	5	14	2	2	4	1	3	0	3	4	11	0	89	1304
5:55 PM	1	22	6	0	5	15	1	2	2	2	3	0	1	1	10	0	71	1269

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	536	100	0	64	212	44	28	20	28	44	0	140	24	232	0	1500
Heavy Trucks	0	0	0		4	0	0		4	0	0		0	0	0		8
Pedestrians		16				0				0				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

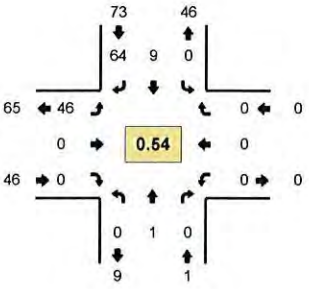
Type of peak hour being reported: Intersection Peak

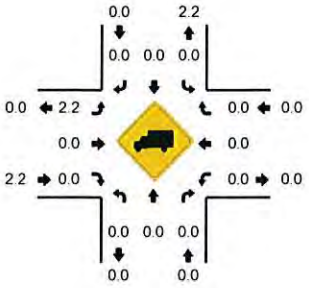
Method for determining peak hour: Total Entering Volume

LOCATION: Parker Flats Rd -- Normandy Rd
CITY/STATE: Marina, CA

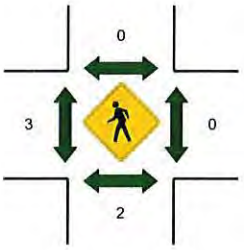
QC JOB #: 10721519
DATE: Thu, Mar 08 2012

Peak-Hour: 7:20 AM -- 8:20 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

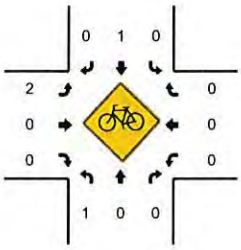


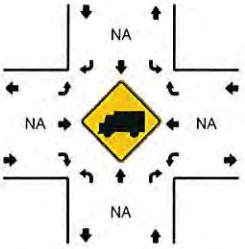


Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

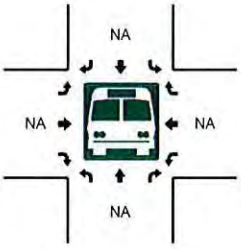












5-Min Count Period Beginning At	Parker Flats Rd (Northbound)				Parker Flats Rd (Southbound)				Normandy Rd (Eastbound)				Normandy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3	
7:10 AM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:20 AM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	
7:25 AM	0	0	0	0	0	3	2	0	1	0	0	0	0	0	0	0	6	
7:30 AM	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	5	
7:35 AM	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3	
7:40 AM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	
7:45 AM	0	0	0	0	0	2	9	0	2	0	0	0	0	0	0	0	13	
7:50 AM	0	0	0	0	0	0	9	0	4	0	0	0	0	0	0	0	13	
7:55 AM	0	0	0	0	0	0	11	0	10	0	0	0	0	0	0	0	21	75
8:00 AM	0	0	0	0	0	0	13	0	9	0	0	0	0	0	0	0	22	97
8:05 AM	0	0	0	0	0	0	4	0	7	0	0	1	0	0	0	0	12	106
8:10 AM	0	1	0	0	0	1	4	0	4	0	0	0	0	0	0	0	10	114
8:15 AM	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	6	120
8:20 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	118
8:25 AM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	114
8:30 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	112
8:35 AM	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	4	113
8:40 AM	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	4	111
8:45 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	101
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88
8:55 AM	0	0	0	0	0	0	5	0	2	2	0	0	0	0	0	0	9	76

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	132	0	92	0	0	0	0	0	0	0	224
Heavy Trucks	0	0	0		0	0	0		4	0	0		0	0	0		4
Pedestrians		4				0				0				0			4
Bicycles	1	0	0		0	1	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

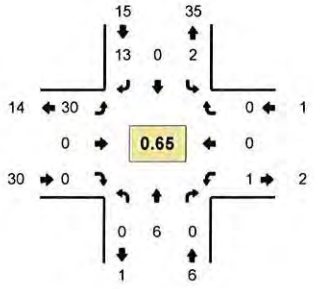
Type of peak hour being reported: Intersection Peak

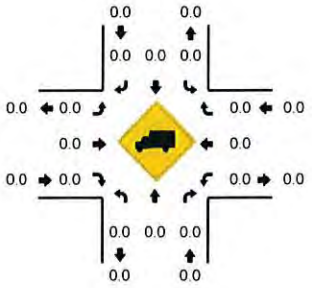
Method for determining peak hour: Total Entering Volume

LOCATION: Parker Flats Rd -- Normandy Rd
CITY/STATE: Marina, CA

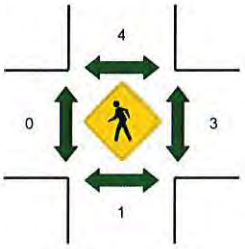
QC JOB #: 10721520
DATE: Wed, Mar 07 2012

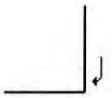
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



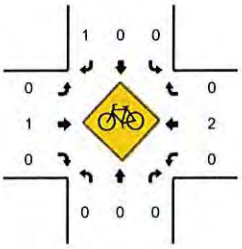


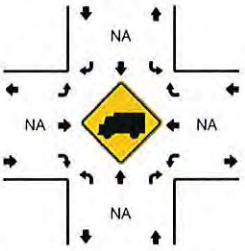
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

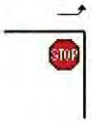


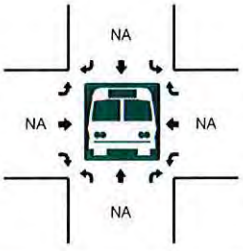












5-Min Count Period Beginning At	Parker Flats Rd (Northbound)				Parker Flats Rd (Southbound)				Normandy Rd (Eastbound)				Normandy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	3	0	2	0	0	0	0	0	0	0	5	
4:05 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
4:10 PM	0	0	0	0	0	0	1	0	3	0	0	0	0	1	1	0	6	
4:15 PM	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3	
4:20 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
4:25 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
4:30 PM	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	4	
4:35 PM	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	4	
4:40 PM	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	3	
4:45 PM	0	0	0	0	1	0	1	0	2	0	0	1	0	0	0	0	5	
4:50 PM	0	0	0	0	0	0	1	0	4	0	0	0	1	0	0	0	6	
4:55 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	41
5:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	38
5:05 PM	0	0	0	0	0	0	1	0	5	0	0	0	0	0	0	0	6	42
5:10 PM	0	4	0	0	1	0	3	0	2	0	0	0	0	0	0	0	10	46
5:15 PM	0	1	0	0	0	0	2	0	1	0	0	0	0	0	0	0	4	47
5:20 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	48
5:25 PM	0	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	5	52
5:30 PM	0	1	0	0	0	0	2	0	1	0	0	0	0	0	0	0	4	52
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
5:45 PM	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	3	43
5:50 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	38
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	38

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	20	0	0	4	0	24	0	32	0	0	0	0	0	0	0	80
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

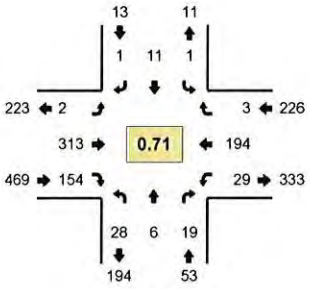
Type of peak hour being reported: Intersection Peak

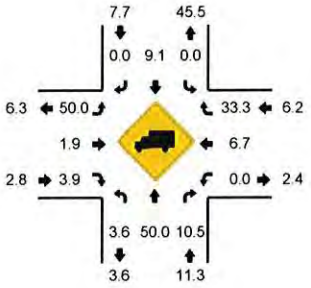
Method for determining peak hour: Total Entering Volume

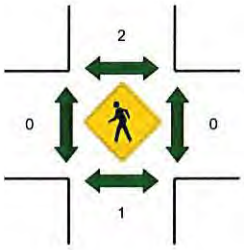
LOCATION: Parker Flats Rd -- Gigling Rd
CITY/STATE: Marina, CA

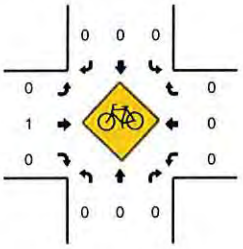
QC JOB #: 10721523
DATE: Thu, Mar 08 2012

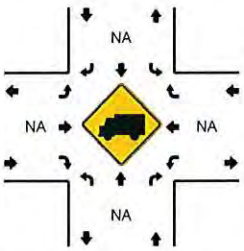
Peak-Hour: 7:20 AM -- 8:20 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

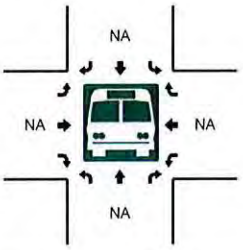












5-Min Count Period Beginning At	Parker Flats Rd (Northbound)				Parker Flats Rd (Southbound)				Gigling Rd (Eastbound)				Gigling Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	0	0	0	0	0	0	0	0	12	2	0	2	6	0	0	23	
7:05 AM	0	0	0	0	0	0	0	0	0	14	2	0	1	11	0	0	28	
7:10 AM	0	0	1	0	0	1	1	0	0	14	0	0	1	12	0	0	30	
7:15 AM	1	0	0	0	0	1	0	0	0	17	2	0	0	5	0	0	26	
7:20 AM	3	0	2	0	0	1	0	0	1	14	4	0	0	17	0	0	42	
7:25 AM	0	0	1	0	0	1	0	0	0	28	2	0	2	14	0	0	48	
7:30 AM	0	0	0	0	0	0	0	0	0	17	3	0	1	19	0	0	40	
7:35 AM	0	1	1	0	0	0	0	0	0	33	10	0	1	22	0	0	68	
7:40 AM	0	1	1	0	0	1	1	0	0	25	20	0	5	21	0	0	75	
7:45 AM	1	1	2	0	1	1	0	0	0	47	14	0	6	18	1	0	92	
7:50 AM	3	1	1	0	0	2	0	0	1	35	22	0	3	18	0	0	86	
7:55 AM	1	0	2	0	0	0	0	0	0	40	24	0	1	21	1	0	90	648
8:00 AM	10	1	4	0	0	0	0	0	0	18	23	0	3	11	0	0	70	695
8:05 AM	2	1	2	0	0	2	0	0	0	20	17	0	3	11	0	0	58	725
8:10 AM	4	0	3	0	0	1	0	0	0	24	9	0	3	13	1	0	58	753
8:15 AM	4	0	0	0	0	2	0	0	0	12	6	0	1	9	0	0	34	761
8:20 AM	1	3	0	0	0	0	0	0	0	12	5	0	0	7	0	0	28	747
8:25 AM	0	0	0	0	0	0	0	0	0	9	14	0	0	6	0	0	29	728
8:30 AM	0	1	0	0	0	0	0	0	0	11	6	0	1	14	0	0	33	721
8:35 AM	1	0	0	0	0	0	0	0	1	9	7	0	1	5	0	0	24	677
8:40 AM	1	0	0	0	0	1	0	0	0	10	2	0	1	6	0	0	21	623
8:45 AM	0	0	0	0	0	0	0	0	0	9	4	0	0	7	0	0	20	551
8:50 AM	2	0	0	0	0	0	0	0	1	5	3	0	0	4	0	0	15	480
8:55 AM	3	0	1	0	0	0	0	0	0	8	9	0	2	10	0	0	33	423

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	8	20	0	4	12	0	0	4	488	240	0	40	228	8	0	1072
Heavy Trucks	4	8	0		0	4	0		4	4	4		0	8	0		36
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

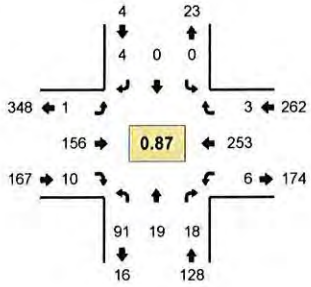
Type of peak hour being reported: Intersection Peak

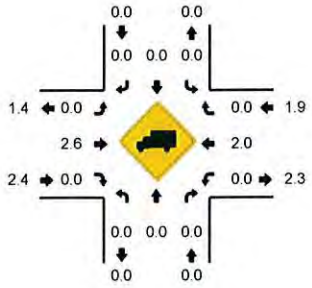
Method for determining peak hour: Total Entering Volume

LOCATION: Parker Flats Rd -- Gigling Rd
CITY/STATE: Marina, CA

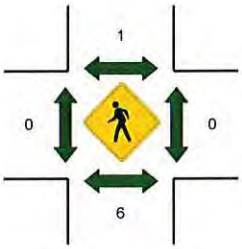
QC JOB #: 10721524
DATE: Wed, Mar 07 2012

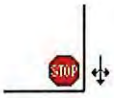
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

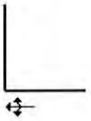


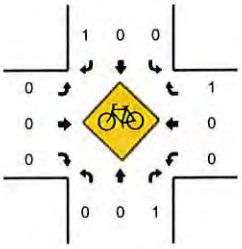


Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES



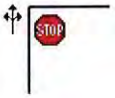


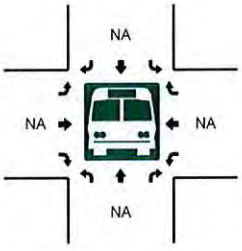












5-Min Count Period Beginning At	Parker Flats Rd (Northbound)				Parker Flats Rd (Southbound)				Gigling Rd (Eastbound)				Gigling Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	0	3	0	0	0	0	0	0	9	4	0	0	13	0	0	36	
4:05 PM	3	2	1	0	0	0	1	0	0	8	2	0	1	16	0	0	34	
4:10 PM	6	1	3	0	0	0	0	0	0	17	1	0	0	14	0	0	42	
4:15 PM	3	0	0	0	0	0	0	0	0	8	0	0	0	15	0	0	26	
4:20 PM	5	0	2	0	0	0	0	0	0	16	0	0	0	12	3	0	38	
4:25 PM	5	1	0	0	1	0	0	0	0	8	0	0	1	6	0	0	22	
4:30 PM	6	0	0	0	0	0	0	0	0	8	1	0	0	22	0	0	37	
4:35 PM	6	0	2	0	0	0	0	0	0	14	1	0	0	26	0	0	49	
4:40 PM	14	1	1	0	0	0	0	0	0	15	0	0	1	30	0	0	62	
4:45 PM	10	2	2	0	0	0	0	0	0	11	1	0	1	19	0	0	46	
4:50 PM	10	4	1	0	0	0	0	0	0	10	0	0	0	28	0	0	53	
4:55 PM	6	0	2	0	0	0	1	0	1	19	0	0	0	18	0	0	47	492
5:00 PM	6	0	2	0	0	0	0	0	0	7	0	0	0	21	0	0	36	492
5:05 PM	5	2	1	0	0	0	2	0	0	5	1	0	1	22	1	0	40	498
5:10 PM	7	2	0	0	0	0	0	0	0	20	2	0	1	25	0	0	57	513
5:15 PM	4	2	1	0	0	0	0	0	0	16	1	0	1	21	1	0	47	534
5:20 PM	8	2	1	0	0	0	1	0	0	12	2	0	0	16	1	0	43	539
5:25 PM	5	1	1	0	0	0	0	0	0	11	1	0	1	13	0	0	33	550
5:30 PM	10	3	4	0	0	0	0	0	0	16	1	0	0	14	0	0	48	561
5:35 PM	2	1	2	0	0	0	0	0	0	9	1	0	0	24	0	0	39	551
5:40 PM	3	1	1	0	0	0	0	0	0	11	0	0	0	15	0	0	31	520
5:45 PM	4	1	1	0	1	0	0	0	0	9	0	0	1	11	1	0	29	503
5:50 PM	4	0	1	0	0	0	0	0	0	6	1	0	0	9	0	0	21	471
5:55 PM	4	0	1	0	0	0	0	0	0	8	0	0	0	8	0	0	21	445

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	136	28	16	0	0	0	0	0	0	144	4	0	8	308	0	0	644
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	12	0		12
Pedestrians		8				4				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

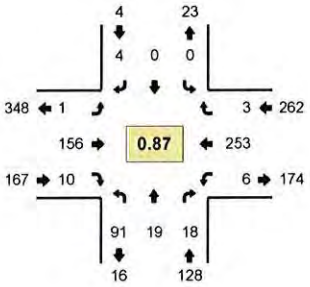
Type of peak hour being reported: Intersection Peak

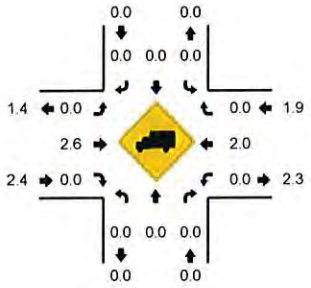
Method for determining peak hour: Total Entering Volume

LOCATION: Parker Flats Rd -- Gigling Rd
CITY/STATE: Marina, CA

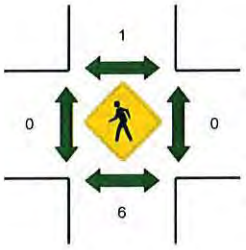
QC JOB #: 10721524
DATE: Wed, Mar 07 2012

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

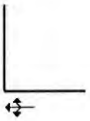


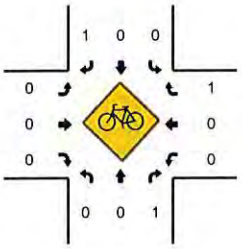


Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

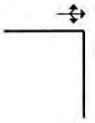


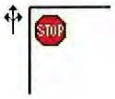


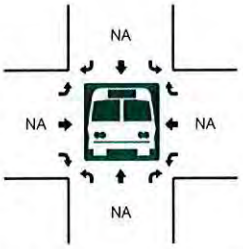












5-Min Count Period Beginning At	Parker Flats Rd (Northbound)				Parker Flats Rd (Southbound)				Gigling Rd (Eastbound)				Gigling Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	0	3	0	0	0	0	0	0	9	4	0	0	13	0	0	36	
4:05 PM	3	2	1	0	0	0	1	0	0	8	2	0	1	16	0	0	34	
4:10 PM	6	1	3	0	0	0	0	0	0	17	1	0	0	14	0	0	42	
4:15 PM	3	0	0	0	0	0	0	0	0	8	0	0	0	15	0	0	26	
4:20 PM	5	0	2	0	0	0	0	0	0	16	0	0	0	12	3	0	38	
4:25 PM	5	1	0	0	1	0	0	0	0	8	0	0	1	6	0	0	22	
4:30 PM	6	0	0	0	0	0	0	0	0	8	1	0	0	22	0	0	37	
4:35 PM	6	0	2	0	0	0	0	0	0	14	1	0	0	26	0	0	49	
4:40 PM	14	1	1	0	0	0	0	0	0	15	0	0	1	30	0	0	62	
4:45 PM	10	2	2	0	0	0	0	0	0	11	1	0	1	19	0	0	46	
4:50 PM	10	4	1	0	0	0	0	0	0	10	0	0	0	28	0	0	53	
4:55 PM	6	0	2	0	0	0	1	0	1	19	0	0	0	18	0	0	47	492
5:00 PM	6	0	2	0	0	0	0	0	0	7	0	0	0	21	0	0	36	492
5:05 PM	5	2	1	0	0	0	2	0	0	5	1	0	1	22	1	0	40	498
5:10 PM	7	2	0	0	0	0	0	0	0	20	2	0	1	25	0	0	57	513
5:15 PM	4	2	1	0	0	0	0	0	0	16	1	0	1	21	1	0	47	534
5:20 PM	8	2	1	0	0	0	1	0	0	12	2	0	0	16	1	0	43	539
5:25 PM	5	1	1	0	0	0	0	0	0	11	1	0	1	13	0	0	33	550
5:30 PM	10	3	4	0	0	0	0	0	0	16	1	0	0	14	0	0	48	561
5:35 PM	2	1	2	0	0	0	0	0	0	9	1	0	0	24	0	0	39	551
5:40 PM	3	1	1	0	0	0	0	0	0	11	0	0	0	15	0	0	31	520
5:45 PM	4	1	1	0	1	0	0	0	0	9	0	0	1	11	1	0	29	503
5:50 PM	4	0	1	0	0	0	0	0	0	6	1	0	0	9	0	0	21	471
5:55 PM	4	0	1	0	0	0	0	0	0	8	0	0	0	8	0	0	21	445

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	136	28	16	0	0	0	0	0	0	144	4	0	8	308	0	0	644
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	12	0		12
Pedestrians		8				4				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 3/16/2012 11:03 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

EXISTING CONDITIONS
2610-19 ECORP; FT ORD VETERANS CEMETERY

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 GEN JIM MOORE / GIIGLING ROAD

Cycle (sec):	60	Critical Vol./Cap.(X):	0.610
Loss Time (sec):	12	Average Delay (sec/veh):	19.2
Optimal Cycle:	45	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	0 1	0	1 0	1 0	1
Volume Module:												
Base Vol:	33	279	121	350	532	24	17	55	48	182	18	58
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	33	279	121	350	532	24	17	55	48	182	18	58
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	0.90	0.90	0.00	0.90	0.90	0.00	0.90	0.90	0.90	0.90	0.90	0.00
PHF Volume:	37	310	0	389	591	0	19	61	53	202	20	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	310	0	389	591	0	19	61	53	202	20	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	37	310	0	389	591	0	19	61	53	202	20	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	1.00	0.93	0.93	1.00	0.93	0.91	0.91	0.93	0.98	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	0.53	0.47	1.00	1.00	1.00
Final Sat.:	1769	3538	1900	1769	3538	1900	1769	925	807	1769	1862	1900
Capacity Analysis Module:												
Vol/Sat:	0.02	0.09	0.00	0.22	0.17	0.00	0.01	0.07	0.07	0.11	0.01	0.00
Crit Moves:		****		****				****		****		
Green/Cycle:	0.06	0.14	0.00	0.36	0.45	0.00	0.15	0.11	0.11	0.19	0.15	0.00
Volume/Cap:	0.37	0.61	0.00	0.61	0.37	0.00	0.07	0.61	0.61	0.61	0.07	0.00
Delay/Veh:	29.7	26.3	0.0	17.5	11.1	0.0	22.2	31.3	31.3	25.7	22.1	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.7	26.3	0.0	17.5	11.1	0.0	22.2	31.3	31.3	25.7	22.1	0.0
LOS by Move:	C	C	A	B	B	A	C	C	C	C	C	A
HCM2kAvgQ:	1	4	0	7	4	0	0	3	3	5	0	0

Note: Queue reported is the number of cars per lane.

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EXISTING CONDITIONS
2610-19 ECORP; FT ORD VETERANS CEMETERY

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 GEN JIM MOORE / NORMANDY

Cycle (sec):	80	Critical Vol./Cap.(X):	0.591
Loss Time (sec):	12	Average Delay (sec/veh):	23.4
Optimal Cycle:	46	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	2	0 1	0 0	1!	0 0	0 0	1!	0 0
Volume Module:												
Base Vol:	74	279	69	95	518	88	85	81	93	88	99	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	74	279	69	95	518	88	85	81	93	88	99	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.75	0.75	6.75	0.68	0.75	0.75	0.75	0.68	0.75	0.68	0.68	0.68
PHF Volume:	99	372	10	141	691	117	113	120	124	130	147	34
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	99	372	10	141	691	117	113	120	124	130	147	34
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	99	372	10	141	691	117	113	120	124	130	147	34
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.93	0.93	0.83	0.75	0.75	0.75	0.69	0.69	0.69
Lanes:	1.00	1.95	0.05	1.00	2.00	1.00	0.32	0.33	0.35	0.42	0.47	0.11
Final Sat.:	1769	3429	94	1769	3538	1583	451	478	494	546	615	143
Capacity Analysis Module:												
Vol/Sat:	0.06	0.11	0.11	0.08	0.20	0.07	0.25	0.25	0.25	0.24	0.24	0.24
Crit Moves:	****				****			****				
Green/Cycle:	0.09	0.25	0.25	0.18	0.33	0.33	0.43	0.43	0.43	0.43	0.43	0.43
Volume/Cap:	0.59	0.44	0.44	0.44	0.59	0.22	0.59	0.59	0.59	0.56	0.56	0.56
Delay/Veh:	40.3	25.9	25.9	30.2	23.1	19.6	19.2	19.2	19.2	18.7	18.7	18.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	40.3	25.9	25.9	30.2	23.1	19.6	19.2	19.2	19.2	18.7	18.7	18.7
LOS by Move:	D	C	C	C	C	B	B	B	B	B	B	B
HCM2kAvgQ:	3	5	5	4	8	2	7	7	7	6	6	6

Note: Queue reported is the number of cars per lane.

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EXISTING CONDITIONS
2610-19 ECORP; FT ORD VETERANS CEMETERY

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 GEN JIM MOORE / GIIGLING ROAD

Cycle (sec):	60	Critical Vol./Cap.(X):	0.405
Loss Time (sec):	12	Average Delay (sec/veh):	17.3
Optimal Cycle:	34	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	0 1	0	1 0	1 0	1
Volume Module:												
Base Vol:	42	485	124	100	223	39	30	29	44	108	23	235
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	485	124	100	223	39	30	29	44	108	23	235
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	0.92	0.92	0.00	0.92	0.92	0.00	0.92	0.92	0.92	0.92	0.92	0.00
PHF Volume:	46	527	0	109	242	0	33	32	48	117	25	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	46	527	0	109	242	0	33	32	48	117	25	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	46	527	0	109	242	0	33	32	48	117	25	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	1.00	0.93	0.93	1.00	0.93	0.89	0.89	0.93	0.98	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	0.40	0.60	1.00	1.00	1.00
Final Sat.:	1769	3538	1900	1769	3538	1900	1769	673	1021	1769	1862	1900
Capacity Analysis Module:												
Vol/Sat:	0.03	0.15	0.00	0.06	0.07	0.00	0.02	0.05	0.05	0.07	0.01	0.00
Crit Moves:		****		****				****		****		
Green/Cycle:	0.14	0.37	0.00	0.15	0.38	0.00	0.16	0.12	0.12	0.16	0.12	0.00
Volume/Cap:	0.18	0.40	0.00	0.40	0.18	0.00	0.11	0.40	0.40	0.40	0.11	0.00
Delay/Veh:	23.0	14.3	0.0	24.0	12.5	0.0	21.6	26.0	26.0	23.4	23.9	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	23.0	14.3	0.0	24.0	12.5	0.0	21.6	26.0	26.0	23.4	23.9	0.0
LOS by Move:	C	B	A	C	B	A	C	C	C	C	C	A
HCM2kAvgQ:	1	4	0	2	2	0	1	2	2	2	1	0

Note: Queue reported is the number of cars per lane.

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EXISTING CONDITIONS
2610-19 ECORP; FT ORD VETERANS CEMETERY

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 GEN JIM MOORE / NORMANDY

Cycle (sec):	80	Critical Vol./Cap.(X):	0.336
Loss Time (sec):	12	Average Delay (sec/veh):	17.3
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	2	0 1	0 0	1!	0 0	0 0	1!	0 0
Volume Module:												
Base Vol:	48	470	43	58	251	42	56	39	30	43	27	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	48	470	43	58	251	42	56	39	30	43	27	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	52	511	47	63	273	46	61	42	33	47	29	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	511	47	63	273	46	61	42	33	47	29	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	52	511	47	63	273	46	61	42	33	47	29	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.92	0.92	0.93	0.93	0.83	0.79	0.79	0.79	0.79	0.79	0.79
Lanes:	1.00	1.83	0.17	1.00	2.00	1.00	0.45	0.31	0.24	0.46	0.29	0.25
Final Sat.:	1769	3199	293	1769	3538	1583	674	470	361	693	435	370
Capacity Analysis Module:												
Vol/Sat:	0.03	0.16	0.16	0.04	0.08	0.03	0.09	0.09	0.09	0.07	0.07	0.07
Crit Moves:		****		****				****				
Green/Cycle:	0.16	0.48	0.48	0.11	0.42	0.42	0.27	0.27	0.27	0.27	0.27	0.27
Volume/Cap:	0.18	0.34	0.34	0.34	0.18	0.07	0.34	0.34	0.34	0.25	0.25	0.25
Delay/Veh:	29.3	13.2	13.2	34.2	14.6	13.9	24.0	24.0	24.0	23.3	23.3	23.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.3	13.2	13.2	34.2	14.6	13.9	24.0	24.0	24.0	23.3	23.3	23.3
LOS by Move:	C	B	B	C	B	B	C	C	C	C	C	C
HCM2kAvgQ:	1	5	5	2	2	1	3	3	3	2	2	2

Note: Queue reported is the number of cars per lane.

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to kdANDERSON TRANSP.

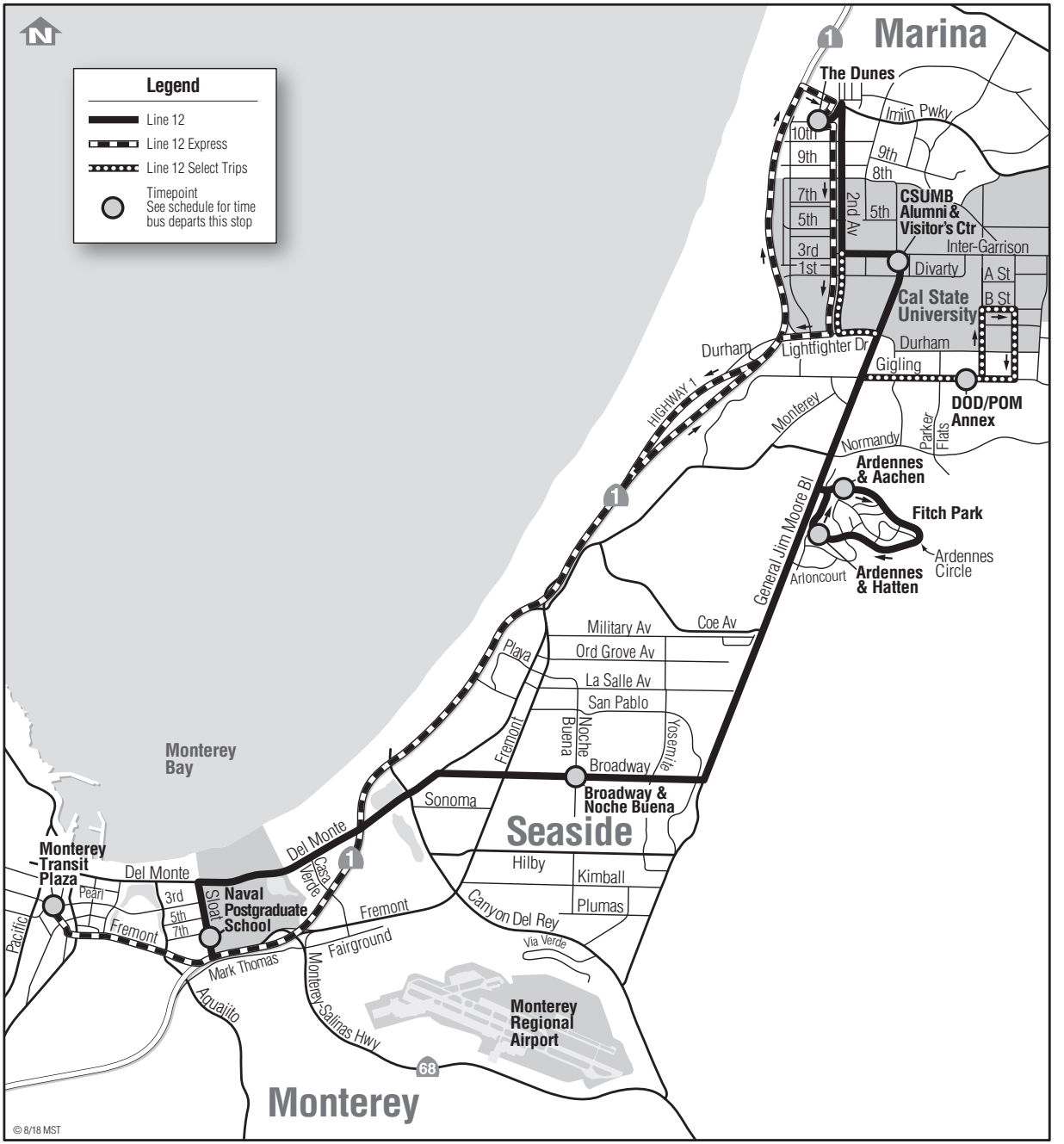
ATTACHMENT F

Appendices Received with Letter 68 Michael Salerno, Keep Fort Ord Wild (On CD)

G. MST ROUTE MAP AND SCHEDULES

12 The Dunes – NPS

Regional / Discount
Regional / Descuento
$3.50 / $1.75



12 The Dunes

Weekdays*/Días de la semana*

Notes	Monterey Transit Plaza	NPS Sloat & 9th St	Broadway & Noche Buena	Fitch Park Ardennes & Aachen	Fitch Park Ardennes & Hatten	DOD/POM Annex Gigling & 6th	CSUMB Almuni & Visitor's Ctr	The Dunes
A	7:15	--	--	--	--	--	--	7:30
	--	8:45	8:54	9:00	9:05	--	--	--
	--	**12:05**	**12:16**	**12:22**	**12:27**	--	**12:34**	**12:41**
	--	**1:40**	**1:51**	**1:57**	**2:02**	--	**2:09**	**2:16**
	--	**3:10**	**3:21**	**3:27**	**3:32**	--	**3:39**	--
	--	**4:10**	**4:21**	**4:27**	**4:32**	**4:37**	--	**4:51**
	--	**5:15**	**5:27**	**5:33**	**5:38**	--	--	--

12 NPS

Weekdays*/Días de la semana*

Notes	The Dunes	CSUMB Almuni & Visitor's Ctr	DOD/POM Annex Gigling & 6th	Fitch Park Ardennes & Aachen	Fitch Park Ardennes & Hatten	Broadway & Noche Buena	NPS Sloat & 9th St	Monterey Transit Plaza
	6:45	6:51	--	6:54	6:59	7:09	7:19	--
	--	7:06	--	7:09	7:14	7:25	7:35	--
	7:35	--	7:43	7:52	7:57	8:10	8:20	--
	--	--	--	9:00	9:05	9:13	9:21	--
	12:47	**12:53**	--	**12:56**	**1:01**	**1:10**	**1:19**	--
	2:22	**2:28**	--	**2:31**	**2:36**	**2:45**	**2:54**	--
	--	**3:42**	--	**3:45**	**3:50**	**3:59**	**4:08**	--
B	**4:53**	--	--	--	--	--	--	**5:08**

Light Type = AM **Bold Type = PM**

Notes:

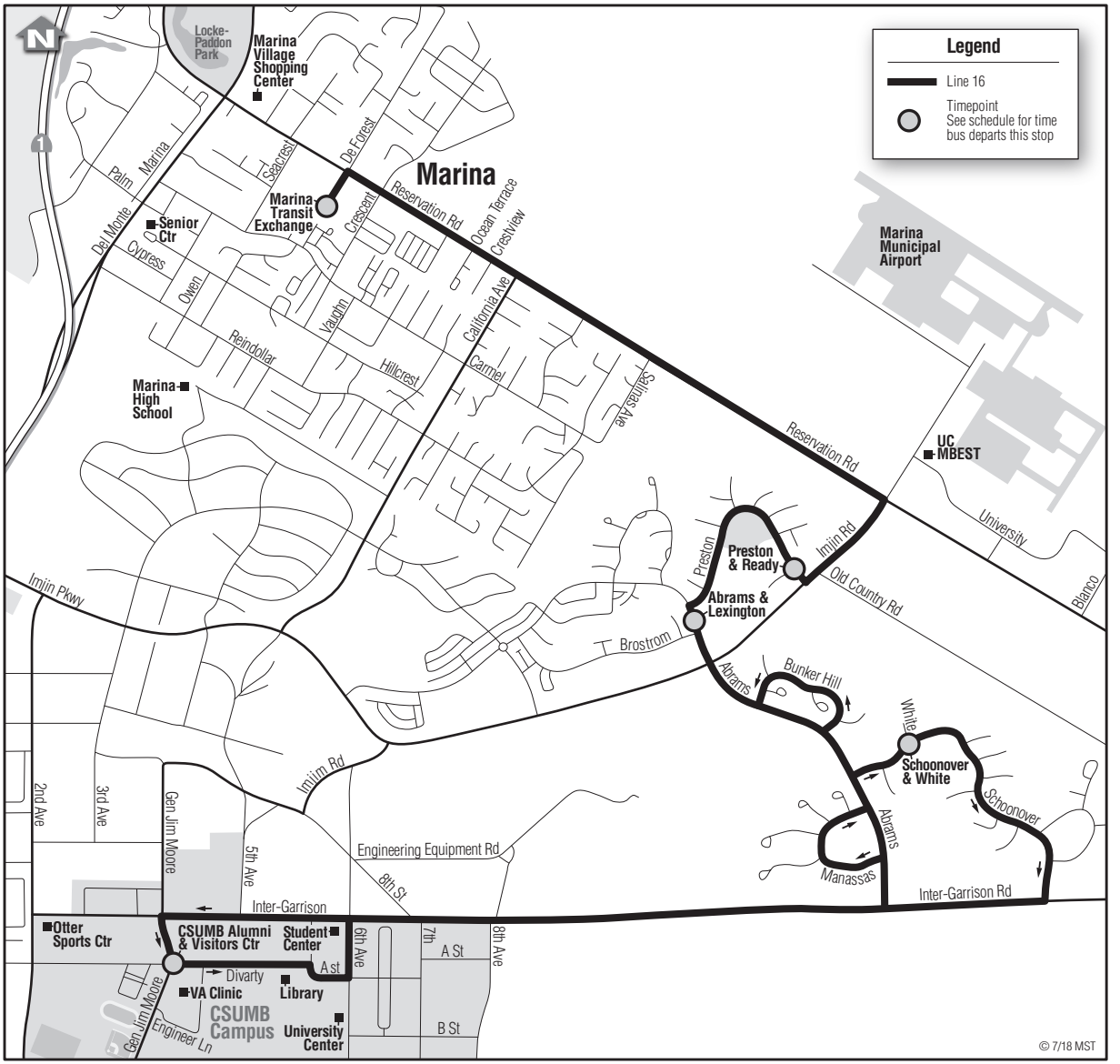
* No holiday service.

A Express trip operating non-stop between Monterey Transit Plaza and The Dunes.

B Express trip operating non-stop between 2nd Ave. and Divarty and Monterey Transit Plaza.

16 Marina–CSUMB

Primary / Discount
Primaria / Descuento
$2.50 / $1.25



Continued on next page

TRANSIT TIP

– Line 16 trips continue to Monterey beyond Marina Transit Exchange as Line 18.

Continued from previous page

16 Marina

Daily*/Diario*

Notes	CSUMB Alumni & Visitor's Ctr	Schoonover & White Ct	Abrams & Lexington	Marina Transit Exchange
A,C	7:25	7:35	7:43	7:51
C	8:25	8:35	8:43	8:51
C	9:25	9:35	9:43	9:51
C	10:25	10:35	10:43	10:51
C	11:25	11:35	11:43	11:51
C	**12:25**	**12:35**	**12:43**	**12:51**
C	**1:25**	**1:35**	**1:43**	**1:51**
C	**2:25**	**2:35**	**2:43**	**2:51**
C	**3:25**	**3:35**	**3:43**	**3:51**
C	**4:25**	**4:35**	**4:43**	**4:51**
C	**5:25**	**5:35**	**5:43**	**5:51**
C	**6:25**	**6:35**	**6:43**	**6:51**
C	**7:25**	**7:35**	**7:43**	**7:51**
A,C	**8:25**	**8:35**	**8:43**	**8:51**
A,C	**9:25**	**9:35**	**9:43**	**9:51**
B	**10:25**	**10:35**	**10:43**	**10:51**

16 CSUMB

Daily*/Diario*

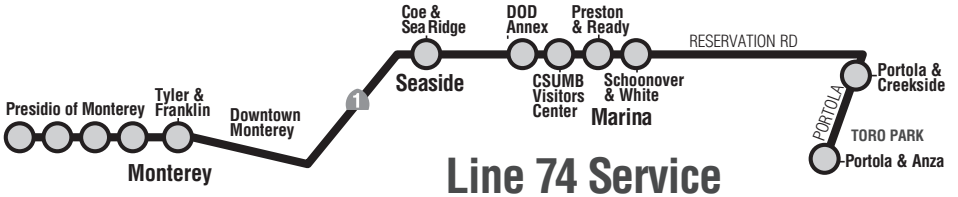
Notes	Marina Transit Exchange	Preston & Ready	Schoonover & White Ct	CSUMB Alumni & Visitor's Ctr
A	6:55	7:01	7:09	7:22
	7:55	8:01	8:09	8:22
	8:55	9:01	9:09	9:22
	9:55	10:01	10:09	10:22
	10:55	11:01	11:09	11:22
	11:55	**12:01**	**12:09**	**12:22**
	12:55	**1:01**	**1:09**	**1:22**
	1:55	**2:01**	**2:09**	**2:22**
	2:55	**3:01**	**3:09**	**3:22**
	3:55	**4:01**	**4:09**	**4:22**
	4:55	**5:01**	**5:09**	**5:22**
	5:55	**6:01**	**6:09**	**6:22**
	6:55	**7:01**	**7:09**	**7:22**
A	**7:55**	**8:01**	**8:09**	**8:22**
A	**8:55**	**9:01**	**9:09**	**9:22**
B	**9:55**	**10:01**	**10:09**	**10:22**

Light Type = AM **Bold Type = PM**

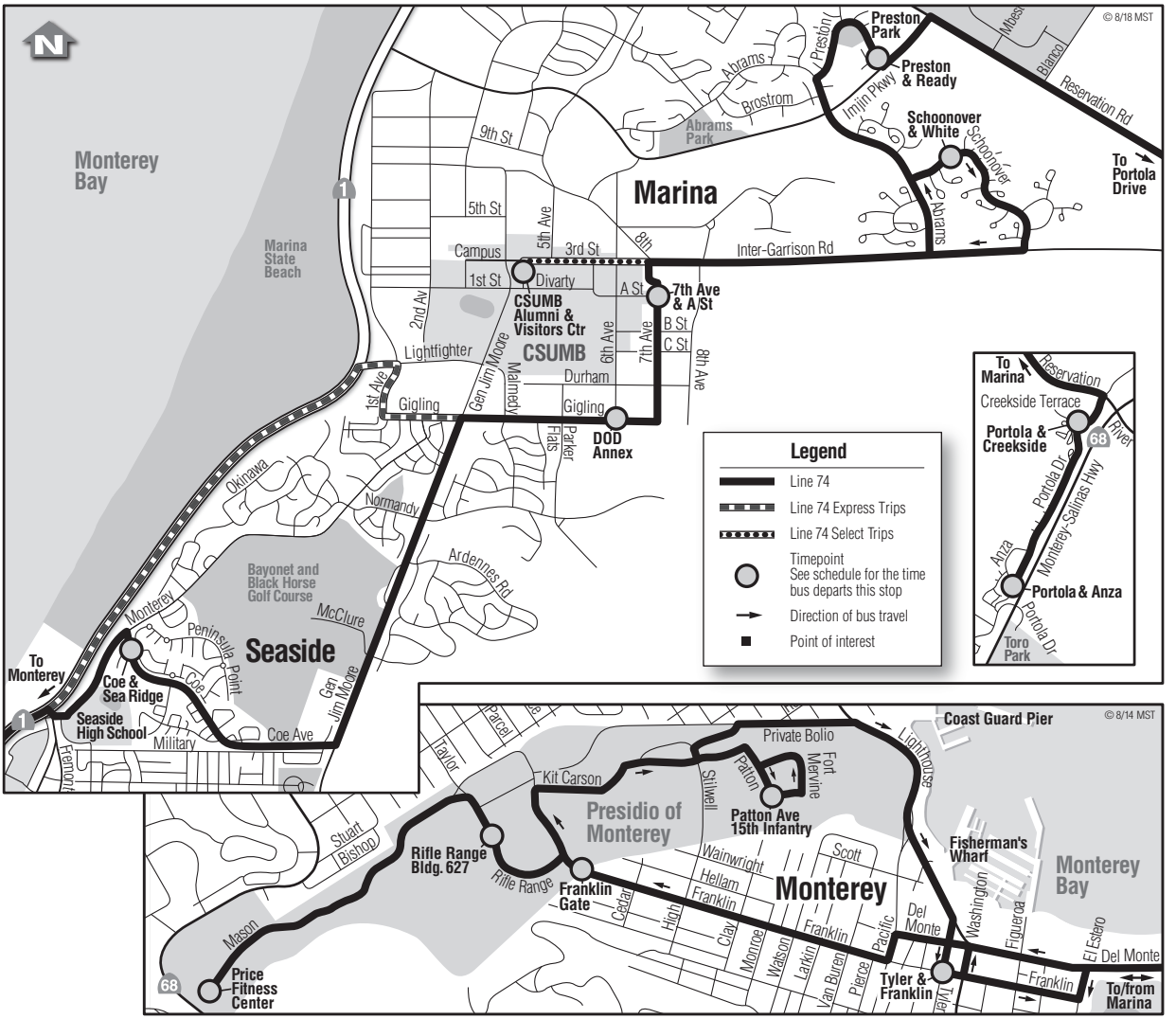
Notes:
A Monday through Saturday
B Weekdays only
C Trip continues as Line 18 to Monterey
*Line 16 does not operate on Thanksgiving, Christmas or New Year's Day.

74 Presidio–Toro Park via Schoonover Park

Primary / Discount
Primaria / Descuento
$2.50 / $1.25



Line 74 Service



Continued on next page

Continued from previous page

74 Presidio

Weekdays*/Días de la semana*

Notes	Portola & Anza	Portola & Creekside	Preston & Ready	Schoonover & White	7th Ave & A St	DOD Annex Gigling & 6th	Coe & Sea Ridge	Tyler & Franklin	Franklin Gate	Rifle Range & Bldg 619	Price Fitness Center
	6:29	6:32	6:44	6:50	6:56	7:00	7:10	7:24	7:33	7:34	7:39

Light Type = AM **Bold Type = PM**

74 Toro Park

Weekdays*/Días de la semana*

Notes	Price Fitness Center	Rifle Range Bldg 627	Patton Ave 15th Infantry	Tyler & Franklin	Coe & Sea Ridge	DOD Annex Gigling & 6th	7th Ave & A St	CSUMB Alumni & Visitor's Ctr	Schoonover & White	Preston Rd. & Ready	Portola & Creekside	Portola & Anza
A	7:05	7:10	7:15	7:25	--	7:40	7:43	7:50	--	--	--	--
B	**4:35**	**4:41**	**4:47**	**4:59**	**5:16**	**5:25**	**5:28**	--	**5:33**	**5:42**	**5:53**	**5:56**

Notes: Light Type = AM **Bold Type = PM**

A Express trip - bus will not serve Coe Ave and General Jim Moore Blvd; terminates at CSUMB Visitor's Center.

B Depending on traffic conditions, bus may depart stops beyond Tyler & Franklin earlier than the time listed.

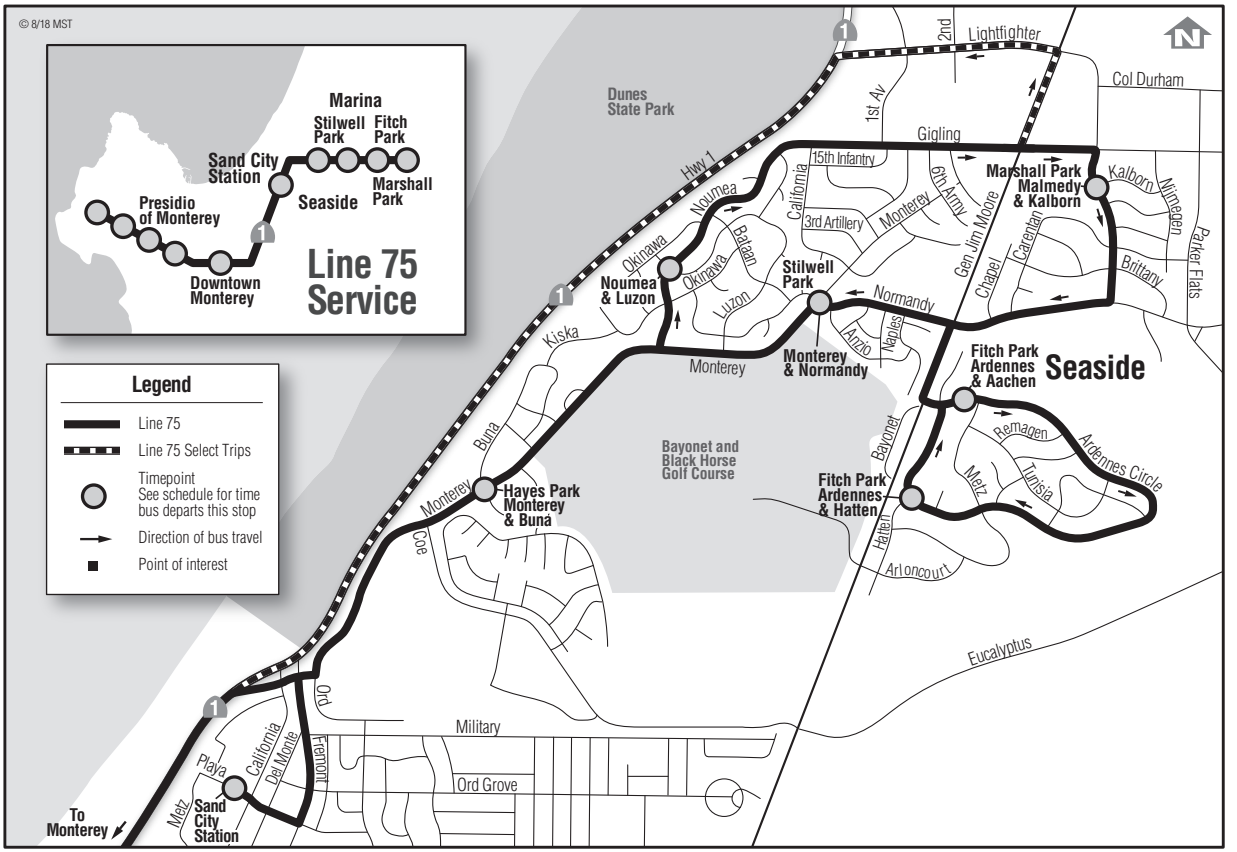
* No holiday service.

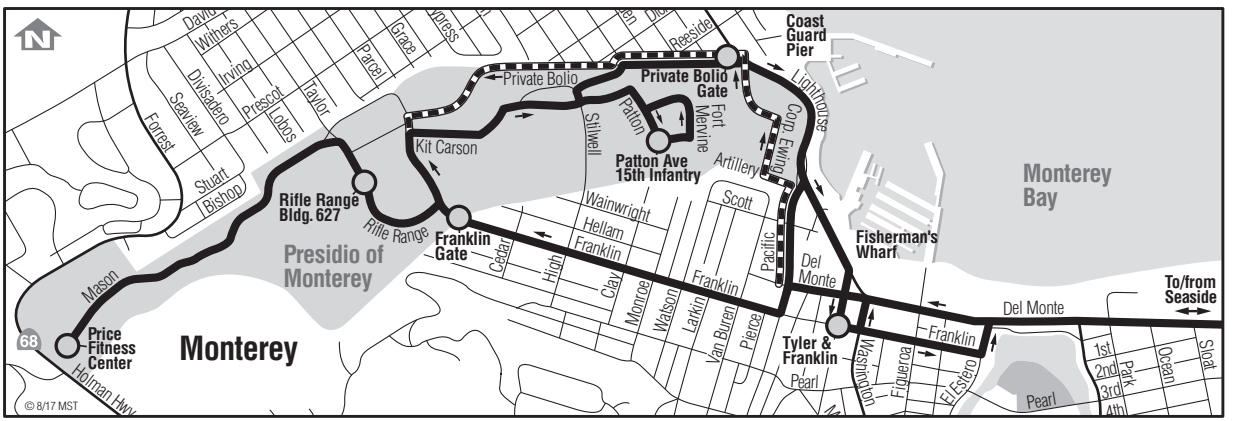
For entry onto the Presidio of Monterey military installation, you must present your valid military/DOD employee badge or identification card to security personnel at the gate entrance.

Passengers boarding in the Presidio of Monterey military installation ride free.

75 Presidio–Marshall Park Express

Primary / Discount
Primaria / Descuento
$2.50 / $1.25





75 Presidio Express

Weekdays*/Días de la semana*

Notes	Marshall Park Malmedy & Kalborn	Fitch Park Ardennes & Aachen	Fitch Park Ardennes & Hatten	Stilwell Park Monterey & Normandy	Stilwell Park Noumea & Luzon	Hayes Park Monterey & Buna	Sand City Station	Tyler & Franklin	Private Bolio Gate	Franklin Gate	Rifle Range & Bldg 619	Price Fitness Center
	5:55	6:00	6:05	6:09	6:13	--	--	6:28	--	6:34	6:35	6:43
	6:25	6:30	6:35	6:39	6:43	--	--	6:58	--	7:04	7:05	7:13
	6:50	6:55	7:00	7:04	7:08	--	--	7:26	--	7:32	7:33	7:41
	9:05	9:10	9:15	9:19	--	9:23	9:29	9:41	--	9:47	9:48	9:54
	11:05	11:10	11:15	11:19	--	11:23	11:29	11:41	--	11:47	11:48	11:54
	1:00	**1:05**	**1:10**	**1:14**	--	**1:18**	**1:24**	**1:36**	--	**1:42**	**1:43**	**1:49**
	--	--	--	--	--	--	--	**2:44**	--	**2:50**	**2:51**	**2:58**
	2:48	**2:53**	**2:58**	**3:02**	--	**3:06**	**3:12**	**3:24**	--	**3:30**	**3:31**	**3:38**
	3:48	**3:53**	**3:58**	**4:02**	--	**4:06**	**4:12**	**4:24**	--	**4:30**	**4:31**	**4:38**
C	**5:34**	**5:39**	**5:44**	**5:48**	--	**5:52**	**5:58**	**6:10**	**6:14**	--	**6:19**	**6:24**
C	**6:16**	**6:21**	**6:26**	**6:30**	--	**6:34**	**6:40**	**6:52**	**6:56**	--	**7:01**	**7:06**
B	**7:14**	**7:19**	**7:24**	--	--	--	--	--	--	--	--	--
B	**8:00**	**8:05**	**8:10**	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	**9:00**	**9:04**	--	**9:09**	**9:14**
B	**9:56**	**10:01**	**10:06**	--	--	--	--	--	--	--	--	--

75 Marshall Park Express

Weekdays*/Días de la semana*

Notes	Price Fitness Center	Rifle Range Bldg 627	Patton Ave 15th Infantry	Tyler & Franklin	Sand City Station	Hayes Park Monterey & Buna	Stilwell Park Noumea & Luzon	Marshall Park Malmedy & Kalborn
	10:18	10:23	10:28	10:38	10:50	10:54	10:58	11:05
	12:10	**12:15**	**12:20**	**12:30**	**12:42**	**12:47**	**12:51**	**12:58**
	2:00	**2:05**	**2:10**	**2:20**	**2:32**	**2:37**	**2:41**	**2:48**
A	**3:00**	**3:05**	**3:10**	**3:20**	**3:32**	**3:37**	**3:41**	**3:48**
A	**4:45**	**4:50**	**4:55**	**5:05**	**5:17**	**5:22**	**5:26**	**5:34**
A	**5:30**	**5:35**	**5:39**	**5:47**	**5:59**	**6:04**	**6:08**	**6:16**
A	**6:33**	**6:38**	**6:42**	**6:48**	**6:58**	**7:03**	**7:07**	**7:14**
A	**7:21**	**7:25**	**7:29**	**7:35**	**7:45**	**7:50**	**7:54**	**8:00**
A	**9:21**	**9:25**	**9:29**	**9:35**	--	**9:46**	**9:50**	**9:56**

Notes: * No holiday service.

Light Type = AM **Bold Type = PM**

A Depending on traffic conditions, bus may depart Monterey Rd and Buna earlier than the time listed.

B Depending on traffic conditions, bus may depart Malmedy & Kalborn and subsequent stops earlier than the time listed.

C Trips entering the Presidio of Monterey before 6:00 am and after 5:30 pm will use the Private Bolio Gate instead of the Franklin Gate, and will not serve Franklin St.

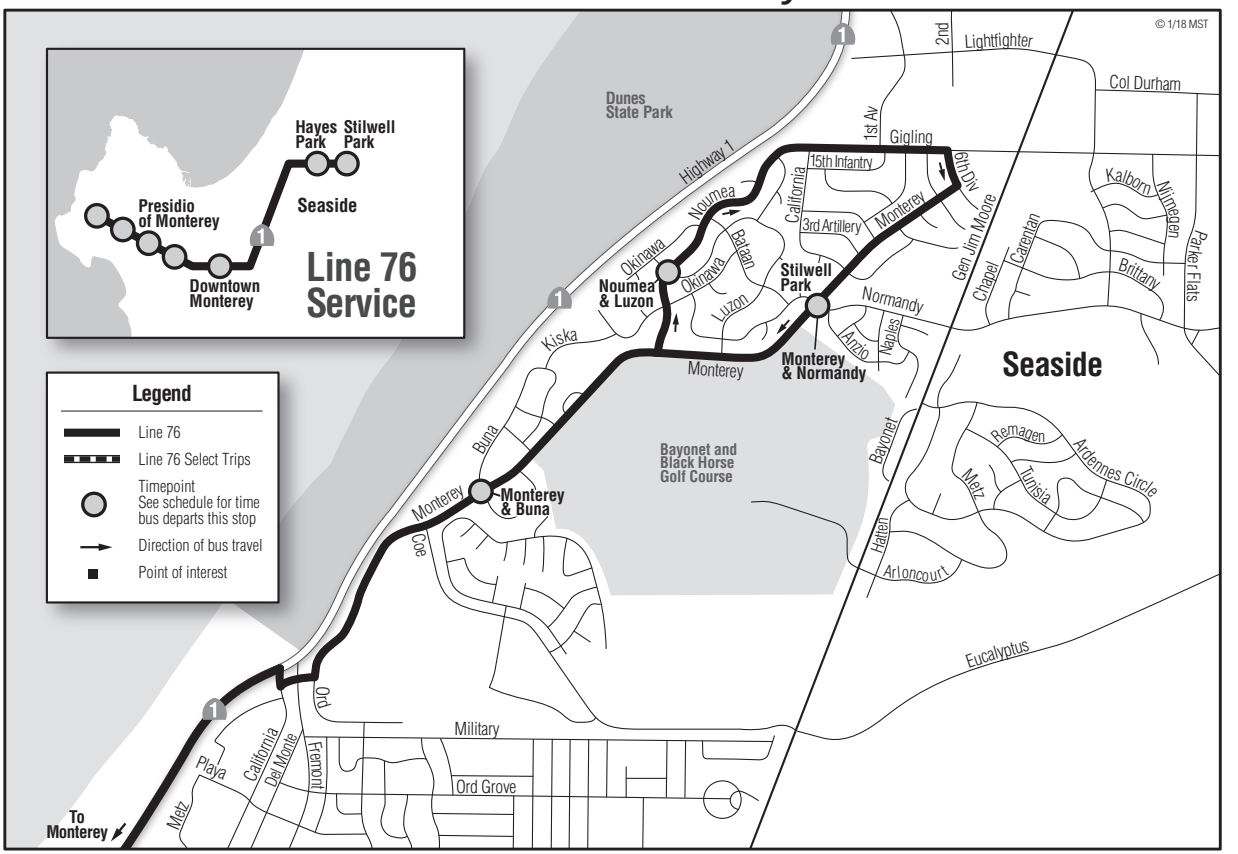
For entry onto the Presidio of Monterey military installation, you must present your valid military/DOD employee badge or identification card to security personnel at the gate entrance.

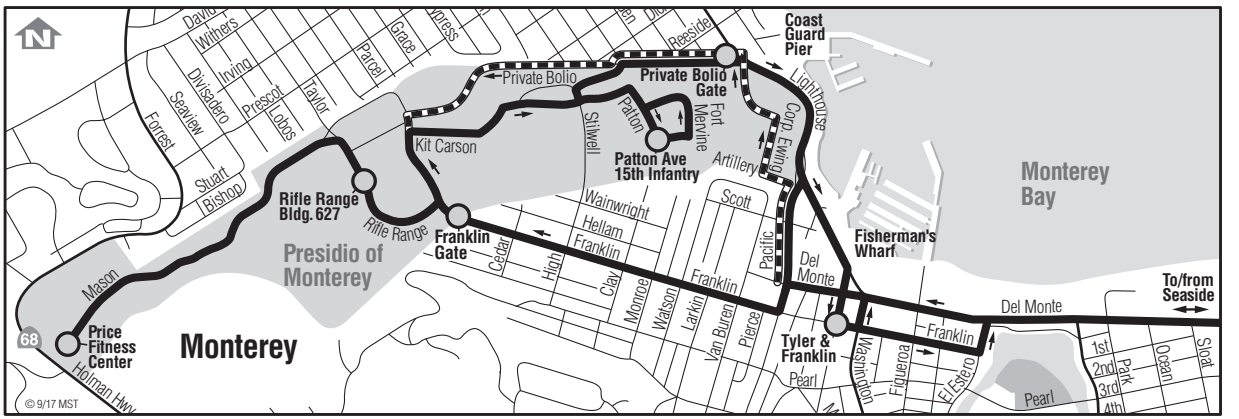
Passengers boarding in the Presidio of Monterey military installation ride free.

76 Presidio–Stilwell Park Express

Primary / Discount
Primaria / Descuento
$2.50 / $1.25

via Hayes Park





76 Presidio Express

Weekdays*/Días de la semana*

Notes	Noumea & Luzon	Monterey Rd. & Normandy	Monterey Rd. & Buna	Tyler & Franklin	Franklin Gate	Private Bolio Gate	Rifle Range & Bldg 619	Price Fitness Center
A	4:10	4:18	4:22	4:34	--	4:37	4:42	4:48
	5:30	5:38	5:42	5:54	6:00	--	6:01	6:08
	6:08	6:16	6:20	6:33	6:39	--	6:40	6:48
	4:37	**4:45**	**4:49**	**5:05**	**5:11**	--	**5:12**	**5:19**
	5:07	**5:15**	--	--	--	--	--	--

76 Stilwell Park Express

Weekdays*/Días de la semana*

Notes	Price Fitness Center	Rifle Range Bldg 627	Patton Ave & 15th Infantry	Tyler & Franklin	Monterey Rd. & Buna	Noumea & Luzon
	--	--	--	--	4:06	4:09
	4:54	4:58	5:03	5:10	5:22	5:25
	--	--	--	--	6:01	6:05
	6:10	6:15	6:20	6:28	--	--
B	**4:00**	**4:05**	**4:10**	**4:20**	**4:33**	**4:37**
B	**4:30**	**4:35**	**4:40**	**4:50**	**5:03**	**5:07**

Light Type = AM **Bold Type = PM**

Notes:

*No Holiday service.

A Trips entering the Presidio of Monterey before 6:00 am and after 5:30 pm will use the Private Bolio Gate instead of the Franklin Street Gate, and will not serve Franklin Street.

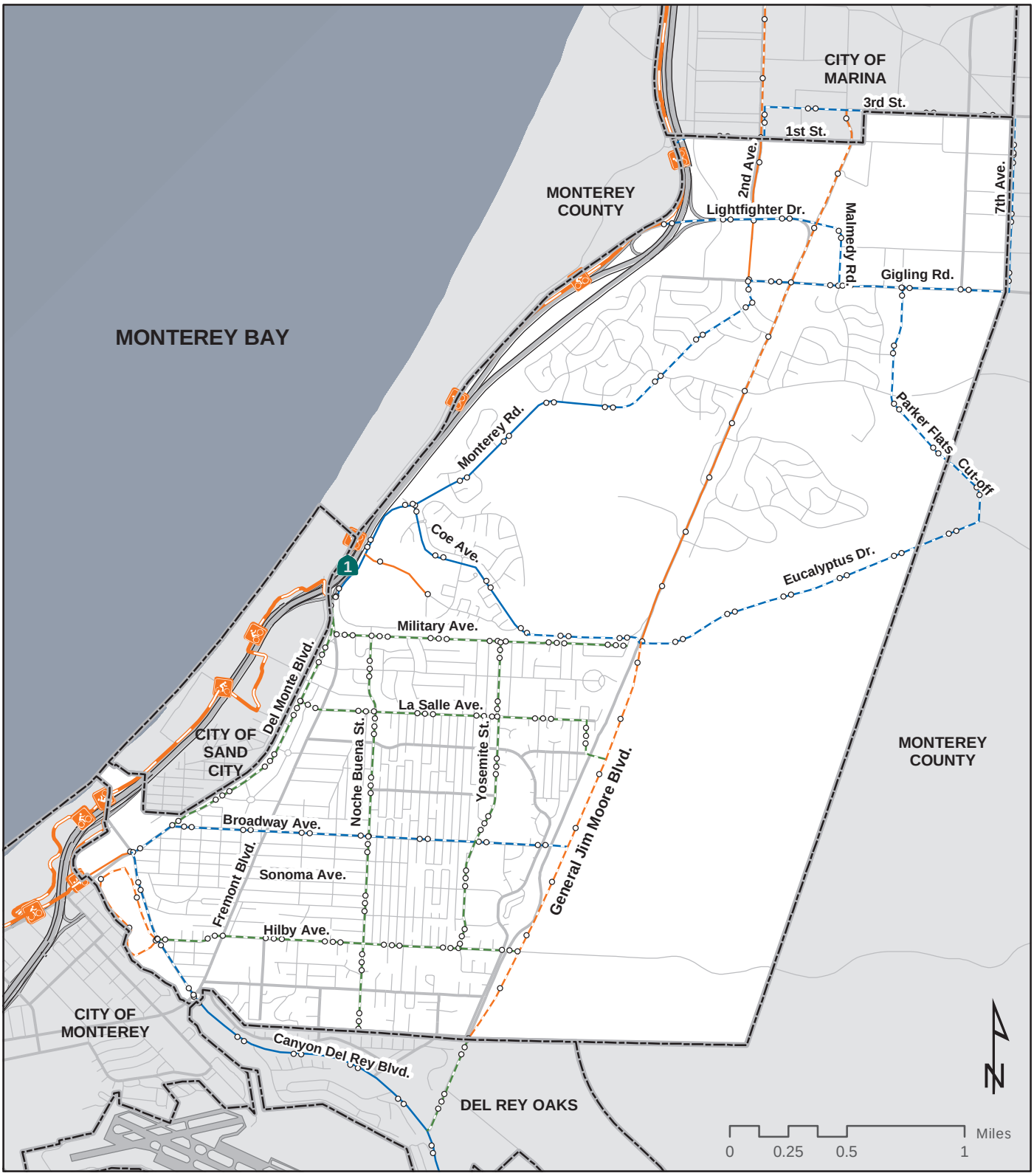
B Depending upon traffic conditions, bus may depart Monterey Rd and Buna earlier than the time listed.

For entry onto the Presidio of Monterey military installation, you must present your valid military/DOD employee badge or identification card to security personnel at the gate entrance.

Passengers boarding in the Presidio of Monterey military installation ride free.

H. TAMC 2011 BICYCLE AND PEDESTRIAN MASTER PLAN FIGURE 4: EXISTING AND PROPOSED BIKEWAYS MAP

Figure 4: Existing and Proposed Bikeways



Source: City of Seaside, GIS 2007

Prepared 10/31/07

California Highway

Monterey Bay Coastal Trail

Proposed Bikeways

- Class I - bike path
- Class II - bike lane
- Class III - bike route

Existing Bikeways

- Class I - bike path
- Class II - bike lane
- Class III - bike route

I. SIGNAL WARRANT EVALUATIONS

Traffic Signal Warrants

Traffic signal warrants analysis was completed for the following intersections:

- Intersection 5: Eastside Parkway and Parker Flats Road

Warrant analysis was completed using the methodology provided by Chapter 4 of the California Manual on Uniform Traffic Control Devices (CAMUTCD) (2014). The Peak Hour Warrant (Warrant 3) was used to analyze these intersections because 24-hour counts were not collected near the intersections to complete the Eight-Hour Warrant (Warrant 1) and Four-Hour Warrant (Warrant 2). In addition, future volumes are only analyzed during the peak hour. Therefore, for this analysis, the Peak Hour Warrant will only be used. It is recommended for future analysis that a full signal warrant to be completed.

In the MUTCD, the Peak Hour Warrant can be analyzed using two methodologies:

- Standard Methodology (Figure 4C-3)
- Standard Methodology with a 70% Factor (Figure 4C-4) – This applies to intersections located within an isolated community with a population of 10,000 or less or if the 85th percentile of the major street exceeds 40 mph.

For Intersection 5, it was assumed that East Side Parkway was the major road. According to the Preliminary Project Screening Analysis for the Northeast-Southwest Arterial Connector Project Memo (August 2018), it was determined that East Side Parkway will be a four-lane high speed roadway. For this analysis it was assumed that high speeds mean that the 85th percentile speed would exceed 40 miles per hour, therefore the 70% factor can be applied.

For Intersection 5, one scenario was analyzed:

- Cumulative Conditions – Two approach lanes for the Major Street approach and one approach lane for the Minor Street approach

For this scenario it was determined that the AM peak hour warrants a signal and therefore it is recommended that a signal be installed at this intersection for Cumulative Conditions. Cumulative Plus Project Conditions were not analyzed since Cumulative Conditions warranted a signal.

For Intersection 6, it was assumed that General Jim Moore Boulevard was the major road. The posted speed limit on General Jim Moore Boulevard near the intersection is 40 miles per hour. It was assumed that since the posted speed is 40 miles per hour, the 85th percentile would also exceed 40 miles per hour, therefore the 70% factor can be applied.

For Intersection 6, two scenarios were analyzed:

- Cumulative with Eastside Parkway Conditions – Four approach lanes for the Major Street approach and three lanes for the Minor Street approach

- Cumulative without Eastside Parkway Conditions – Three approach lanes for the Major Street approach and two approach lanes for the Minor Street approach.

It was determined that a signal is warranted for both the AM and PM peak hour with and without the Eastside Parkway Project. The Plus Project Conditions were not analyzed because the base conditions warrant a signal. Signal warrant sheets are provided in the Appendix of the report.

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2010 MUTCD)

MAJOR STREET: **Eastside Parkway** EB WB # OF APPROACH LANES: **2**

MINOR STREET: **Parker Flats** NB SB # OF APPROACH LANES: **1**

CITY, STATE: **Seaside, CA**

COMMENTS: **Cumulative with Eastside Parkway Conditions**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N) **N**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **Y**

	MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	Ped Count CROSSING MAJOR ST	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
				MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES				**420**	**105**		**630**	**53**		**336**	**84**		**504**	**42**		**60**	**75**
06:30 AM TO 07:30 AM																	
07:30 AM TO 08:30 AM																	
08:30 AM TO 09:30 AM	1,053	109		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:30 AM TO 10:30 AM																	
10:30 AM TO 11:30 AM																	
11:00 AM TO 12:00 PM																	
12:30 PM TO 01:30 PM																	
01:30 PM TO 02:30 PM																	
02:30 PM TO 03:30 PM																	
03:30 PM TO 04:30 PM																	
04:30 PM TO 05:30 PM	1,034	35		Y			Y			Y			Y				
05:30 PM TO 06:30 PM																	
06:30 PM TO 07:30 PM																	
07:30 PM TO 08:30 PM																	
08:30 PM TO 09:30 PM																	
09:30 PM TO 10:30 PM																	
	2,087	144		2	1	**1**	2	1	**1**	2	1	**1**	2	1	**1**	**1**	**1**
				8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
				NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

03/15/19
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TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2010 MUTCD)

MAJOR STREET: **General Jim Moore** NB SB # OF APPROACH LANES: **3**

MINOR STREET: **Eastside Parkway** WB EB # OF APPROACH LANES: **2**

CITY, STATE: **Seaside, CA**

COMMENTS: **Cumulative without Eastside Parkway Conditions**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N) **N**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **Y**

	MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	Ped Count CROSSING MAJOR ST	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
				MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES →				**420**	**140**		**630**	**70**		**336**	**112**		**504**	**56**		**60**	**75**
06:30 AM TO 07:30 AM																	
07:30 AM TO 08:30 AM																	
08:30 AM TO 09:30 AM	2,165	531		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:30 AM TO 10:30 AM																	
10:30 AM TO 11:30 AM																	
11:00 AM TO 12:00 PM																	
12:30 PM TO 01:30 PM																	
01:30 PM TO 02:30 PM																	
02:30 PM TO 03:30 PM																	
03:30 PM TO 04:30 PM																	
04:30 PM TO 05:30 PM	2,168	189		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:30 PM TO 06:30 PM																	
06:30 PM TO 07:30 PM																	
07:30 PM TO 08:30 PM																	
08:30 PM TO 09:30 PM																	
09:30 PM TO 10:30 PM																	
	4,333	720		2	2	**2**	2	2	**2**	2	2	**2**	2	2	**2**	**2**	**2**
				8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
				NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

03/15/19
Kimley-Horn and Associates

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2010 MUTCD)

MAJOR STREET: **General Jim Moore** NB SB # OF APPROACH LANES: **4**

MINOR STREET: **Eastside Parkway** WB EB # OF APPROACH LANES: **3**

CITY, STATE: **Seaside, CA**

COMMENTS: **Cumulative with Eastside Parkway Conditions**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N) **N**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **Y**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	Ped Count CROSSING MAJOR ST	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
						MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES						**420**	**140**		**630**	**70**		**336**	**112**		**504**	**56**		**60**	**75**
06:30 AM	TO	07:30 AM																	
07:30 AM	TO	08:30 AM																	
08:30 AM	TO	09:30 AM	2,279	659		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
09:30 AM	TO	10:30 AM																	
10:30 AM	TO	11:30 AM																	
11:00 AM	TO	12:00 PM																	
12:30 PM	TO	01:30 PM																	
01:30 PM	TO	02:30 PM																	
02:30 PM	TO	03:30 PM																	
03:30 PM	TO	04:30 PM																	
04:30 PM	TO	05:30 PM	2,557	494		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
05:30 PM	TO	06:30 PM																	
06:30 PM	TO	07:30 PM																	
07:30 PM	TO	08:30 PM																	
08:30 PM	TO	09:30 PM																	
09:30 PM	TO	10:30 PM																	
			4,836	1,153		2	2	**2**	2	2	**2**	2	2	**2**	2	2	**2**	**2**	**2**
						8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
						NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**SATISFIED**

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J. MITIGATED CONDITIONS SYNCHRO OUTPUT SHEETS

HCM 2010 Signalized Intersection Summary
6: General Jim Moore Blvd & Coe Ave/Eucalyptus Rd

03/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	427	541	5	113	226	442	462	21	1008	121
Future Volume (veh/h)	95	5	427	541	5	113	226	442	462	21	1008	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	104	5	469	595	5	124	248	486	508	23	1108	133
Adj No. of Lanes	1	1	0	2	1	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	586	4	358	595	132	149	252	1514	951	41	1091	1001
Arrive On Green	0.33	0.23	0.23	0.17	0.07	0.07	0.14	0.42	0.42	0.02	0.31	0.31
Sat Flow, veh/h	1792	17	1583	3476	1881	1599	1792	3574	1599	1792	3574	1565
Grp Volume(v), veh/h	104	0	474	595	5	124	248	486	508	23	1108	133
Grp Sat Flow(s),veh/h/ln	1792	0	1599	1738	1881	1599	1792	1787	1599	1792	1787	1565
Q Serve(g_s), s	4.8	0.0	26.0	19.7	0.3	5.4	15.9	10.4	3.3	1.5	35.1	0.0
Cycle Q Clear(g_c), s	4.8	0.0	26.0	19.7	0.3	5.4	15.9	10.4	3.3	1.5	35.1	0.0
Prop In Lane	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	586	0	362	595	132	149	252	1514	951	41	1091	1001
V/C Ratio(X)	0.18	0.00	1.31	1.00	0.04	0.83	0.98	0.32	0.53	0.57	1.02	0.13
Avail Cap(c_a), veh/h	586	0	362	595	532	488	252	1514	951	98	1091	1001
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	0.0	44.5	47.6	49.8	27.3	49.3	22.1	6.2	55.6	40.0	8.5
Incr Delay (d2), s/veh	0.1	0.0	158.4	36.7	0.1	11.4	51.6	0.1	0.6	11.9	31.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	27.4	12.5	0.2	2.9	11.5	5.2	6.2	0.9	22.0	1.7
LnGrp Delay(d),s/veh	27.8	0.0	202.9	84.3	49.9	38.7	100.9	22.2	6.8	67.5	71.2	8.5
LnGrp LOS	C		F	F	D	D	F	C	A	E	F	A
Approach Vol, veh/h		578			724			1242			1264	
Approach Delay, s/veh		171.4			76.3			31.6			64.5	
Approach LOS		F			E			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	53.2	24.2	30.5	20.7	39.6	42.1	12.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.3	45.0	19.7	26.0	16.2	35.1	13.2	32.5
Max Q Clear Time (g_c+I1), s	3.5	12.4	21.7	28.0	17.9	37.1	6.8	7.4
Green Ext Time (p_c), s	0.0	6.4	0.0	0.0	0.0	0.0	1.5	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	72.2
HCM 2010 LOS	E

Notes

Appendix J

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING & REPORTING PROGRAM
California Central Coast Veterans Cemetery Project – 2015 Master Plan and Phase 2

Introduction

In accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), an Environmental Impact Report/Environmental Assessment (EIR/EA) was prepared that identifies potential adverse impacts related to construction and operation of the California Central Coast Veterans Cemetery Project (CCCVC) Project – 2015 Master Plan and Phase 2 (proposed project). The EIR/EA identifies mitigation measures that would reduce or eliminate these impacts.

Section 21081.6 of the Public Resources Code and Sections 15091(d) and 15097 of the State CEQA Guidelines and NEPA require public agencies to adopt a reporting and monitoring program for changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. A Mitigation Monitoring Reporting Plan (MMRP) is required for the proposed project, because the EIR/EA identified potentially significant adverse impacts related to construction and operation activities, and mitigation measures have been identified to mitigate these impacts. Adoption of the MMRP will occur along with approval of the proposed project.

Purpose of the Mitigation Monitoring and Reporting Plan

This MMRP has been prepared to ensure that all required mitigation measures are implemented and completed according to schedule and maintained in a satisfactory manner during the construction and operation of the proposed project, as required. The MMRP may be modified by the California Department of Veterans Affairs (CalVet) during project implementation, as necessary, in response to changing conditions or other project refinements. The MMRP table below has been prepared to assist the responsible parties in implementing the MMRP. This table identifies the category of significant environmental impact(s), individual mitigation measures, monitoring and mitigation timing, responsible person/agency for implementing the measure, monitoring and reporting procedure, and notation space to confirm implementation of the mitigation measures. The numbering of the mitigation measures follows the numbering sequence in the Draft EIR/EA.

Roles and Responsibilities

CalVet, as the CEQA lead agency, and the U.S. Department of Veteran's Affairs (USDVA), as NEPA lead agency, are responsible for the oversight of compliance of the mitigation measures in the MMRP.

Mitigation Monitoring and Reporting Plan

The following describes the column categories identified in the MMRP table:

- **Mitigation Measure** – This column lists the mitigation measures by number.
- **Project Component/Activity/Timing/Frequency/Agency Coordination** – This column lists the project component the mitigation measure applies to, activity(ies) to be monitored for each mitigation measure, the timing of each activity, the frequency of monitoring for each activity, and identification of any outside agency coordination.
- **Implementation Responsibility/Verification** – This column identifies the entity responsible for complying with the requirements of the mitigation measure and provides space for verification initials and date.
- **Responsibility for Oversight of Compliance/Verification** – This column provides the agency responsible for oversight of the mitigation implementation, and is to be dated and initialed by the agency representative based on the documentation provided by the construction contractor or through personal verification by agency staff.
- **Comments** – this column provides space for written comments, if necessary.

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MITIGATION MONITORING & REPORTING PROGRAM
California Central Coast Veterans Cemetery Project – 2015 Master Plan and Phase 2

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
Biological Resources				
BIO-1: HMP Species Salvage Prior to each future phase of the 2015 Master Plan, including Phase 2, CalVet shall require that a biological survey of development sites be conducted by a qualified biologist to determine if the development could potentially impact HMP species or potential habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to 1) a description of the biological conditions at the site; 2) identification of the potential for HMP species to occur or HMP species observed, if any; and 3) maps of the locations of HMP species or potential habitat, if observed. If HMP species that do not require take authorization from the USFWS or CDFW are identified within the development site, salvage efforts for these species will be evaluated by a qualified biologist in coordination with CalVet to further reduce impacts per the requirements of the HMP and Programmatic BO. Where salvage is determined feasible and proposed, seed collection should occur from plants within the development site and/or topsoil should be salvaged within occupied areas to be disturbed. Seeds should be collected during the appropriate time of year for each species by qualified biologists. The collected seeds and topsoil should be used to revegetate temporarily disturbed construction areas and reseeding and restoration efforts on- or off-site, as determined appropriate by the qualified biologist CalVet. For HMP species that require take authorization from the USFWS or CDFW, any additional salvage measures identified in the take authorization(s) shall be followed.	**Applies to**: Phase 2 2015 Master Plan **Activity**: Conduct biological surveys and plant salvage. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with CNPS, CDFW, and USFWS.	**CalVet** _____ Initials _____ Date **Project Biologist** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	
BIO-2: ESA and CESA Compliance If HMP or other species that require take authorization from the USFWS and/or CDFW are identified within the development site, CalVet will comply with the ESA and CESA and obtain necessary authorizations prior to construction of each phase of the 2015 Master Plan, including Phase 2. Due to the presence and potential presence of Federally listed species on the 2015 Master Plan site and Federal nexus (i.e., Federal funding), the USDVA, acting as the NEPA lead agency for the proposed project, shall be required to initiate a Section 7 consultation with the USFWS and prepare a written analysis in the form	**Applies to**: Phase 2 2015 Master Plan **Activity**: Prepare BA and conduct Section 7 consultation. Implement mitigation included measures in BO.	**USDVA** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
of a Biological Assessment (BA) to determine whether their actions may affect a listed or proposed species and designated and proposed critical habitat for each future phase. Based on the BA, the USFWS will issue a BO regarding likely impacts as a result of implementing the proposed future phase. Any further avoidance and minimization measures that may be required as a component of the BA will be implemented. For potential impacts to State listed species, CalVet will comply with the CESA and consult with the CDFW to determine whether authorization for the incidental take of the species is required prior to construction. If it is determined that authorization for incidental take is required from the CDFW, CalVet will obtain an incidental take permit at the project-level prior to ground-disturbing activities. Permit requirements typically involve preparation and implementation of a mitigation plan and mitigating impacted habitat at a 3:1 ratio through preservation and/or restoration, as described above. CalVet would be required to retain a qualified biologist to prepare a mitigation plan, which will include, but is not limited to, identifying avoidance and minimization measures; mitigation strategy, including a take assessment, compensatory mitigation lands, and success criteria; and funding assurances. CalVet would be required to implement the approved plan and any additional permit requirements. Alternatively, if the State listed species is covered under the Fort Ord HCP, CalVet can wait to implement the phase, including any ground-disturbing activities, until the Fort Ord HCP is approved and base-wide state incidental take permits are issued. If CalVet chooses the base-wide permit alternative, project-specific, project-specific incidental take permits will not be necessary; however, all applicable requirements of the HCP will be implemented.	Consult with CDFW and obtain an incidental take permit, if necessary. Implement mitigation measures included in the permit. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: USFWS and/or CDFW.			
BIO-3: Construction Best Management Practices The following best management practices will be implemented during all identified phases of construction (i.e., pre-, during, and post-) to reduce impacts to special-status plant and wildlife species for each phase of the 2015 Master Plan, including Phase 2: • A qualified biologist will conduct an Employee Education Program for the construction crew prior to any construction activities. The qualified biologist will meet with the construction crew at the onset of construction at the project site to educate the construction crew on the following: 1) the	**Applies to**: Phase 2 2015 Master Plan **Activity**: Implement construction best management practices. **Timing**: Prior to, during, and post	**Project Contractor** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
appropriate access route(s) in and out of the construction area and review project boundaries; 2) how a biological monitor will examine the area and agree upon a method which will ensure the safety of the monitor during such activities, 3) the special-status species that may be present; 4) the specific mitigation measures that will be incorporated into the construction effort; 5) the general provisions and protections afforded by USFWS and CDFW; and 6) the proper procedures if a special-status species is encountered within the project site. • Trees and vegetation not planned for removal or trimming will be protected prior to and during construction to the maximum possible through the use of exclusionary fencing, such as hay bales for herbaceous and shrubby vegetation, and protective wood barriers for trees. Only certified weed-free straw will be used to avoid the introduction of non-native, invasive species. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact. • Protective fencing will be placed prior to and during construction to stop construction equipment and personnel from impacting vegetation outside of work limits. A biological monitor will supervise the installation of protective fencing and monitor at least once per week until construction is complete to ensure that the protective fencing remains intact. • Following construction, disturbed areas will be restored to pre-project contours to the maximum extent possible and revegetated using locally-occurring native species and native erosion control seed mix, per the recommendations of a qualified biologist. • Grading, excavating, and other activities that involve substantial soil disturbance will be planned and implemented in consultation with a qualified hydrologist, engineer, or erosion control specialist, and will utilize standard erosion control techniques to minimize erosion and sedimentation to native vegetation (pre-, during, and post-construction). • No firearms will be allowed on the project site at any time. • All food-related and other trash will be disposed of in closed containers and removed from the project area at least once a week during the construction	construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A.	**Project Biologist** Initials Date		

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
period, or more often if trash is attracting avian or mammalian predators. Construction personnel will not feed or otherwise attract wildlife to the area.				
BIO-4: Construction-Phase Monitoring The applicant will retain a qualified biologist to monitor all ground disturbing construction activities (i.e., vegetation removal, grading, excavation, or similar activities) to protect any special-status species encountered for each phase of the 2015 Master Plan, including Phase 2. Any handling and relocation protocols of special-status wildlife species will be determined in coordination with CDFW prior to any ground disturbing activities, and will be conducted by a qualified biologist with appropriate scientific collection permit. After ground disturbing project activities are complete, the qualified biologist will train an individual from the construction crew to act as the on-site construction biological monitor. The construction biological monitor will be the contact for any special-status wildlife species encounters, will conduct daily inspections of equipment and materials stored on site and any holes or trenches prior to the commencement of work, and will ensure that all installed fencing stays in place throughout the construction period. The qualified biologist will then conduct regular scheduled and unscheduled visits to ensure the construction biological monitor is satisfactorily implementing all appropriate mitigation protocols. Both the qualified biologist and the construction biological monitor must work through the State Inspector to cease construction contractor work and/or redirect project activities to ensure protection of resources and compliance with all environmental permits and conditions of the project. The qualified biologist and the construction monitor shall complete a daily log summarizing activities and environmental compliance throughout the duration of the project. The log will also include any special-status wildlife species observed and relocated.	**Component**: Phase 2 2015 Master Plan **Activity**: Monitor ground disturbing and construction activities. **Timing**: Prior to and during construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with CDFW.	**Project Biologist** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	
BIO-5: Non-Native, Invasive Species Controls The following measures will be implemented for each phase of the 2015 Master Plan, including Phase 2, to reduce the introduction and spread of non-native, invasive species: • Any landscaping or replanting required for the project will not use species listed as noxious by the California Department of Food and Agriculture (CDFA) or invasive by the California Invasive Plant Council (Cal-IPC).	**Component**: Phase 2 2015 Master Plan **Activity**: Implement measures to reduce the introduction and spread of non-native, invasive species.	**Project Contractor** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
• Bare and disturbed soil will be landscaped with CDFA recommended seed mix or plantings from locally adopted species to preclude the invasion on noxious weeds in the project site. • Construction equipment will be cleaned of mud or other debris that may contain invasive plants and/or seeds and inspected to reduce the potential of spreading noxious weeds, before mobilizing to arrive at the construction site and before leaving the construction site. • All non-native, invasive plant species will be removed from disturbed areas prior to replanting.	**Timing**: During construction. **Frequency**: Ongoing during each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A.			
BIO-6: Project-Specific Biological Resources Studies (Non-HMP Species) CalVet shall require that a biological survey of each future phase of the 2015 Master Plan be conducted by a qualified biologist to determine if the development could potentially impact a special-status species or their habitat. A report describing the results of the surveys will be provided to CalVet prior to any ground disturbing activities. The report will include, but not be limited to: 1) a description of the biological conditions at the site; 2) identification of the potential for special-status species to occur or special-status species observed, if any; 3) maps of the locations of special-status species or potential habitat, if observed; and 4) recommended mitigation measures, if applicable. • If special-status species are determined not to occur at the development site, no additional mitigation is necessary. • If special-status species are observed or determined to have the potential to occur, the project biologist shall recommend measures necessary to avoid, minimize, and/or compensate for identified impacts. Measures may include, but are not limited to, revisions to the project design and project modifications, pre-construction surveys, construction buffers, construction best management practices, monitoring, non-native species control, restoration and preservation, and salvage and relocation.	**Component**: Phase 2 2015 Master Plan **Activity**: Conduct biological surveys and implement recommended mitigation measures. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A.	**Project Biologist** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	
BIO-7: Pre-Construction Surveys for Protected Avian Species Construction activities that may directly (e.g., vegetation removal) or indirectly (e.g., noise/ground disturbance) affect protected nesting avian species will be	**Component**: Phase 2 2015 Master Plan	**Project Biologist** _____	**CalVet** _____	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
timed to avoid the breeding and nesting season. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Specifically, vegetation and/or tree removal can be scheduled after September 16 and before January 31. Alternatively, a qualified biologist will be retained by the project applicant to conduct pre-construction surveys for nesting raptors and other protected avian species within 500 feet of proposed construction activities if construction occurs between February 1 and September 15. Pre-construction surveys will be conducted no more than 14 days prior to the start of construction activities during the early part of the breeding season (February through April) and no more than 30 days prior to the initiation of these activities during the late part of the breeding season (May through August). Because some bird species nest early in spring and others nest later in summer, surveys for nesting birds may be required to continue during construction to address new arrivals, and because some species breed multiple times in a season. The necessity and timing of these continued surveys will be determined by the qualified biologist based on review of the final construction plans and in coordination with the CDFW, as needed. If raptors or other protected avian species nests are identified during the pre-construction surveys, the qualified biologist will notify the project applicant and an appropriate no-disturbance buffer will be imposed within which no construction activities or disturbance should take place (generally 500 feet in all directions for raptors; other avian species may have species-specific requirements) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist.	**Activity**: Conduct pre-construction surveys for avian nesting species and implement mitigation measures as necessary. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with CDFW.	Initials Date	Initials Date	
BIO-8: Pre-Construction Special-Status Plant Surveys A qualified biologist shall be retained to conduct special-status plant survey(s) according to USFWS, CDFW, and CNPS protocols for during the appropriate identification period(s) to determine their presence within the Phase 2 site. The biologist shall prepare a report that provides the results of the survey, and, if found the number and locations of individuals/populations identified within the site. If no special-status plant species are found, no further mitigation is necessary. If special-status plant species are found, the following measures shall be implemented: • Individuals shall be avoided to the maximum extent possible.	**Component**: Phase 2 **Activity**: Conduct special-status plant surveys and implement mitigation measures as necessary. **Timing**: Prior to construction.	**Project Biologist** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
• For impacts to the HMP species within the development site that do not require take authorization from USFWS or CDFW, salvage efforts for these species will be evaluated by a qualified biologist in coordination with the contractor to further reduce impacts per the requirements of the HMP and BO, in accordance with **Mitigation Measure BIO-1.** • If non-HMP special-status plant species are observed and if avoidance is not feasible, species shall be replaced at a 1:1 success ratio for the acreage or individuals impacted (depending on species impacted) and a Rare Plant Restoration Plan shall be prepared by a qualified biologist and implemented. The plan shall include, but is not limited to, the following: – A description of the baseline conditions of the habitats within the work site, including the presence of any special-status species, their locations, and densities; – Procedures to control and/or eliminate non-native invasive species within the work site; – Provisions for ongoing training of facility maintenance personnel to ensure compliance with the requirements of the plan; – A detailed description of on-site and/or off-site restoration areas, salvage of seed and/or soil bank, plant salvage, seeding and planting specifications, including, if required by the CDFW, increased planting ratio to ensure the 1:1 success ratio; and – A monitoring program that describes annual monitoring efforts which incorporate success criteria and contingency plans if success criteria are not met.	**Frequency**: Once per Phase 2. **Outside Agency Coordination**: Possible coordination with CNPS, CDFW, and USFWS.			
BIO-9: Pre-Construction Surveys for Special-Status Bats To avoid and reduce impacts to hoary bat and Townsend's big-eared bat, CalVet will retain a qualified bat specialist or wildlife biologist to conduct site surveys during the reproductive season (May 1 through September 15) to characterize bat utilization of the site and potential species present (techniques utilized to be determined by the biologist) prior to any vegetation removal. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. Based on the results of these initial surveys, one or more of the following will	**Component**: Phase 2 2015 Master Plan **Activity**: Conduct pre-construction surveys for special-status bats and implement mitigation	**Project Biologist** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
occur: • If it is determined that bats are not present at the site, no additional mitigation is required. • If it is determined that bats are utilizing the site and may be impacted by the proposed project, pre-construction surveys will be conducted within 100 feet of construction limits no more than 30 days prior to any tree removal. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, tree removal may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night). • If a single bat and/or only adult bats are roosting, removal of trees may proceed after the bats have been safely excluded from the roost. Exclusion techniques will be determined by the biologist and depend on the roost type; the biologist will prepare a mitigation plan for provision of alternative habitat to be approved by CDFW. • If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) will be postponed until the biologist monitoring the roost(s) determines that the young have fledged and are no longer dependent on the roost. The monitor will ensure that all bats have left the area of disturbance prior to initiation of limbing and/or removal of trees. If avoidance is not possible and a maternity roost must be disrupted, a depredation permit would be required prior to removal of the roost.	measures as necessary. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with CDFW.			
BIO-10: Pre-Construction Surveys for Monterey Dusky-Footed Woodrat Not more than thirty (30) days prior to the start of construction (including vegetation removal), a qualified biologist shall conduct a survey of the project sites to locate existing Monterey dusky-footed woodrat nests. This measure shall be implemented for each phase of the 2015 Master Plan, including Phase 2. All Monterey dusky-footed woodrat nests shall be mapped and flagged for avoidance. Graphics depicting all Monterey dusky-footed woodrat nests shall be provided to the construction contractor. Any Monterey dusky-footed woodrat	**Component**: Phase 2 2015 Master Plan **Activity**: Conduct pre-construction surveys for Monterey dusky-footed woodrat and implement mitigation measures as necessary.	**Project Biologist** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
nests that cannot be avoided shall be relocated according to the following procedures: • Each active nest shall be disturbed by the qualified biologist to the degree that the woodrats leave the nest and seek refuge elsewhere. After the nests have been disturbed, the nest sticks shall be removed from the impact areas and placed outside of areas planned for impacts. Nests shall be dismantled during the non-breeding season (between October 1 and December 31), if possible. If a litter of young is found or suspected, nest material shall be replaced and the nest left alone for 2-3 weeks, after this time the nest will be rechecked to verify that young are capable of independent survival before proceeding with nest dismantling.	**Timing**: No more than 30 days prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A			
BIO-11: Oak Tree Protection and Replacement Measures For each phase of the 2015 Master Plan, including Phase 2, impacts to coast live oak trees shall be avoided and minimized through site design and protection during construction. To maximize tree retention and protection, a forester, arborist, or other tree care professional shall be involved with early design and planning for each phase and shall be involved in the review and development of final grading and construction plants wherever trees occur within the site or at the grading margins. To avoid unintended impacts to trees outside the construction area, the following tree protection measures shall be implemented: • Temporary construction fencing shall be placed at approximately 10 feet from the trunk and no grading, trenching, or vegetative alteration shall occur within this environmental exclusion zone. Grading, vegetation removal, and other ground disturbing construction activities may not commence until the project forester has inspected and approved the protective fencing installed by the contractor. No equipment or materials, including soil, shall be stored within the established environmental exclusion zone. Prior to grading within 25 feet of retained trees, the project forester, arborist or other tree care professional shall be consulted to determine whether pruning is necessary to protect limbs from grading equipment. • To avoid soil compaction from damaging the roots, heavy equipment shall not be allowed to drive over the root area. If deemed necessary and approved by the forester, equipment may drive across one side of the tree. To reduce soil compaction, wood chips shall be spread 6-12 inches deep to disperse the	**Component**: Phase 2 2015 Master Plan **Activity**: Implement tree protection measures to minimize and avoid impacts to coast live oak trees. **Timing**: Prior to and during construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A.	**CalVet** _____ Initials _____ Date **Project Arborist** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
weight of equipment and plywood sheets shall be placed over the wood chips for added protection. To reduce soil compaction, wood chips shall be spread 6-12 inches deep to disperse the weight of equipment and plywood sheets shall be placed over the wood chips for added protection. • Roots exposed by excavation must be pruned and recovered as quickly as possible to promote callusing, closure, and healthy regrowth. • Retained trees shall be watered periodically in accordance with species need to promote tree health. Transplanted trees and their intended planting areas shall be pre-watered. Post planting watering shall be done as needed to assure establishment. • When phase design is completed, an estimate of the appropriate number of replacement trees shall be made based on available planting space. These replacement trees (minimum five-gallon specimens) shall be planted along boundaries and within landscape areas. Planting density for replacement trees shall be accurately detailed to allow for some unavoidable mortality over time. • Transplants are encouraged and shall be credited on a 3:1 basis. Final replanting numbers may be modified by additional tree retention and should be made part of the final landscaping plan.				
BIO-12: Coast Live Oak Tree and Woodland Protection **Mitigation Measure BIO-6, Project-Specific Biological Resources Studies**, requires biological surveys and an assessment of potential impacts to sensitive biological resources prior to construction of future phases of the 2015 Master Plan. During the implementation of **Mitigation Measure BIO-6**, a qualified biologist shall determine whether coast live oak trees/woodland would be impacted by each proposed phase. If coast live oak trees/woodland have the potential to be impacted, a qualified biologist will provide a description of the conditions of the trees and habitat that may be impacted and quantify the individuals and/or acreage that may be impacted for inclusion in the Project-Specific Biological Resources Study required by **Mitigation Measure BIO-6**.	**Component**: 2015 Master Plan **Activity**: Prepare an inventory of coast live oak trees and implement mitigation measures as necessary. **Timing**: Prior to construction.	**Project Biologist** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
The impact analysis shall take into consideration tree retention, relocation, and replacement proposed for each phase. A qualified biologist will include a summary of coast live oak trees/woodland impacted by phase to date in the study and verify that the impacts that the oak mitigation continues to meet the 1:1 mitigation ratio. If a future phase would exceed the 1:1 mitigation ratio of the acreage coast live oak woodland preserved on-site, the phase may be designed to avoid or additional mitigation (e.g., including off-site preservation, on-site or off-site restoration, or payment of in-lieu fees) would be required. A qualified biologist will identify potential additional mitigation strategies in the study, and the appropriate mitigation strategy shall be determined and initiated prior to construction of the future phase that would exceed the mitigation ratio. Potential mitigation strategies may include: • Opportunities for off-site oak woodland preservation areas may include coast live oak woodland habitat within or adjacent to the former Fort Ord. However, off-site preservation areas shall not include any lands conserved as part of the Fort Ord Oak Woodland Conservation Area, once approved. • On-site or off-site restoration of coast live oak woodland habitat within or adjacent to the former Fort Ord. • Payment of in-lieu fees to the County and/or Seaside to fund a portion of the management and monitoring of the Fort Ord Oak Woodland Conservation Area, once approved, in order to satisfy phase-specific mitigation required if the on-site coast live oak impacts exceed a 1:1 mitigation ratio exceeded in the phase.	**Frequency**: Once per each phase of each future phase of the 2015 Master Plan. **Outside Agency Coordination**: N/A.			
Cultural and Tribal Resources				
CTR-1: Unanticipated Discovery A. If subsurface deposits believed to be cultural or human in origin are discovered during construction, then all work must halt within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgement.	**Component**: Phase 2 2015 Master Plan **Activity**: Avoid or mitigate impacts to unanticipated cultural discovery.	**Project Contractor** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
A Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, shall be required if the nature of the unanticipated discovery is prehistoric. Work cannot continue within the no-work radius until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either: 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR. B. If a potentially-eligible resource is encountered, then the archaeologist and lead agency shall arrange for either: 1) total avoidance of the resource, if possible; or 2) test excavations to evaluate eligibility. If found to be eligible for either the NRHP or CRHR, then adverse effects (under Section 106) and significant impacts (under CEQA) would be resolved/mitigated through data recovery excavations to the extent of obtaining enough information to address applicable research questions. If data recovery is necessary, a data recovery plan will be prepared, reviewed by the lead agency, and implemented. Determinations of eligibility and completion of data recovery (if necessary) shall be formally documented in writing and submitted to the lead agency as verification that the provisions in CEQA/NEPA for managing unanticipated discoveries have been met.	**Timing**: During construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with the SHPO and the NAHC.	**Project Archaeologist** Initials Date		
CTR-2: Cultural Sensitivity Training: A *Worker Awareness Training* will be developed and conducted prior to any construction operations for future phases, including Phase 2. The training program will inform crew members of the potential for archaeological finds and the protocols to be followed in the event of the discovery of archaeological materials. The program will be presented by a Professional Archaeologist and include an ALERT Sheet with visual aids with a focus on archaeological objects and other cultural materials that could be present within the project site. The training will also provide protocols in the event of an unexpected discovery and points of contact in the event of an unexpected find including Native American burials. The training will include a briefing to supervisory construction personnel and "tailgate" training to field personnel.	**Component**: Phase 2 2015 Master Plan **Activity**: Prepare and implement a Worker Awareness Training for potential archeological finds and protocols. **Timing**: Prior to construction. **Frequency**: Once per each phase of each	**Project Contractor** Initials Date		

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
	future phase of the 2015 Master Plan. **Outside Agency Coordination**: N/A.	**Project Archaeologist** Initials Date		
CTR-3: Discovery of Human Remains In the event that evidence of human remains is discovered, construction activities within 100 meters of the discovery shall be halted or diverted and the requirements of Mitigation Measure CTR-1 will be implemented. In addition, the County Coroner shall be notified in accordance with provisions of PRC Sections 5097.98-99. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four hours of the determination, as required by California Health and Safety Code Section 7050.5(c) and PRC 5097. The NAHC shall identify the person or persons it believes to be most likely descended (MLD) from the deceased Native American (PRC Section 5097.98). The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a document with the county in which the property is located (AB 2641).	**Component**: Phase 2 2015 Master Plan **Activity**: Conduct biological surveys and plant salvage. **Timing**: During construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: Possible coordination with the County Coroner, SHPO, NAHC, and MLD.	**Project Contractor** Initials Date **CalVet** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
Hydrology and Water Quality				
HYD-1: Drainage Basin Analysis Prior to construction of Phase 3 or subsequent phases of the 2015 Master Plan, further analysis shall be completed by CalVet to confirm that the retention basin has the capacity to contain runoff from a 100-year storm event. If it is determined that the size of the retention basin is not adequate, design of that phase shall include modifications to the retention basin design to increase its capacity to the adequate size. In addition, the project proponent shall consult with the City of Seaside to submit a Letter of Map Revision (LOMR) request to FEMA to revise flood elevation included in FIRM Map #06053C0195H, based on the findings of the analysis.	**Component**: 2015 Master Plan **Activity**: Determine if the capacity of the drainage basin is adequate for each future phase of the 2015 Master Plan, and implement mitigation measures if necessary. **Timing**: Prior to construction of Phase 3 and subsequent phases of the 2015 Master Plan. **Frequency**: Once per each future phase of the 2015 Master Plan. **Outside Agency Coordination**: Possible coordination with the City of Seaside.	**CalVet** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	
Noise				
NOI-1: Construction Noise Reduction Measures The following measures shall be implemented to reduce construction-generated noise levels: • Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and between the hours of 9:00 a.m. and 7:00 p.m. on weekends and legal holidays.	**Component**: Phase 2 2015 Master Plan **Activity**: Implement measures to reduce construction-generated noise impacts.	**Project Contractor** _____ Initials _____ Date	**CalVet** _____ Initials _____ Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
• Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation. • When not in use, all construction equipment and haul trucks shall be turned off and shall not be allowed to idle. Clear signage that posts this requirement shall be provided for workers at the entrances to the site. • Construction equipment and material staging areas shall be located at the furthest distance possible from nearby residential land uses. • To the extent possible, heavy-duty haul truck trips required for project construction should be scheduled during the non-peak hours of the day.	**Timing**: During construction. **Frequency**: Ongoing during construction of each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: N/A.			
Transportation				
TR-1: Construction Traffic Management Plan Prior to the commencement of construction activities for Phase 2 and future phases, CalVet or designated representative shall prepare a Construction Traffic Management Plan and submit plan to the City of Seaside and/or County Engineer. The plan shall: • Designate construction vehicle access routes to the project site that avoid roads with potential sensitive receptors (Normandy Road). The preferred designated access route to the project site should be via Gigling Road to Parker Flats Road. • Identify proper safety precautions to avoid safety impacts to sensitive receptors if access to the project site via Normandy Road is unavoidable. Access to the project site shall not occur directly before or directly after school hours.	**Component**: Phase 2 2015 Master Plan **Activity**: Prepare and implement a Construction Traffic Management Plan to reduce construction-related traffic impacts. **Timing**: Prior to construction. **Frequency**: Once per each phase of the 2015 Master Plan, including Phase 2. **Outside Agency Coordination**: City of Seaside and/or County Engineer.	**CalVet** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
TR-2: Operational Traffic Management To reduce potential safety impacts during the operation of Phase 2 and future phases of the CCCVC: • Identify preferred routes to the CCCVC site which do not make use of Normandy Road between General Jim Moore Boulevard and Parker Flats Road. • Publicize and encourage the use of the identified alternative routes on the CCCVC facility information (i.e., website, pamphlet, and brochures).	**Component**: Phase 2 2015 Master Plan **Activity**: Implement operational traffic management to reduce safety impacts during operation. **Timing**: During operation of the CCCVC. **Frequency**: Ongoing during project operations. **Outside Agency Coordination**: N/A.	**CalVet** Initials Date	**CalVet** Initials Date	
TR-3: Signal Timings and Phasing Adjustments If the Northeast Southwest Arterial Connector Roadway is in operation at the time the construction of Phase 4 of the CCCVC is proposed, CalVet will coordinate with the City of Seaside to adjust signal timing and signal phasing to improve intersection operations at General Jim Boulevard & Coe Avenue and reduce AM peak hour delay. The signal timings and signal phasing will be adjusted prior to operation of Phase 4 of the CCCVC.	**Component**: 2015 Master Plan (Phase 4) **Activity**: Adjust signal timing and phasing to improve peak hour intersection operations on major roads. **Timing**: Prior to operation of Phase 4. **Frequency**: Once. **Outside Agency Coordination**: City of Seaside.	**CalVet** Initials Date	**CalVet** Initials Date	

Mitigation Measure	Project Component/Activity/ Timing/Frequency/ Agency Coordination	Implementation Responsibility/ Verification	Responsible Party for Oversight of Compliance/ Verification	Comments
TR-4: Pedestrian and Bicycle Facility Improvements ADA compliant sidewalks and crosswalks, as well as bicycle parking, shall be designed and constructed as part of Phase 3 development of the CCCVC to address the gap in the sidewalk network along the project frontage and just west of the Normandy Road & Parker Flats Cut-Off Road intersection. The improvements will be constructed in compliance with adopted City of Seaside and County standards.	**Component**: 2015 Master Plan (Phase 3) **Activity**: Design and construct bicycle ADA compliant sidewalks and crosswalks as well as bicycle parking. **Timing**: Prior to and during construction of Phase 3. **Frequency**: Once. **Outside Agency Coordination**: Possible coordination with the City of Seaside and County of Monterey.	**CalVet** Initials Date	**CalVet** Initials Date	
TR-5: Special Event Management Plan CalVet shall prepare and implement a Special Event Transportation Management Plan during special events at the cemetery. The plan shall be submitted to the City of Seaside and/or County Engineer for review and approval for issuance of a Special Event Permit. The plan shall include: • Designated off-site parking facilities; • A traffic flow plan to direct motorists from access roads to identified off-site parking facilities; and • A description of the shuttle service system to transport special event attendees to and from established parking areas.	**Component**: Phase 2 2015 Master Plan **Activity**: Prepare and implement a Special Event Transportation Management Plan. **Timing**: Prior to and during operations. **Frequency**: Ongoing during project operations. **Outside Agency Coordination**: N/A.	**CalVet** Initials Date	**CalVet** Initials Date	

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