INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

FOR THE

WACKERLY ANNEXATION PROJECT

JULY 2019

Prepared for:

City of Manteca – City Hall
1001 West Center Street
Manteca, CA 95337
(209) 456-8000

Prepared by:

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De Novo Planning Group

A Land Use Planning, Design, and Environmental Firm

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Proposed Mitigated Negative Declaration for the Wackerly Annexation Project

Lead Agency:
City of Manteca
1001 West Center Street
Manteca, CA 95337

Project Title: Wackerly Annexation Project

Project Location: The Wackerly Annexation project site (project site) includes approximately 13.08 acres located outside the south-central portion of the City of Manteca in unincorporated San Joaquin County, California. The project site is within the City of Manteca's 10-Year Planning Horizon per the City's Sphere of Influence Map. The site is identified by San Joaquin County Assessor's Parcel Number 226-170-03. The site is bound by Woodward Avenue to the north, a developed single-family subdivision to the east, undeveloped agricultural land to the south, and a developed single-family residence and a Sikh temple to the west.

Project Description: The proposed project includes development of 60 single-family homes on the 13.08-acre site. The project also includes associated circulation and infrastructure improvements throughout the project site. The existing home and garage located on the northeast corner of the site will remain, and the existing home located on the northwest corner will be demolished prior to construction. The proposed 60 single-family residential units will be located within 60 separate lots throughout the project site. All of the trees surrounding the northwestern residence will be removed as part of the project. The trees surrounding the northeastern residence will remain. The project site will be re-landscaped with trees, shrubbery, grass and other common landscaping vegetation.

The existing City laterals and lines currently located in Woodward Avenue will be extended into the project site. The project also includes development of internal 12-inch to 24-inch storm drainage, 6-inch to 8-inch sewer, and 8-inch water lines within the proposed internal streets right-of-way. Storm drainage would be conveyed to an on-site storm drain basin and storm drainage metering station which will discharge to the City's storm drainage system. The project also proposes to include a drainage basin in the southwestern corner of the site. The basin will have 0.96 acre-feet of storage potential. Various storm drainage supporting structures, inlets, outlets, and drainage swales will be located throughout the project site directing the direction of flow into the drainage basin.

Two primary access points are proposed by the project off Woodward Avenue. Internal circulation will be provided by an array of interior streets that encircle and cross through the center of the project site. Two secondary future access points are proposed by the project at the southwestern corner of the project site. Barriers are proposed at the at the ends of the secondary access points, meeting the edge of the property line. Future adjacent development to the west and south will eventually extend these two secondary access points to connect to this portion of the site. Street lighting and sidewalks are proposed along interior streets throughout the project site. Additionally, the project will provide a minimum two car garage, and two driveway spaces per lot for a minimum of 120 garage spaces and 120 driveway spaces in total.

Findings:

In accordance with the California Environmental Quality Act, the City of Manteca has prepared an Initial Study to determine whether the proposed project may have a significant adverse effect on the environment. The Initial Study and Proposed Mitigated Negative Declaration reflect the independent judgment of City of Manteca staff. On the basis of the Initial Study, the City of Manteca hereby finds:

> *Although the proposed project could have a significant adverse effect on the environment, there will not be a significant adverse effect in this case because the project has incorporated specific provisions to reduce impacts to a less than significant level and/or the mitigation measures described herein have been added to the project. A Mitigated Negative Declaration has thus been prepared.*

The Initial Study, which provides the basis and reasons for this determination, is attached and/or referenced herein and is hereby made a part of this document.

_____ _____

Signature Date

Proposed Mitigation Measures:

The following Mitigation Measures are extracted from the Initial Study. These measures are designed to avoid or minimize potentially significant impacts, and thereby reduce them to an insignificant level. A Mitigation Monitoring and Reporting Program (MMRP) is an integral part of project implementation to ensure that mitigation is properly implemented by the City and the implementing agencies. The MMRP will describe actions required to implement the appropriate mitigation for each CEQA category including identifying the responsible agency, program timing, and program monitoring requirements. Based on the analysis and conclusions of the Initial Study, the impacts of proposed project would be mitigated to less-than-significant levels with the implementation of the mitigation measures presented below.

AESTHETICS

Mitigation Measure AES-1*: A lighting plan shall be prepared prior to the approval of the improvement plans. The lighting plan shall demonstrate that the lighting throughout the subdivision has been designed to minimize light spillage onto adjacent properties to the greatest extent feasible.*

AGRICULTURAL RESOURCES

Mitigation Measure AG-1: *Prior to the conversion of important farmland on the project site, the project applicant shall participate in the City's agricultural mitigation fee program by paying the established fees on a per-acre basis for the loss of important farmland. Fees paid toward the City's program shall be used to fund conservation easements on comparable or better agricultural lands to provide compensatory mitigation.*

Mitigation Measure AG-2*: Prior to approval of improvement plans for each phase of the project, the project applicant shall demonstrate that the project site plans include adequate measures to buffer adjacent agricultural uses from urban uses on the project site and to reduce adverse impacts to neighboring agricultural uses. Such measures shall include, but not be limited to:*

- *The project shall provide adequate and secure fencing which may include but would not be limited to six (6) foot high wood fencing at the interface of the project site, or any individual phase of the project, and adjacent agricultural uses.*

- *The project shall provide notifications to all operators of uses on the project site that are adjacent or in the vicinity of existing agricultural land of the City's Right-to-Farm Ordinance.*

AIR QUALITY

Mitigation Measure AIR-1: *Prior to the commencement of construction activities, the project proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3, for the review and approval of the APCD Air Pollution Control Officer.*

Mitigation Measure AIR-2: *During all construction activities, the project proponent shall implement dust control measures, as required by APCD Rules 8011-8081, to limit Visible Dust Emissions to 20% opacity or less. Dust control measures shall include application of water or chemical dust suppressants to unpaved roads and graded areas, covering or stabilization of transported bulk materials, prevention of carryout or trackout of soil materials to public roads, limiting the area subject to soil disturbance, access restrictions to inactive sites as required by the applicable rules.*

Mitigation Measure AIR-3: *During all construction activities, the project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (San Joaquin Valley APCD, 2002).*

a. *All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.*

b. *All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.*

c. *All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.*

d. *When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.*

e. *All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.*

f. *Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.*

g. *Limit traffic speeds on unpaved roads to 5 mph; and*

h. *Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.*

I *Restrict vehicular access to the area to prevent unlawful entry to disturbed areas and limit unnecessary onsite construction traffic on disturbed surfaces. Restriction measures may include fencing or signage as determined appropriate by the City.*

J. *Cease grading activities during periods of high winds (greater than 20 mph over a one-hour period).*

Implementation of this mitigation shall occur during all grading or site clearing activities. The SJVAPCD shall be responsible for monitoring.

Mitigation Measure AIR-4: *Architectural coatings applied to all structures in the project site shall meet or exceed volatile organic compound (VOC) standards set in APCD Rule 4601. The project applicant shall submit to the APCD a list of architectural coatings to be used and shall indicate how the coatings meet or exceed VOC standards. If the APCD determines that any architectural coatings do not meet VOC standards, the project applicant shall replace the identified coatings with those that meet standards.*

Mitigation Measure AIR-5: *Asphalt paving shall be applied in accordance with APCD Rule 4641. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations.*

Mitigation Measure AIR-6*: Prior to the commencement of grading activities, the City shall require the grading contractor to prepare a construction emissions reduction plan that meets the requirements of SJVAPCD Rule VIII. The construction emissions reductions plan shall be submitted to the SJVAPCD for review and approval. The Project applicant shall comply with all applicable APCD requirements prior to commencement of grading activities.*

Mitigation Measure AIR-7*: Prior to final approval of improvement plans, the Project proponent shall submit an Air Impact Assessment (AlA) application to the San Joaquin Valley Air Pollution Control District for District Rule 9510 Indirect Source Review (ISR). Prior to the issuance of a building permit, the project proponent shall incorporate mitigation measures into the proposed project and demonstrate compliance with District Rule 9510 including payment of all fees.*

BIOLOGICAL RESOURCES

Mitigation Measure BIO-1: *Prior to commencement of any grading activities, the project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.*

Mitigation Measure BIO-2*: Prior to the approval of improvement plans, the applicant shall provide a landscape plan that includes tree planting specifications established by the Manteca Municipal Code (17.19.060) for the replacement of any trees, excluding orchard and non-native trees, to be removed at a ratio of 1:1. Replacement trees shall be planted on-site at a location that is agreeable to the City.*

Mitigation Measure BIO-3*: Prior to the commencement of grading activities or other ground disturbing activities on the Project site, the Project applicant shall arrange for a qualified biologist to conduct a preconstruction survey for nesting raptors in accordance with SJMSCP requirements. If no nests are detected, then construction activities may*

commence. If occupied nests are discovered, then the Project applicant shall coordinate with SJCOG regarding the appropriate buffer needed to avoid the particular bird species. If burrowing owl is discovered during the non-breeding season (September 1 through January 31) they should be evicted from the project site by passive relocation as described in the California Department of Fish and Game's Staff Report on Burrowing Owls (Oct., 1995). Implementation of this mitigation shall occur prior to grading or site clearing activities. SJCOG shall be responsible for monitoring and a qualified biologist shall conduct surveys and relocate owls as required.

Mitigation Measure BIO-4*: Prior to commencement of any grading activities, the Project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through payment of development fees for conversion of open space lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. In addition, coverage includes incidental take avoidance and minimization measures for species that could be affected as a result of the proposed Project. There are a wide variety of incidental take avoidance and minimization measures contained in the SJMSCP that were developed in consultation with the USFWS, CDFW, and local agencies. The applicability of incidental takes avoidance and minimization measures are determined by SJCOG on a Project basis. The process of obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a) and California Fish and Game Code Section 2081. The Section 10(a) permit also serves as a special-purpose permit for the incidental take of those species that are also protected under the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species. The SJMSCP includes the implementation of an ongoing Monitoring Plan to ensure success in mitigating the habitat impacts that are covered. The SJMSCP Monitoring Plan includes an Annual Report process, Biological Monitoring Plan, SJMSCP Compliance Monitoring Program, and the SJMSCP Adaptive Management Plan SJCOG.*

CULTURAL RESOURCES

Mitigation Measure CUL-1: *If cultural resources (i.e., prehistoric sites, historic sites, isolated artifacts/features, and paleontological sites) are discovered during construction, work shall be halted immediately within 50 meters (165 feet) of the discovery, the City of Manteca shall be notified, and a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology (or a qualified paleontologist in the event paleontological resources are found) shall be retained to determine the significance of the discovery. The City of Manteca shall consider recommendations presented by the professional for any unanticipated discoveries and shall carry out the measures deemed feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. Specific measures are developed based on the significance of the find.*

Mitigation Measure CUL-2: *If any human remains are found during grading and construction activities, all work shall be halted immediately within 50 meters (165 feet) of the discovery and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed. Additionally, if the Native American resources are identified, 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, may also be required and, if required, shall be retained at the applicant's expense.*

GEOLOGY AND SOILS

Mitigation Measure GEO-1*: Prior to earthmoving activities, the Project applicant shall have a final geotechnical evaluation prepared as required by the requirements of the California Building Code. The evaluation shall be prepared in accordance with the standards and requirements that addresses structural design, tests and inspections, and soils and foundation standards. The final geotechnical evaluation shall include design recommendations to ensure that soil conditions do not pose a threat to the health and safety of people or structures, including threats from liquefaction or lateral spreading. The grading and improvement plans, as well as the storm drainage and building plans shall be designed in accordance with the recommendations provided in the final geotechnical evaluation.*

Mitigation Measure GEO-2*: The project applicant shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall be designed to control pollutant discharges utilizing Best Management Practices (BMPs) and technology to reduce erosion and sediments. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater runoff from the project site. Measures shall include temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) that will be employed to control erosion from disturbed areas. Final selection of BMPs will be subject to*

approval by the City of Manteca and the RWQCB. The SWPPP will be kept on site during construction activity and will be made available upon request to representatives of the RWQCB.

GREENHOUSE GAS EMISSIONS

Mitigation Measure GHG-1*: To reduce greenhouse gas emissions and energy consumption, the project applicant shall institute measures to reduce wasteful, inefficient, and unnecessary consumption of energy during construction, operation, and maintenance/landscaping. As the project is further designed and reviewed by the City of Manteca, an explanation as to why certain measures were incorporated in the individual phases and why other measures were dismissed shall be provided. The measures to reduce wasteful, inefficient, and unnecessary consumption of energy during construction, operation, and maintenance/landscaping include the following:*

- *Ensure that the pedestrian network within the project area connects to offsite pedestrian networks;*
- *Install high efficiency lighting and appliance within all buildings;*
- *Install low-flow faucets, toilets, and showers as applicable;*
- *Use water-efficient irrigation systems throughout the project area.*

HAZARDS AND HAZARDOUS MATERIALS

Mitigation Measure HAZ-1*: A Soils Management Plan (SMP) shall be submitted and approved by the San Joaquin County Department of Environmental Health prior to the issuance of a grading permit for each phase of the project. The SMP shall establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. The approved SMP shall be posted and maintained onsite during construction activities and all construction personnel shall acknowledge that they have reviewed and understand the plan.*

Mitigation Measure HAZ-2: *The applicant shall hire a qualified consultant to perform additional testing prior to the issuance of grading permits and demolition permits for construction activities for each phase of the project in the following areas that have been deemed to have potentially hazardous conditions present:*

- *The residential unit and adjoining structures.*
- *The remnant construction and/or farming materials (i.e. remnant pipes, etc.).*
- *The soils in the area where above ground tanks have been stored.*

The intent of the additional testing is to investigate whether any of the buildings, facilities, or soils contain hazardous materials so that an appropriate disposal plan can be established. If asbestos-containing materials and/or lead are found in the buildings, a Cal-OSHA certified ACBM and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and California Occupational Safety and Health Administration (Cal/OSHA) standards. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal/OSHA asbestos and lead worker construction standards. The ACBM and lead shall be disposed of properly at an appropriate offsite disposal facility. If surface staining is found on the Project site, a hazardous waste specialist shall be engaged to further assess the stained area.

Mitigation Measure HAZ-3*: Prior to initiation of any ground disturbance activities within 50 feet of a well, the applicant shall hire a licensed well contractor to obtain a well abandonment permit from San Joaquin County Environmental Health Department, and properly abandon the on-site wells, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.*

Mitigation Measure HAZ-4*: Prior to initiation of any ground disturbance activities within 50 feet of the on-site septic tank, the applicant shall hire a licensed contractor to obtain an Onsite Wastewater Treatment System permit for the destruction of the septic tank from San Joaquin County Environmental Health Department, and properly abandon the on-site septic tank, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.*

HYDROLOGY AND WATER QUALITY

Mitigation Measure HYDRO-1*: Prior to the issuance of a building or grading permit, the project applicant shall submit a drainage plan to the City of Manteca for review and approval. The plan shall include an engineered storm drainage plan that demonstrates attainment of pre-project runoff requirements prior to release at the outlet canal and describes*

the volume reduction measures and treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.

Mitigation Measure HYDRO-2*: The project applicant shall implement the following nonstructural BMPs that focus on preventing pollutants from entering stormwater:*

- *Pollution Prevention/Good Housekeeping*
    - *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the project, the project proponent shall develop a spill response and prevention plan as a component of (1) SWPPPs prepared for construction activities, (2) SWPPPs for facilities subject to the NPDES Stormwater Permit, and (3) spill prevention control and countermeasure plans for qualifying facilities. The spill response and prevention plan shall be implemented during all construction activities.*
- *Operation and Maintenance (O&M) of Treatment Controls*
    - *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the project, the project proponent shall develop an Operation and Maintenance (O&M) Plan for the storm drainage facilities to ensure long-term performance. The O&M plan shall incorporate the manufacturers' recommended maintenance procedures and include (1) provisions for debris removal, (2) guidance for addressing public health or safety issues, and (3) methods and criteria for assessing the efficacy of the storm drainage system. An annual report shall be submitted to the City certifying that maintenance of the facilities was conducted according to the O&M plan.*

NOISE

Mitigation Measure NOI-1: *A minimum 6-foot tall sound wall shall be constructed along the Woodward Avenue frontage, adjacent to proposed residential uses, in order to achieve the City's exterior noise standards. Final wall height selection would be at the discretion of the City. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department.*

Mitigation Measure NOI-2: *Mechanical ventilation shall be provided to allow occupants to keep doors and windows closed for acoustic isolation.*

Mitigation Measure NOI-3: *Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure NOI-4: *All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure NOI-5: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

PUBLIC SERVICES

Mitigation Measure PUBLIC-1: *The applicant shall pay applicable park in-lieu fees or dedicate parkland in accordance with the City of Manteca Municipal Code standards outlined in Chapter 3.20. Proof of payment of the in-lieu fees shall be submitted to the City Engineer.*

TRANSPORTATION

Mitigation Measure TRANS-1: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Airport Way/Woodward Avenue intersection. The improvements include:*

- *Signalize the Airport Way/Woodward Avenue intersection; and*
- *Retiming and optimizing the intersection.*

Mitigation Measure TRANS-2: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Union Road/Woodward Avenue intersection. The improvements include:*

- *Signalize the Union Road / Woodward Avenue intersection; and*
- *Retiming and optimizing the intersection.*

Mitigation Measure TRANS-3: *A "No U-turn" sign shall be installed at the median break on Woodward Avenue fronting "Street A" on the project site. This sign shall be installed per city of Manteca standard specifications and shall be visible to all westbound incoming motorists. This measure shall be shown on the project improvements plans.*

TRIBAL CULTURAL RESOURCES

Mitigation Measure TRIBAL-1: *If cultural resources are discovered during project-related construction activities, all ground disturbances within a minimum of 50 feet of the find shall be halted until a qualified professional archaeologist can evaluate the discovery. The archaeologist shall examine the resources, assess their significance, and recommend appropriate procedures to the lead agency to either further investigate or mitigate adverse impacts. If the find is determined by the lead agency in consultation with the Native American tribe traditionally and culturally affiliated with the geographic area of the project site to be a tribal cultural resource and the discovered archaeological resource cannot be avoided, then applicable mitigation measures for the resource shall be discussed with the geographically affiliated tribe. Applicable mitigation measures that also take into account the cultural values and meaning of the discovered tribal cultural resource, including confidentiality if requested by the tribe, shall be completed (e.g., preservation in place, data recovery program pursuant to PRC §21083.2[i]). During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project site.*

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INITIAL STUDY CHECKLIST

PROJECT TITLE

Wackerly Annexation Project

LEAD AGENCY NAME AND ADDRESS

City of Manteca – City Hall
1001 West Center Street
Manteca, CA 95337
(209) 456-8000

CONTACT PERSON AND PHONE NUMBER

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Manteca, CA 95337
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PROJECT LOCATION AND SETTING

The Wackerly Annexation project site (project site) includes approximately 13.08 acres located outside the south-central portion of the City of Manteca in unincorporated San Joaquin County, California. The project site is within the City of Manteca's 10-Year Planning Horizon per the City's Sphere of Influence (SOI) Map. The site is identified by San Joaquin County Assessor's Parcel Number (APN) 226-170-03. The site is bound by Woodward Avenue to the north, a developed single-family subdivision to the east, undeveloped agricultural land to the south, and a developed single-family residence and a Sikh temple to the west. Surrounding land uses include a single-family residence and other land planned for future residential development to the north, single-family residential uses to the east (the Oleander Estates Unit 2 Project), rural residential and agricultural land uses to the south rural residential uses and Airport Way to the west, and mixed-use commercial to the northwest. Planned adjacent land uses to the south and west include low density residential development and park space.

The majority of the project site is currently vacant, undeveloped land used for agricultural purposes. Two existing single-family residences are located on the northeastern and northwestern corners of the project site along Woodward Avenue. An existing septic tank is located on-site near the northwestern residence and will be abandoned as part of the project. An existing septic tank, water tank and well are located on-site near the northeastern residence and will remain as part of the project. An existing agricultural ditch is located along the eastern, southern, and western boundaries of the site. An existing storm drain ditch is located at the northern perimeter boundary along Woodward Avenue. The project site contains 21 sparsely clustered trees located along the northern project site boundary, surrounding the existing residences. The project site is generally flat at an elevation of approximately 26 to 28 feet above mean sea level.

See Figures 1 and 2 for the regional location and the project vicinity. See Figure 3 for an aerial view of the project area.

PROJECT DESCRIPTION

The proposed project includes development of 60 single-family homes on the 13.08-acre site. The project also includes associated circulation and infrastructure improvements throughout the project site. The project site plan is shown on Figure 4. Each project component is discussed in detail below.

Residential

As part of the proposed project, the existing home and garage located on the northeast corner of the site will remain, and the existing home located on the northwest corner will be demolished prior to construction. The proposed 60 single-family residential units will be located within 60 separate lots throughout the project site. Lot sizes would range from 4,614 square feet (sf) to 10,835 sf. The average lot size throughout the project site is approximately 50 feet by 100 feet.

All of the trees surrounding the northwestern residence will be removed as part of the project. The trees surrounding the northeastern residence will remain. The project site will be re-landscaped with trees, shrubbery, grass and other common landscaping vegetation.

Infrastructure and Access

Existing City-maintained 12-inch water, 36-inch sewer, and 54-inch storm drainage lines are located in Woodward Avenue. The existing City laterals and lines currently located in Woodward Avenue will be extended into the project site. The project also includes development of internal 12-inch to 24-inch storm drainage, 6-inch to 8-inch sewer, and 8-inch water lines within the proposed internal streets right-of-way.

Storm drainage would be conveyed to an on-site storm drain basin and storm drainage metering station which will discharge to the City's storm drainage system. As shown in Figure 4, the project proposes to include a drainage basin in the southwestern corner of the site. The basin will have 0.96 acre-feet [ac-ft] of storage potential. Various storm drainage supporting structures, inlets, outlets, and drainage swales will be located throughout the project site directing the direction of flow into the drainage basin.

Access to the site is currently located off of Woodward Avenue, which can be accessed from Airport Way to the west and Union Road to the east. Two primary access points are proposed by the project off Woodward Avenue. Internal circulation will be provided by an array of interior streets that encircle and cross through the center of the project site. Two secondary future access points are proposed by the project at the southwestern corner of the project site. Barriers are proposed at the at the ends of the secondary access points, meeting the edge of the property line. Future adjacent development to the west and south will eventually extend these two secondary access points to connect to this portion of the site.

Street lighting and sidewalks are proposed along interior streets throughout the project site. Additionally, the project will provide a minimum two car garage, and two driveway spaces per lot for a minimum of 120 garage spaces and 120 driveway spaces in total.

GENERAL PLAN AND ZONING DESIGNATIONS

The project site is currently within the jurisdiction of San Joaquin County. The existing (County) and proposed (City) General Plan designations and zoning (County) and pre-zoning (City) are discussed below.

General Plan

The project site is designated R/L (Low Density Residential) by the San Joaquin County General Plan land use map. The R/L land use provides for low density residential development in neighborhoods where single-family homes are the dominant land use. The County's R/L designation generally applies to residential neighborhoods in Urban Communities and City Fringe Areas. Typical building types include one- to two-story single family dwellings in an urban setting. The allowed density within the County's R/L designation is 2.1 to 6 dwelling units per acre.

The project site is designated LDR (Low Density Residential) by the Manteca General Plan land use map. The City's LDR land use establishes a mix of dwelling unit types and character determined by the individual site and market conditions. The density range allows substantial flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs. The type of dwelling units anticipated in this density range include small lots and clustered lots as well as conventional large lot detached residences. The allowed density within the City's LDR designation is 2.1 to 8 dwelling units per acre. With 60 units on approximately 13.08 acres, the proposed density would be 4.6 dwelling units per acre, which is within the allowed density range.

A General Plan Amendment would not be required for the project.

Zoning

The San Joaquin County Local Agency Formation Commission (LAFCo) will require the project site to be pre-zoned by the City of Manteca in conjunction with the proposed annexation.

The project site is currently zoned AU-20 (Agriculture-Urban Reserve, 20 Acres) by the San Joaquin zoning map. The City's pre-zoning for the entire site will be R-1 (One Family Dwelling), which is consistent with the LDR (Low Density Residential) land use designation of the Manteca General Plan. This zoning district allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The types of dwelling units include small lots and clustered lots as well as conventional large-lot detached residences.

The existing County land use is shown in Figure 5.1, the existing City land use is shown in Figure 5.2, and the proposed pre-zoning is shown in Figure 5.3.

REQUESTED ENTITLEMENTS AND OTHER APPROVALS

The City of Manteca is the Lead Agency for the proposed project, pursuant to the State Guidelines for Implementation of CEQA, Section 15050.

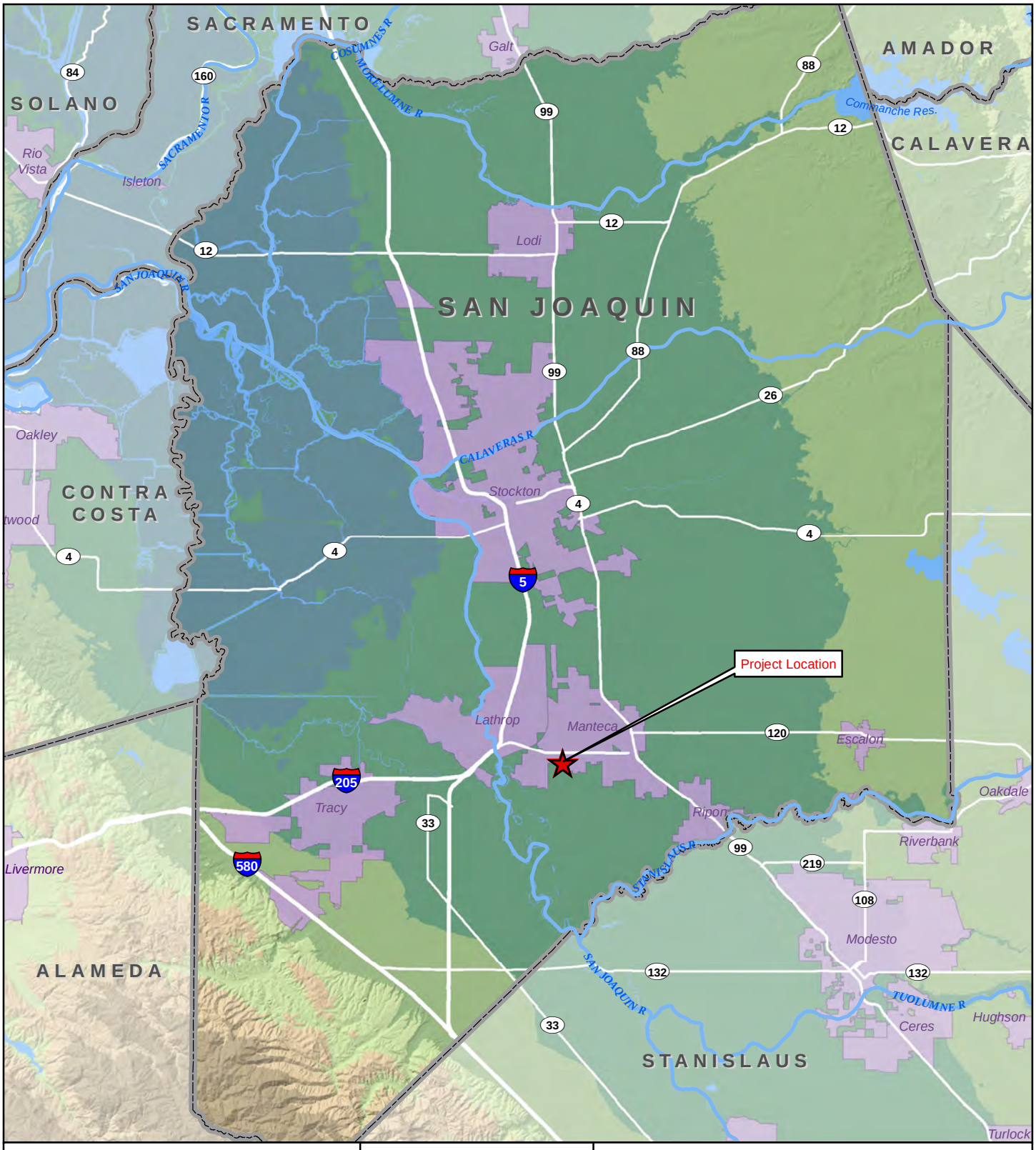
This document will be used by the City of Manteca to take the following actions:

- Adoption of the Mitigated Negative Declaration (MND);
- Adoption of the Mitigation Monitoring and Reporting Program;
- Approval of City of Manteca pre-zoning;
- Annexation approval;
- Approval of improvement plans;
- Approval of grading plans;
- Approval of building permits;
- Approval of future site plan and design review;

- Approval of future tentative and final map(s);
- City review of project utility plan.

The following agencies may be required to issue permits or approve certain aspects of the proposed project:

- Regional Water Quality Control Board (RWQCB) – Construction activities would be required to be covered under the National Pollution Discharge Elimination System (NPDES);
- RWQCB – The Storm Water Pollution Prevention Plan (SWPPP) would be required to be approved prior to construction activities pursuant to the Clean Water Act;
- San Joaquin Valley Air Pollution Control District (SJVAPCD) – Approval of construction-related air quality permits;
- San Joaquin Council of Governments (SJCOG) – Review of project application to determine consistency with the San Joaquin County Multi-Species Habitat, Conservation, and Open Space Plan (SJMSCP).



Legend

- Project Location
- County Boundary

Sources: CalAtlas; San Joaquin County; Stanislaus County; Contra Costa County. Map date: May 31, 2019.

N

0 2½ 5

Miles

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 1. Regional Location Map

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Legend

- Project Boundary
- City of Manteca
- School
- Park
- Fire Station
- Police Station

N

0 500 1,000

Feet

Sources: San Joaquin County; Google Maps. Map date: May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 2. Vicinity Map

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Legend

- Project Boundary
- Manteca City Boundary

0 250 500

Feet

Sources: San Joaquin County; ArcGIS Online World Imagery Map Service. Map date: May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 3. Aerial View of Project Site

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Legend

Project Boundary

0 50 100

Feet

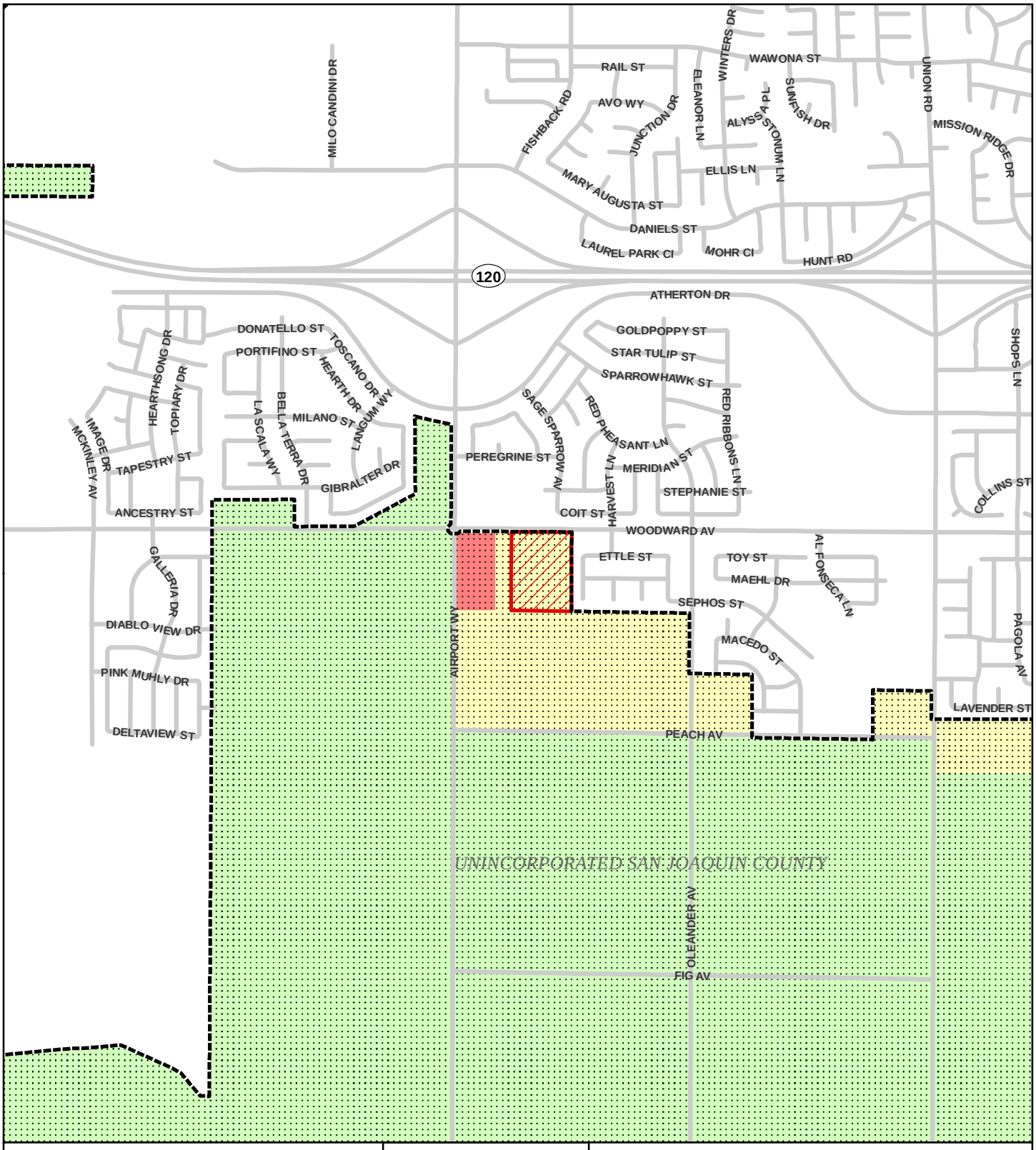
Sources: Wackerly Property Tentative Subdivision Map, Dimension and Topographic Plan, North Star Engineering Group, 1/22/2019; San Joaquin County. Map date: June 5, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 4. Site Plan

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Legend

- Project Boundary
- Manteca City Boundary

San Joaquin County Land Use Designations

- Agriculture/Urban Reserve
- Commercial/Neighborhood
- Residential/Low Density

Sources: San Joaquin County. Map date: May 31, 2019.

N

0 500 1,000

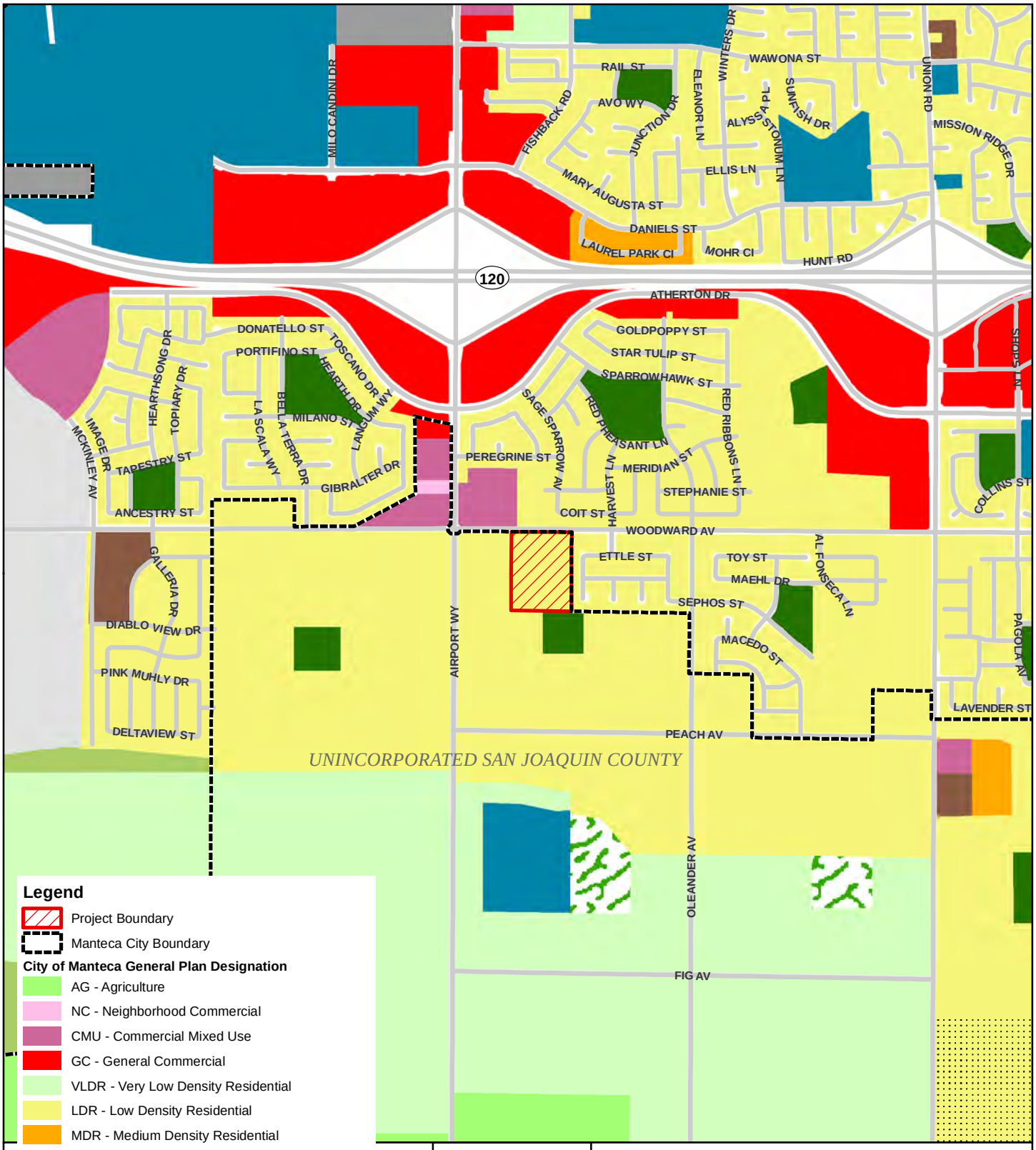
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CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 5.1. Existing County Land Use

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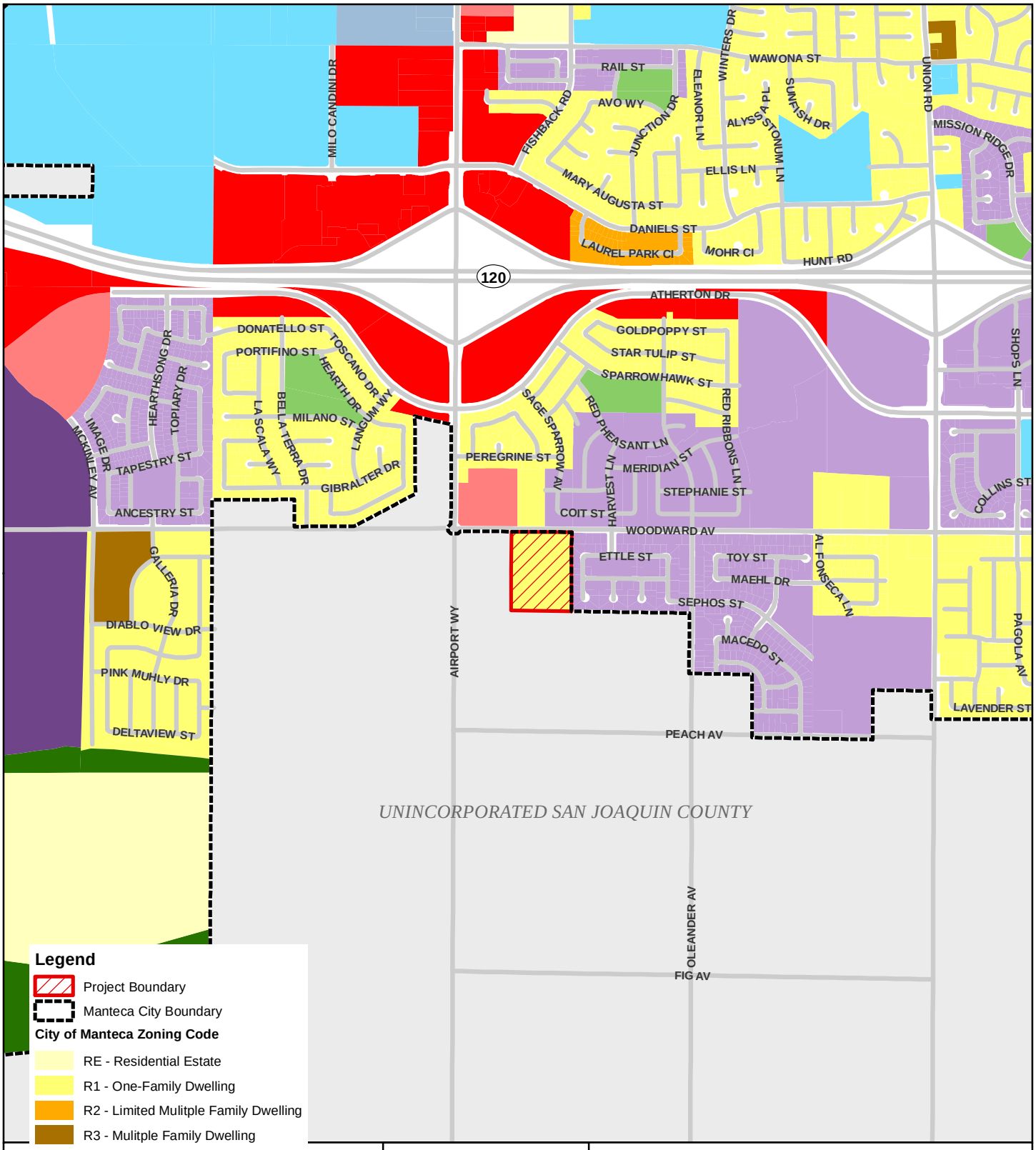
Sources: City of Manteca; San Joaquin County. Map date: May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 5.2. Existing City Land Use

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Legend

- Project Boundary
- Manteca City Boundary

City of Manteca Zoning Code

- RE - Residential Estate
- R1 - One-Family Dwelling
- R2 - Limited Mulitple Family Dwelling
- R3 - Mulitple Family Dwelling
- CMU - Mixed Use Commercial
- BIP - Business Industrial Park
- CG - Commercial General
- M1 - Light Industrial
- OS - Open Space
- P - Park
- PD -Planned Development
- PQP - Public/Quasi-Public

Sources: City of Manteca; San Joaquin County. Map date: May 31, 2019.

N

0 500 1,000

Feet

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 5.3. Proposed City Pre-Zoning

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ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

None of the environmental factors listed below would have potentially significant impacts as a result of development of this project, as described on the following pages.

	Aesthetics		Agriculture and Forestry Resources		Air Quality
	Biological Resources		Cultural Resources		Energy
	Geology and Soils		Greenhouse Gasses		Hazards and Hazardous Materials
	Hydrology and Water Quality		Land Use and Planning		Mineral Resources
	Noise		Population and Housing		Public Services
	Recreation		Transportation		Tribal Cultural Resources
	Utilities and Service Systems		Wildfire		Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature Date

EVALUATION INSTRUCTIONS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9) The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impact to less than significant.

EVALUATION OF ENVIRONMENTAL IMPACTS

In each area of potential impact listed in this section, there are one or more questions which assess the degree of potential environmental effect. A response is provided to each question using one of the four impact evaluation criteria described below. A discussion of the response is also included.

- Potentially Significant Impact. This response is appropriate when there is substantial evidence that an effect is significant. If there are one or more "Potentially Significant Impact" entries, upon completion of the Initial Study, an EIR is required.
- Less than Significant With Mitigation Incorporated. This response applies when the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". The Lead Agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level.
- Less than Significant Impact. A less than significant impact is one which is deemed to have little or no adverse effect on the environment. Mitigation measures are, therefore, not necessary, although they may be recommended to further reduce a minor impact.
- No Impact. These issues were either identified as having no impact on the environment, or they are not relevant to the project.

ENVIRONMENTAL CHECKLIST

This section of the Initial Study incorporates the most current Appendix "G" Environmental Checklist Form contained in the CEQA Guidelines. Impact questions and responses are included in both tabular and narrative formats for each of the 21 environmental topic areas.

I. AESTHETICS

Would the project:	***Potentially Significant Impact***	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
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?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		

Responses to Checklist Questions

Responses a), c): The City of Manteca General Plan does not specifically designate any scenic viewsheds within the city. The existing Manteca General Plan does, however, note Manteca's scenic environmental resources including the San Joaquin River environment, and scenic vistas of the Coast Range and the Sierra.

For analysis purposes, a scenic vista can be discussed in terms of a foreground, middleground, and background viewshed. The middleground and background viewshed is often referred to as the broad viewshed. Examples of scenic vistas can include mountain ranges, valleys, ridgelines, or water bodies from a focal point of the forefront of the broad viewshed, such as visually important trees, rocks, or historic buildings. An impact would generally occur if a project would change the view to the middle ground or background elements of the broad viewshed, or remove the visually important trees, rocks, or historic buildings in the foreground.

The proposed project will not significantly disrupt middleground or background views from public viewpoints. The proposed project would result in changes to the foreground views from the public viewpoint by adding single-family residences to a site that is undeveloped.

Upon build-out, the project would be of similar visual character to nearby and adjacent developments, such as the existing Oleander Estates Unit 2 Project to the immediate east and future planned residential developments to the north and south, as designated by the City of

Manteca General Plan. For motorists travelling along nearby roadways, such as Woodward Avenue, the project would appear to be a continuation of adjacent residential land uses and would not present unexpected or otherwise unpleasant aesthetic values within the general project vicinity.

The greatest visual change would apply to neighbors that are located south of Woodward Avenue or immediately adjacent to the project site with a direct view of the area. Views of the project site are generally visible from immediately adjacent residences, but are obscured by existing fencing, agricultural drainage and landscaping. Upon development of the project, landscaping will be provided throughout the project site, a 6-feet chain link fence will be placed along the project boundaries bordering the storm water basin in the southwest corner, and an enhanced wood fence with pilasters will be placed along the northern project boundary from the northwest corner to the existing residence. The proposed landscaping includes a variety of plants, shrubs, and trees at varying heights that would provide some shielding from existing residences in the vicinity.

The change in character of the project site, once developed, is anticipated by the City's General Plan and associated EIR, and the project would be visually compatible with surrounding existing residential uses to the north, east, south, and west, as well as the neighborhood commercial uses to the northwest. Setbacks and landscaping around the perimeter of the site will buffer the foreground viewshed from residents in the immediate vicinity. Therefore, implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Response b): The project site is not located within view of a state scenic highway. Only one highway section in San Joaquin County is listed as a Designated Scenic Highway by the Caltrans Scenic Highway Mapping System; the segment of Interstate 580 from Interstate 5 to SR 205. The City of Manteca is not visible from this roadway segment. Therefore, the proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. Implementation of the proposed project would have ***no impact*** relative to this topic.

Response d): The majority of the project site is currently vacant and undeveloped, with the exception of the two existing single-family residences in the northeast and northwest corners of the project site. As described in the project description, the existing home and garage located on the northeast corner of the site will remain, and the existing home located on the northwest corner will be demolished prior to construction of the project. Sources of existing lighting within the project site are contained in and around the existing single-family residences and consists of interior lighting and limited exterior lighting, such as a wall light to the rear patio and driveway. The residence in the northwest corner of the site contains a light post which will be removed prior to construction of the project. Existing sources of light are also located immediately adjacent to the project site to the east and west. The area to the east, within Oleander Estates, consists primarily of interior lighting, backyard and driveway lighting and street lighting along interior roads. To the west, lighting consists of interior lighting, limited exterior wall lighting and light posts throughout the parking lot. Adjacent lighting is directed in a manner that does not directly project into the project area. Woodward Avenue currently does not contain street lighting immediately fronting the project site.

The proposed project would create new sources of light and glare. A detailed lighting plan has not been prepared for the proposed project, but for the purposes of this analysis, it has been assumed that nighttime street lighting, outdoor lighting, and safety lighting will be installed throughout the project site consistent with a typical residential subdivision. It is assumed that

exterior security lighting, such as a driveway or backyard wall light, will be installed on residences throughout the project site. Examples of lighting would include construction lighting, street lighting, security lighting along sidewalks, exterior building lighting, interior building lighting, and automobile lighting. Examples of glare would include reflective building materials and automobiles.

Contributors to light and glare impacts would also include construction lighting and street lighting that would create ongoing light impacts to the area. Nighttime construction activities are not anticipated to be required as part of on-site roadway construction. Operational light sources from street lighting may be required to provide for safe travel. All street lighting would have to comply with the City of Manteca lighting standards. Section 17.50.060 of the Manteca Municipal Code identifies general lighting standards for light shielding, illumination levels, and nuisance prevention. These standards are designed to ensure that lighting does not intrude to areas not intended for illumination.

The Manteca Municipal Code Chapter 17 (Zoning Code) states that direct glare shall not be permitted, and provides standards for nuisance prevention and shielding requirements. Chapter 17.48 of the Manteca Zoning Ordinance also includes requirements for the installation of parking lot landscaping which further limit glare impacts.

Chapter 17.50, Lighting, of the City Zoning Ordinance contains standards and provisions related to exterior lighting. The primary purpose of this chapter is to regulate lighting to balance the safety and security needs for lighting with the City's desire to preserve dark skies and to ensure that light trespass and glare have negligible impacts on surrounding property (especially residential) and roadways. Section 17.50.070 requires the preparation of an outdoor lighting plan as part of each Site Plan and Design Review application for commercial and industrial properties. At a minimum, the outdoor lighting plan shall include the following:

1. Manufacturer specifications sheets, cut sheets, and other manufacturer-provided information for all proposed outdoor light fixtures to show fixture diagrams and outdoor light output levels.
2. The proposed location, mounting height, and aiming point of all outdoor lighting fixtures.
3. If building elevations are proposed for illumination, drawings of all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the illumination level of the elevations, and the aiming point for any remote light fixture.
4. Photometric data including a computer-generated photometric grid showing foot-candle readings every 10 feet within the property or site and 10 feet beyond the property lines.

The Manteca General Plan EIR determined the impact of new sources of light and glare can be minimized by incorporating design features and operating requirements into new developments that limit light and glare. Policy CD-P-44 requires the use of minimal street lighting to meet safety standards and provide direction. Policy CD-P-45 requires the use of directionally shielded lighting for all exterior lighting. Policy CD-P-46 requires automatic shut-off or motion sensors for lighting features in newly developed areas. The City of Manteca Zoning Ordinance has requirements for lighting and glare to reduce the impacts of glare and light trespass.

The proposed project lighting would be installed as per the City of Manteca standards and specifications, and would be required to incorporate design features to minimize the effects of light and glare. However, without a detailed lighting plan, increase of nighttime lighting is a potentially significant impact. Implementation of Mitigation Measure AES-1 would reduce

potential impacts associated with nighttime lighting and light spillage onto adjacent properties to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure AES-1*: A lighting plan shall be prepared prior to the approval of the improvement plans. The lighting plan shall demonstrate that the lighting throughout the subdivision has been designed to minimize light spillage onto adjacent properties to the greatest extent feasible.*

II. AGRICULTURE AND FORESTRY RESOURCES

Would the project:	***Potentially Significant Impact***	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?		X		
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?			X	
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1222(g)) or timberland (as defined in Public Resources Code section 4526)?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?		X		

Responses to Checklist Questions

Response a): As shown in Figure 6, a small portion of the northwestern corner of the project site is designated Rural Residential Land as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. Within that portion of the project area, the project would not result in the conversion of designated Farmland of Statewide Importance land to a non-agricultural use. However, the remaining approximately 13 acres of the project site is designated Farmland of Statewide Importance. The proposed project would result in the conversion of 13 acres of Farmland of Statewide Importance land to a non-agricultural use. The loss of Important Farmland as classified under the Farmland Mapping and Monitoring Program (FMMP) is considered a potentially significant environmental impact.

The City's agricultural mitigation fee program requires that future development pay the agricultural mitigation fee to mitigate the conversion of agricultural land to urban use. The City will use these funds to purchase conservation easements or deed restrictions on agricultural land to ensure that the land remains in agricultural use in perpetuity. In addition to the City's agricultural mitigation fee program, the SJMSCP (San Joaquin County Multi-Species Habitat Conservation and Open Space Plan) requires development to pay fees on a per-acre basis for impacts to agricultural lands that function as habitat for biological resources. SJCOG will then use these funds to purchase the conservation easements on agricultural and habitat lands in the project vicinity. The compensation results in the purchase of conservation easements that are placed over agricultural land. Mitigation Measure BIO-1 requires the project proponent to seek coverage under the SJMSCP. As such, the project fees paid to SJCOG as administrator of the SJMSCP will result in the preservation of agricultural lands in perpetuity.

The purchase of conservation easements and/or deed restrictions through the City agricultural mitigation fee program and the SJMSCP allows the landowners to retain ownership of the land and continue agricultural operations, and preserves such lands in perpetuity.

It is noted that the project site is designated as LDR (Low Density Residential) by the Manteca General Plan Land Use Map. The Manteca General Plan EIR anticipated development of the project site as part of the overall evaluation of the build out of the City. The General Plan EIR addressed the conversion and loss of agricultural land that would result from the build out of the General Plan (General Plan 2023 Draft EIR, pp. 4-13 through 4-15). The General Plan EIR determined that even with the implementation of mitigation measure AG-1.1, which identifies General Plan goals, policies, and implementation measures LU-P-41, LU-I-1, Goal RC-9, RC-P-18, RC-P-19, and AG-1.2 and directs the major growth area to the Primary Urban Service boundary in a manner that avoids Prime Farmlands where feasible, the impact would be significant and unavoidable. The City subsequently adopted a Statement of Overriding Consideration and certified the General Plan EIR. The proposed project is consistent with the General Plan.

The proposed project will contribute fees toward the purchase of conservation easements on agricultural lands through the City's agricultural mitigation fee program and the SJMSCP (as required by Mitigation Measure BIO-1). Additionally, the project will contribute fees consistent with the agricultural mitigation fee program (as required by Mitigation Measure AG-1). Because conversion of the project site from agricultural to urban uses was analyzed in the City's General Plan EIR, and because the project will contribute fees through the agricultural mitigation fee program and SJMSCP, implementation of the proposed project would have a ***less than significant*** impact relative to this issue.

Mitigation Measure(s)

Mitigation Measure AG-1*: Prior to the conversion of important farmland on the project site, the project applicant shall participate in the City's agricultural mitigation fee program by paying the established fees on a per-acre basis for the loss of important farmland. Fees paid toward the City's program shall be used to fund conservation easements on comparable or better agricultural lands to provide compensatory mitigation.*

Response b): The project site is not under a Williamson Act Contract, nor are any of the parcels immediately adjacent to the project site under a Williamson Act Contract. The project site is currently zoned AU-20 (Agriculture-Urban Reserve, 20 Acres) by the San Joaquin zoning map, which is an existing agricultural use. As described in the project description, the project site will be pre-zoned to a non-agricultural use by the City of Manteca zoning map in conjunction with the proposed annexation; as required by the San Joaquin LAFCo. The pre-zoning would go into effect upon annexation into the City of Manteca. Upon annexation into the City of Manteca, the General Plan and zoning map for the City of Manteca would be consistent with the intended use of the site and thus not conflict with the current agricultural site designations.

Because the proposed project would not conflict with existing zoning for agricultural use, as designated by the City of Manteca General Plan and zoning map; and does not conflict with an existing Williamson Act contract, implementation of the proposed project would have a ***less than significant*** impact relative to this issue.

Response c): The project site is not forest land (as defined in Public Resources Code section 1222(g)) or timberland (as defined in Public Resources Code section 4526). The proposed project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. Implementation of the proposed project would have ***no impact*** relative to this issue.

Response d): The project site is not forest land. The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. Implementation of the proposed project would have ***no impact*** relative to this issue.

Response e): The majority of the project site is currently vacant and undeveloped, with the exception of the two existing single-family residences are both northern corners of the project site. The site does not contain forest land, and forest land is not located in the vicinity of the site. The site has previously been used for agricultural purposes. The lands adjacent to the site contain commercial mixed uses, residential uses and agricultural uses. The adjacent agricultural land to the north and south of the site is designated Farmland of Local Importance. The adjacent agricultural land west of the site is designated Farmland of Statewide Importance. The land to the north, east, south and west is also designated for Low Density Residential, with a small portion of land to the south designated for Park, by the Manteca General Plan land use map. As such, development of adjacent land to the north, south and west of the site for urban uses was contemplated by the City's General Plan EIR.

Existing agricultural lands that are located adjacent the project site to the south and east of the site may be impacted by the increased human presence on the project site. The City's Right-to-Farm Ordinance reduces the potential for conflict between existing agricultural lands and adjacent uses. The notification procedures in the ordinance serves to inform landowners and developers of non-agricultural uses of what the expectations are in the area with regard to agricultural activities and to reduce complaints.

The General Plan 2023 EIR identifies that the location or nature of the General Plan could result in the conversion of farmland to non-agricultural use and identified Mitigation Measure AG-3.1, which included General Plan Policies RC-P-20, RC-P-23, RC-P-24, RC-P-25, and RC-P-27 and Implementation Measure RC-I-30. It is noted that some of these policies are re-numbered in the General Plan as adopted. The General Plan 2023 EIR determined that the impact would be less than significant if the mitigation was implemented to maintain agricultural use adjacent to non-agricultural uses (General Plan 2023 Draft EIR, pp. 4-18 and 4-19).

General Plan Policy RC-P-24 requires buffers at the interface of urban development and farmland in order to minimize conflicts between the uses. Policy RC-P-25 requires that the City, in approving urban development near existing agricultural lands, ensures that such development will not constrain nearby agricultural practices. Implementation measure RC-I-30 requires urban development next to farmland to provide notifications in keeping with the Right-to-Farm Ordinance and include adequate and secure fencing at the interface of urban and agricultural uses.

A portion of the proposed development would not be buffered from existing agricultural operations along the southern and western side of the project site. It is noted, however, that the land adjacent south and west of the project site is designated for low density residential uses by the City's General Plan. Land opposite Woodward Avenue to the north of the project site, which has been designated farmland of local importance, has been approved for a residential subdivision. The areas to the east and northwest do not contain existing agricultural operations.

As discussed previously, the City's Right to Farm Ordinance is intended to reduce the occurrence of such conflicts between nonagricultural and agricultural land uses within the City through requiring the transferor of any property in the City to provide a disclosure statement describing that the City permits agricultural operations, including those that utilize chemical fertilizers and pesticides. Compliance with the City's Right to Farm Ordinance would be ensured through

Mitigation Measures AG-2. Implementation of Mitigation Measure AG-2 would ensure that the project includes adequate measures to buffer Project uses from adjacent agricultural uses and would reduce adverse effects on neighboring agricultural uses.

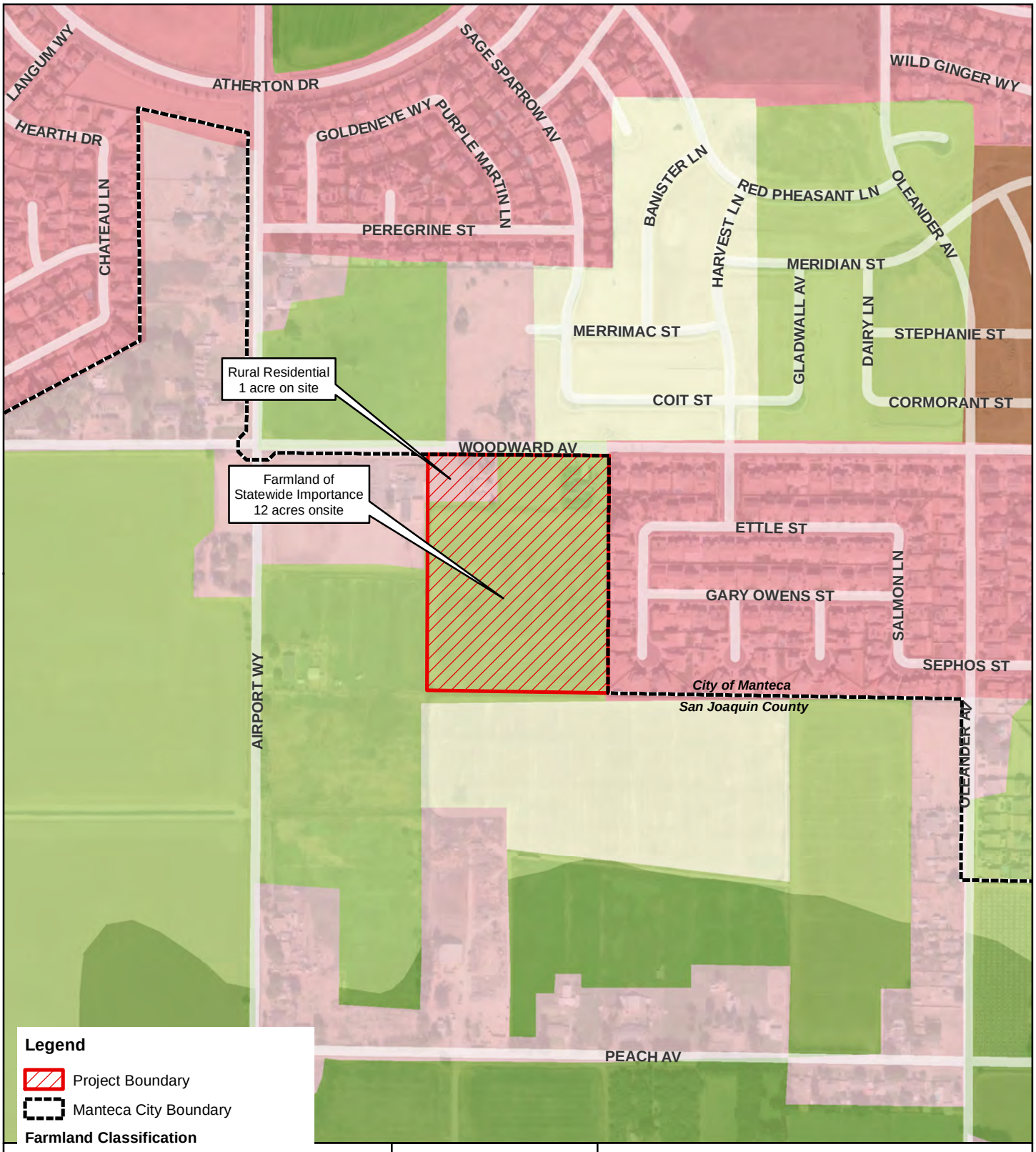
The proposed project does not involve changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use, or conversion of forest land to non-forest use. With implementation of Mitigation Measure AG-2, the proposed project would have a ***less than significant*** impact relative to this issue.

Mitigation Measure(s)

Mitigation Measure AG-2*: Prior to approval of improvement plans for each phase of the project, the project applicant shall demonstrate that the project site plans include adequate measures to buffer adjacent agricultural uses from urban uses on the project site and to reduce adverse impacts to neighboring agricultural uses. Such measures shall include, but not be limited to:*

- *The project shall provide adequate and secure fencing which may include but would not be limited to six (6) foot high wood fencing at the interface of the project site, or any individual phase of the project, and adjacent agricultural uses.*
- *The project shall provide notifications to all operators of uses on the project site that are adjacent or in the vicinity of existing agricultural land of the City's Right-to-Farm Ordinance.*

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Sources: California Department of Conservation Farmland Mapping and Monitoring Program, San Joaquin 2016; San Joaquin County; ArcGIS Online World Imagery Map Service. Map date: May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 6. Important Farmlands Map

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

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III. AIR QUALITY

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Conflict with or obstruct implementation of the applicable air quality plan?		X		
b) 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?		X		
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

Existing Setting

The project site is located within the San Joaquin Valley Air Pollution Control District (SJVAPCD). This agency is responsible for monitoring air pollution levels and ensuring compliance with federal and state air quality regulations within the San Joaquin Valley Air Basin (SJVAB) and has jurisdiction over most air quality matters within its borders.

The SJVAPCD has primary responsibility for compliance with both the federal and state standards and for ensuring that air quality conditions are maintained. They do this through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues.

Activities of the SJVAPCD include the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, issuance of permits for stationary sources of air pollution, inspection of stationary sources of air pollution and response to citizen complaints, monitoring of ambient air quality and meteorological conditions, and implementation of programs and regulations required by the FCAA and CCAA.

The SJVAPCD has prepared the *2007 Ozone Plan* to achieve Federal and State standards for improved air quality in the SJVAB regarding ozone. The *2007 Ozone Plan* provides a comprehensive list of regulatory and incentive-based measures to reduce emissions of ozone and particulate matter precursors throughout the SJVAB. The 2007 Ozone Plan calls for major advancements in pollution control technologies for mobile and stationary sources of air pollution. The *2007 Ozone Plan* calls for a 75-percent reduction in ozone-forming oxides of nitrogen emissions.

The SJVAPCD has also prepared the *2007 PM_{10} Maintenance Plan and Request for Redesignation* (2007 PM_{10} Plan). On April 24, 2006, the SJVAPCD submitted a Request for Determination of PM_{10} Attainment for the Basin to the California Air Resources Board (CARB). CARB concurred with the request and submitted the request to the U.S. Environmental Protection Agency (EPA) on May 8, 2006. On October 30, 2006, the EPA issued a Final Rule determining that the Basin had attained the National Ambient Air Quality Standards (NAAQS) for PM_{10}. However, the EPA noted that the

Final Rule did not constitute a redesignation to attainment until all of the Federal Clean Air Act requirements under Section 107(d)(3) were met.

The SJVAPCD has prepared the *2008 PM.2.5 Plan* to achieve Federal and State standards for improved air quality in the San Joaquin Valley Air Basin. The *2008 PM.2.5 Plan* provides a comprehensive list of regulatory and incentive-based measures to reduce PM2.5.

In addition to the *2007 Ozone Plan, the 2008 $PM_{2.5}$ Plan,* and the *2007 PM_{10} Plan*, the SJVAPCD prepared the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI). The GAMAQI is an advisory document that provides Lead Agencies, consultants, and project applicants with analysis guidance and uniform procedures for addressing air quality impacts in environmental documents. Local jurisdictions are not required to utilize the methodology outlined therein. This document describes the criteria that SJVAPCD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for determining whether or not projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. An update of the GAMAQI was approved on March 19, 2015, and is used as a guidance document for this analysis.

Responses to Checklist Questions

Responses a), b):

Air Quality Plan Consistency

The SJVAPCD's various air quality plans (i.e., 2007 Ozone Plan, 2007 PM_{10} Plan, and 2008 $PM_{2.5}$ Plan) includes growth assumptions generated by SJCOG. These growth assumptions are generated based, in part, on the development projections from individual land use authorities (i.e. incorporated cities and unincorporated counties) that are located within their region. It is noted that the consistency with the SJCOG population projection is growth that would generate population that is at, or below, the projections established by SJCOG. Any growth above the SJCOG population projection, would be growth that is inconsistent with the SJCOG projections. Any growth that is at, or below, the SJCOG projections would be consistent with the SJCOG projections.

The City's 2023 General Plan designates the project area as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 105 units on the 13.08-acre site and an associated population of 334 persons. Because the project density does not exceed the maximum allowed, it is consistent with the General Plan and development will remain within (i.e. will not exceed) the SJCOG projections.

Because the proposed project does not exceed the SJCOG projections it is considered to be consistent with the population projections. Therefore, the proposed project would be consistent with the regional air quality plan (i.e., SJVAPCD's 2007 Ozone Plan, 2007 PM_{10} Plan, and 2008 $PM_{2.5}$ Plan).

Cumulative Air Quality Impacts

As discussed above, the SJVAPCD is an agency responsible for ensuring that air quality conditions are attained, and where non-attainment is determined, this agency develops strategies to achieve attainment in the future. This effort to achieve attainment is documented in the SJVAPCD's various air quality plans (i.e., 2007 Ozone Plan, 2007 PM_{10} Plan, and 2008 $PM_{2.5}$ Plan), which are updated periodically to accommodate changes. While the scope of the SJVAPCD's strategies to achieve attainment is wide ranging, the agency has established thresholds of significance for

individual new projects and if a project exceeds the threshold of significance, then it would also be a significant contribution to a cumulative impact.

The SJVAPCD's air quality significance thresholds represent the maximum emissions from a project that are not expected to conflict with the SJVAPCD's air quality plans, and is not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. These are developed based on the ambient concentrations of the pollutant for each source. Because the project would not exceed the air quality significance thresholds on the project-level (as discussed below), and would not otherwise conflict with the SJVAPCD's air quality plans, the cumulative emissions would not be a significant contribution to a cumulative impact.

Construction Emissions

Construction-generated emissions are temporary and short term but have the potential to represent a significant air quality impact. The construction and development of the proposed project would result in the temporary generation of emissions. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities.

The SJVAPCD has adopted guidelines for determining potential adverse impacts to air quality in the region. The SJVAPCD guidelines state that construction activities are considered a potentially significant adverse impact if: the feasible control measures for construction in compliance with Regulation VIII as listed in the SJVAPCD guidelines are not incorporated or implemented; if the project generates emissions of reactive organic gases (ROG) or oxides of nitrogen (NO_X) that exceeds 10 tons per year; or if the project generates emissions of respirable particulate matter (PM_{10}) or fine particulate matter ($PM_{2.5}$) that exceeds 15 tons per year.

Construction Activities/Schedule: Construction activities will consist of multiple phases over approximately 2.5 years. These construction activities can be described as site improvements (demolition, grading, underground infrastructure, and topside improvements) and vertical construction (building construction and architectural coatings). For purposes of this analysis, it is assumed that the entire project is built-out from 2019 through 2021. This construction schedule is considered a worst-case scenario. Actual construction emissions will likely be spread out over an extended period of time.

Site Improvements: The exact construction schedule of the entire project is largely dependent on market demands. For purposes of this analysis it is assumed that site improvements are installed in one phase. This approach will present a more conservative and worst-case scenario.

The site improvement phase of construction will begin with demolition, followed by site preparation. The demolition step will include the use of concrete/industrial saws, excavators, and rubber tired dozers in order to demolish the existing on-site residence in the northwestern corner of the site. This task will generally take 20days to complete and will include vehicle trips from construction workers and waste hauling.

The site preparation step will include the use of dozers, backhoes, and loaders to strip (clear and grub) all organic materials and the upper half-inch to inch of soil from the project site. This task will generally take less than two months to complete and will include vehicle trips from construction workers. This step would take approximately 10 days.

After the site is striped of organic materials grading will begin. This activity will involve the use of excavators, graders, dozers, scrappers, loaders, and backhoes to move soil around the project site to create specific engineered grade elevations and soil compaction levels. Grading the project site would take approximately 30 days and will include vehicle trips from construction workers. *(Note: It would be possible to grade the site under a more compacted schedule with extra equipment operating or under a longer timeframe with less equipment.).*

The last task is to install the topside improvements, which includes pouring concrete curbs, gutters, sidewalks, and access aprons and then paving of all streets and parking lots. This task will involve the use of pavers, paving equipment, and rollers and will take approximately 20 days and will include vehicle trips from construction workers. *(Note: It would be possible to install the topside improvements under a more compacted schedule with extra equipment operating or under a longer timeframe with less equipment).*

Building Construction/Architectural Coatings: Building construction involves the vertical construction of structures and landscaping around the structures. This task will involve the use of cranes, forklifts, generator sets, welders, and tractors/loaders/backhoes. The exact construction schedule of the entire project is largely dependent on market demands. For purposes of this analysis it is assumed that the entire project is constructed in approximately 300 days. The actual building construction phase may be much shorter or much longer. Architectural coatings involve the interior and exterior painting associated with the structures. This task will generally begin after construction begins on the structure and will generally be completed with the completion of the individual buildings.

Construction Emissions: The SJVAPCD has published guidance on determining CEQA applicability, significance of impacts, and potential mitigation of significant impacts, in the SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI). The SJVAPCD has established thresholds of significance for criteria pollutant emissions, which are based on District New Source Review (NSR) offset requirements for stationary sources. Using project type and size, the SJVAPCD has pre-quantified emissions and determined a size below which it is reasonable to conclude that a project would not exceed applicable thresholds of significance for criteria pollutants. In the interest of streamlining CEQA requirements, projects that fit the descriptions and project sizes provided in the SJVAPCD Small Project Level (SPAL) are deemed to have a less than significant impact on air quality and, as such, are excluded from quantifying criteria pollutant emissions for CEQA purposes.

The SJVAPCD's approach to analysis of construction impacts is that quantification of construction emissions is not necessary if an Initial Study demonstrates that construction emissions would less than significant based on the SJVAPCD SPAL screening levels (SJVAPCD, 2015). The proposed project would only generate a very small number of vehicle trips during its construction and operational phases (far less than the SPAL screening threshold of 1,453 trips/day for residential housing land uses) and would not result in exceedance of the SPAL project site for single family uses (i.e., 152 units). Based on these project characteristics, the proposed project would be deemed to have a less than significant impact on air quality under the SPAL guidelines (SJVAPCD, 2015). As such, the proposed project is excluded from quantifying criteria pollutant emissions for CEQA purposes.

Nevertheless, regardless of emission quantities, the SJVAPCD requires construction related mitigation in accordance with their rules and regulations. Implementation of the following mitigation measures will ensure that the proposed project would reduce construction related

emissions to the extent possible. With implementation of the following mitigation measures, the proposed project would have *a* ***less than significant*** *i*mpact related to construction emissions.

Mitigation Measure(s)

Mitigation Measure AIR-1: *Prior to the commencement of construction activities, the project proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3, for the review and approval of the APCD Air Pollution Control Officer.*

Mitigation Measure AIR-2: *During all construction activities, the project proponent shall implement dust control measures, as required by APCD Rules 8011-8081, to limit Visible Dust Emissions to 20% opacity or less. Dust control measures shall include application of water or chemical dust suppressants to unpaved roads and graded areas, covering or stabilization of transported bulk materials, prevention of carryout or trackout of soil materials to public roads, limiting the area subject to soil disturbance, access restrictions to inactive sites as required by the applicable rules.*

Mitigation Measure AIR-3: *During all construction activities, the project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (San Joaquin Valley APCD, 2002).*

a. *All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.*
b. *All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.*
c. *All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.*
d. *When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.*
e. *All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.*
f. *Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.*
g. *Limit traffic speeds on unpaved roads to 5 mph; and*
h. *Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.*
I *Restrict vehicular access to the area to prevent unlawful entry to disturbed areas and limit unnecessary onsite construction traffic on disturbed surfaces. Restriction measures may include fencing or signage as determined appropriate by the City.*
J. *Cease grading activities during periods of high winds (greater than 20 mph over a one-hour period).*

Implementation of this mitigation shall occur during all grading or site clearing activities. The SJVAPCD shall be responsible for monitoring.

Mitigation Measure AIR-4: *Architectural coatings applied to all structures in the project site shall meet or exceed volatile organic compound (VOC) standards set in APCD Rule 4601. The project applicant shall submit to the APCD a list of architectural coatings to be used and shall indicate how the coatings meet or exceed VOC standards. If the APCD determines that any architectural coatings do not meet VOC standards, the project applicant shall replace the identified coatings with those that meet standards.*

Mitigation Measure AIR-5: *Asphalt paving shall be applied in accordance with APCD Rule 4641. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations.*

Mitigation Measure AIR-6*: Prior to the commencement of grading activities, the City shall require the grading contractor to prepare a construction emissions reduction plan that meets the requirements of SJVAPCD Rule VIII. The construction emissions reductions plan shall be submitted to the SJVAPCD for review and approval. The Project applicant shall comply with all applicable APCD requirements prior to commencement of grading activities.*

Operational Emissions

For the purposes of this operational air quality analysis, actions that violate Federal standards for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, the SJVAPCD has established operations related emissions thresholds of significance as follows: 10 tons per year of NO_x, 10 tons per year of ROG, and 15 tons per year of PM_{10}, and 15 tons per year of $PM_{2.5}$. Additionally, as discussed previously, the SJVAPCD has established thresholds of significance for criteria pollutant emissions, which are based on District NSR offset requirements for stationary sources. Using project type and size, the SJVAPCD has pre-quantified emissions and determined a size below which it is reasonable to conclude that a project would not exceed applicable thresholds of significance for criteria pollutants.

The proposed project is smaller in scope and size than the SJVAPCD's SPAL for residential uses (152 single family units). Therefore, localized CO modeling is not warranted for this project.

In addition, because the City's 2023 General Plan EIR addressed the effects of developing the project site with LDR uses, environmental review can also be streamlined pursuant to Public Resources Code Section 21083.3 and CEQA Guidelines Section 15183.

The proposed project is consistent with the General Plan and zoning designations for the project site. The City's 2023 General Plan designates the project area as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 105 units and an associated population of 334 persons within the project area. The analysis included in the City's General Plan EIR assumed that the site would be developed with LDR uses. The project would not increase development beyond the level assumed for the site in the City's General Plan EIR.

The Manteca General Plan 2023 Draft EIR concludes that implementation of the General Plan would result in a significant and unavoidable impact related to violation of air quality standards and contributions to the current nonattainment status for ozone and PM_{10}. NO_X is an ozone precursor, meaning that NO_X emissions result in the formation of ground-level ozone. The City of Manteca certified the Manteca General Plan 2023 Draft EIR, adopted a statement of overriding considerations relative to this significant and unavoidable impact, and approved the General

Plan. As such, the operational NO_X emission resulting from operation of the proposed project were previously considered by the City as part of the General Plan and General Plan EIR planning efforts.

Conclusion

The project is smaller in scope and size than the SJVAPCD's SPAL for residential uses. Because the proposed project is also consistent with the General Plan and zoning designations for the project site, conversion of the site to LDR uses was analyzed by the City's General Plan EIR. The project would not increase development beyond the level assumed for the site in the City's General Plan EIR. As such, the operational NO_X emission resulting from operation of the proposed project were previously considered by the City as part of the General Plan and General Plan EIR planning efforts. With implementation of the following mitigation measure, this impact would be ***less than significant***.

Mitigation Measure(s)

Mitigation Measure AIR-7*: Prior to final approval of improvement plans, the Project proponent shall submit an Air Impact Assessment (AIA) application to the San Joaquin Valley Air Pollution Control District for District Rule 9510 Indirect Source Review (ISR). Prior to the issuance of a building permit, the project proponent shall incorporate mitigation measures into the proposed project and demonstrate compliance with District Rule 9510 including payment of all fees.*

Response c):

Carbon Monoxide Hotspots

Project traffic would increase concentrations of carbon monoxide along streets providing access to the project site. Carbon monoxide is a local pollutant (i.e., high concentrations are normally only found very near sources). The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations (i.e. hotspots), therefore, are usually only found near areas of high traffic volume and congestion.

The SJVAPCD recommends utilizing a screening approach for analyzing CO concentrations to determine if dispersion modeling is warranted. The methodology provides lead agencies with a conservative indication of whether project-generated vehicle trips will result in the generation of CO emissions that contribute to an exceedance of the thresholds of significance. The recommended screening criteria are divided into two tiers, as described below.

First Tier: The proposed project will result in a less-than-significant impact to air quality for local CO if:

- Traffic generated by the proposed project will not result in deterioration of intersection level of service (LOS) to LOS E or F; and
- The project will not contribute additional traffic to an intersection that already operates at LOS of E or F.

For the proposed project, the first tier is met because the addition of project trips would not degrade operations at any of the study intersections, and the project would not contribute traffic to an intersection that already operates at LOS E or F. See Section XVII, Transportation, for more information. As such, the proposed project screens out satisfactorily under Tier 1. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Toxic Air Contaminants

A Toxic Air Contaminant (TAC) is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at very low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the state and federal governments have set ambient air quality standards.

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources. In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.

The 2007 EPA rule requires controls that will dramatically decrease Mobile Source Air Toxics (MSAT) emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050. California maintains stricter standards for clean fuels and emissions compared to the national standards, therefore it is expected that MSAT trends in California will decrease consistent with or more than the U.S. EPA's national projections.

CARB published the *Air Quality and Land Use Handbook: A Community Health Perspective* (2007) to provide information to local planners and decision-makers about land use compatibility issues associated with emissions from industrial, commercial and mobile sources of air pollution. The CARB Handbook indicates that mobile sources continue to be the largest overall contributors to the State's air pollution problems, representing the greatest air pollution health risk to most Californians. The most serious pollutants on a statewide basis include diesel exhaust particulate matter (diesel PM), benzene, and 1,3-butadiene, all of which are emitted by motor vehicles. These mobile source air toxics are largely associated with freeways and high traffic roads. Non-mobile source air toxics are largely associated with industrial and commercial uses. Table 1 provides the CARB minimum separation recommendations on siting sensitive land uses. The proposed project does not include any of the source categories identified in the CARB minimum separation standards.

There are sensitive receptors, such as residences, that are proposed as part of this project. However, the project site is not located within 500 feet of a freeway, particularly, State Route (SR) 120. The majority of the proposed residences are well beyond the minimum separation distance from toxic air emitters. The proposed residential lots would be approximately 2,740 to 3,304 feet (approximately 0.52 to 0.63 miles) south of SR 120. The measurements were taken from the closest lane of SR 120 to the proposed residences (i.e., the northernmost and southernmost boundary).

Table 1: CARB Minimum Separation Recommendations on Siting Sensitive Land Uses

Source Category	*Advisory Recommendations*
Freeways and High-Traffic Roads	• Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	• Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). • Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	• Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. • Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	• Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the CARB on the status of pending analyses of health risks.
Refineries	• Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	• Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloro-ethylene	• Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. • Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	• Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

SOURCE: AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE (CARB 2005).

State law restricts the siting of new schools within 500 feet of a freeway, urban roadways with 100,000 vehicles/day, or rural roadways with 50,000 vehicles with some exceptions. However, no such requirements apply to the siting of residences. The available data show that exposure to vehicle-related pollutants is greatly reduced at approximately 300 feet. Specifically, a southern California study (Zhu, 2002) showed measured concentrations of vehicle-related pollutants, including ultra-fine particles, decreased dramatically within approximately 300 feet of the 710 and 405 freeways.[1] This study is cited by CARB as a reference for their minimum separation recommendations, summarized above. According to this study, total particulate matter in the size range of 6 to 25 nanometers (nm) decreases by about 80% when the distance from the freeways is about 100 meters (or approximately 328 feet). Concentrations of CO and black carbon[2] exhibited similar trends as the distance to freeways increased. Overall, total particulate matter, CO, and black carbon decayed exponentially as distance from the freeways increased.

[1] Zhu, Y., Hinds, W., Kim, S., Shen, S., Sioutas, C. Study of ultrafine particles near a major highway with heavy-duty diesel traffic. Atmospheric Environment 36 (2002) 4323-4335.

[2] Black carbon is the sooty black material emitted from gas and diesel engines and other sources that burn fossil fuel. Black carbon comprises a significant portion of particulate matter. Source: https://www.epa.gov/air-research/black-carbon-research/

The 710 and 405 freeways, the locations studied in the southern California study (Zhu, 2002), are high volume freeways, especially when compared to SR 120. Freeway 405 is one of the busiest freeways in the Los Angeles basin. Freeway 710 is a major truck route with a large percent of the traffic consisting of heavy-duty diesel trucks. During the sampling period for the southern California study (Zhu, 2002), traffic density along Freeway 710 ranged from 180 to 230 vehicles/min passing the sampling site, total for both directions, with approximately 25% of the vehicles being heavy diesel trucks. Freeway 710 carries approximately 221,000 vehicles per day[3], while the existing average daily trips along SR 120 is approximately 77,000.

According to the CARB Air Quality and Land Use Handbook: A Community Health Perspective, the risk at that distance for other freeways will vary based on local conditions – it may be higher or lower. However, in all these analyses the relative exposure and health risk dropped substantially within the first 300 feet. The relatively low daily traffic volume along SR 120 compared to the 710 and 405 freeways would result in reduced exposure to vehicle-related pollutants.

Overall, the proposed project would not cite a residential building within 500 feet of SR 120, and the average daily trips along SR 120 is well below the amount shown in Table 1. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Response d): The proposed project would not generate objectionable odors. People in the immediate vicinity of construction activities may be subject to temporary odors typically associated with construction activities (diesel exhaust, hot asphalt, etc.). However, any odors generated by construction activities would be minor and would be short and temporary in duration.

Examples of facilities that are known producers of operational odors include: Wastewater Treatment Facilities, Chemical Manufacturing, Sanitary Landfill, Fiberglass Manufacturing, Transfer Station, Painting/Coating Operations (e.g. auto body shops), Composting Facility, Food Processing Facility, Petroleum Refinery, Feed Lot/Dairy, Asphalt Batch Plant, and Rendering Plant. If a project would locate receptors and known odor sources in proximity to each other further analysis may be warranted; however, if a project would not locate receptors and known odor sources in proximity to each other, then further analysis is not warranted.

The project does not include any of the aforementioned uses. As such, implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

[3] Volume between Imperial Highway and Firestone Boulevard. Source: Caltrans. 2015 Traffic Volumes on California State Highways. Available: http://www.dot.ca.gov/trafficops/census/docs/2015_aadt_volumes.pdf.

IV. BIOLOGICAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
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 the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?		X		
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
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 wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		X		
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?		X		

Regional Setting

The City of Manteca is located in the western portion of the Great Valley Geomorphic Province of California. The Great Valley Province is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The San Joaquin River is located just south and west of the City. This major river drains the Great Valley Province into the San Joaquin Delta to the north, ultimately discharging into the San Francisco Bay to the northwest.

The City of Manteca is located within the San Joaquin Valley Bioregion, which is comprised of Kings County, most of Fresno, Kern, Merced, and Stanislaus counties, and portions of Madera, San Luis Obispo, and Tulare counties. The San Joaquin Valley Bioregion is the third most populous out of ten bioregions in the state, with an estimated 2 million people. The largest cities are Fresno, Bakersfield, Modesto, and Stockton. Interstate 5 and State Route 99 are the major north-south roads that run the entire length of the bioregion. Habitat in the bioregion includes vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, orchards, and oak savannah. Historically, millions of acres of wetlands flourished in the bioregion, but stream diversions for irrigation dried all but about five percent. Remnants of the wetland habitats are

protected in this bioregion in publicly owned parks, reserves, and wildlife areas. The bioregion is considered the state's top agricultural producing region with the abundance of fertile soil.

The region has a Mediterranean climate that is subject to cool, wet winters (often blanketed with fog) and hot, dry summers. The average annual precipitation is approximately 13.81 inches. Precipitation occurs as rain most of which falls between the months of November through April, peaking in January at 2.85 inches. The average temperatures range from December lows of 37.5 F to July highs of 94.3 F.

The project site is relatively flat. Topographic features within the project site include level fields and irrigation ditches/catch basins. Elevation ranges slightly from approximately 27 to 28 feet above mean sea level. There are no rivers, streams, or other natural aquatic habitats on the project site. The agricultural fields are actively maintained during the growing season, which includes small man-made irrigation ditches along the perimeter of the fields.

Vegetation on the project site consists of agricultural, ruderal, and landscaping. Because of the active agricultural use, there is very limited natural vegetation on the project site with the exception of the trees and landscaping around the residences. Common plant species observed in these areas include: wild oat (*Avena barbata*), rip-gut brome (*Bromus diandrus*), softchess (*Bromus hordeaceus*) alfalfa (*Medicago sativa*), Russian thistle (Salsola tragus), Italian thistle (*Carduus pycnocephalus*), rough pigweed (*Amaranthus retroflexus*), sunflower (*Helianthus annuus*), tarragon (*Artemisia dracunculus*), coyote brush (*Baccharis pilularis*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), sow thistle (*Sonchus asper*), telegraph weed (*Heterotheca grandiflora*), barley (*Hordeum* sp.), mustard (*Brassica niger*), and heliotrope (*Heliotropium curassavicum*).

Agricultural and ruderal vegetation found on the project site provides habitat for both common and a few special-status wildlife populations. For example, some commonly observed wildlife species in the region include: California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus),* American kestrel (*Falco sparverius*), white-tailed kite (*Elanus leucurus*), American killdeer (*Charadrius vociferus*), gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis species*), and western fence lizard (*Sceloporus occidentalis*), as well as many native insect species. There are also several bat species in the region. Bats often feed on insects as they fly over agricultural and natural areas.

Locally common and abundant wildlife species are important components of the ecosystem. Due to habitat loss, many of these species must continually adapt to using agricultural, ruderal, and ornamental vegetation for cover, foraging, dispersal, and nesting.

Responses to Checklist Questions

Response a): The following discussion is based on a background search of special-status species that are documented in the California Natural Diversity Database (CNDDB), the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants, and the U.S. Fish and Wildlife Service's (USFWS) records of listed endangered and threatened species from the IPAC database. The background search was regional in scope and focused on the documented occurrences within 10 miles of the project site. Table 2 provides a list of special-status plants and Table 3 provides a list of special-status animals. Figure 7 shows the general CNDDB occurrences.

Table 2: Special-Status Plant Species Which May Occur in Project Area

Species	*Status (Fed./CA/ CNPS/SJMSCP)*	*Geographic Distribution*	*Habitat and Blooming Period*
Big tarplant *Blepharizonia plumosa*	--/--/1B.1/No	San Francisco Bay area with occurrences in Alameda, Contra Costa, San Joaquin, Stanislaus, and Solano Counties	Valley and foothill grassland; 30-505 m. July-Oct.
Slough thistle *Cirsium crassicaule*	--/--/1B.1/Yes	San Joaquin Valley: Kings, Kern, and San Joaquin Counties	Freshwater sloughs and marshes; 3-100 m. May-August.
Recurved larkspur *Delphinium recurvatum*	--/--/1B.2/Yes	Central Valley from Colusa to Kern Counties	Alkaline soils in saltbush scrub, cismontane woodland, valley and foothill grassland; 3-750 m. March-May.
Palmate-bracted bird's-beak *Chloropyron palmatum*	E/E/1B.1/No	Scattered locations in Fresno and Madera counties in the San Joaquin Valley, San Joaquin, Yolo, and Colusa counties in the Sacramento Valley, and the Livermore Valley area of Alameda County.	Saline-alkaline soils in seasonally-flooded lowland plains and basins at elevations of less than 500 feet. May-October.
Delta button-celery *Eryngium racemosum*	--/E/1B.1/Yes	San Joaquin River delta floodplains and adjacent Sierra Nevada foothills: Calaveras, Merced, San Joaquin, and Stanislaus Counties	Riparian scrub, seasonally inundated depressions along floodplains on clay soils; below 75 m. June-August.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	--/--/2.1/Yes	Scattered locations in the Central Valley; southern coast of Texas	Floodplains, moist places, on alkaline soils; below 450 m. May-September.
Greene's tuctoria *Tuctoria greenei*	E/R/1B.1/Yes	Historic range is the Central Valley from Shasta to Tulare county, although it is extirpated from several of the southern counties.	Large, relatively deep vernal pools, which often are located on low-lying lands suitable for agriculture. May-July.
Lesser saltscale *Atriplex minuscula*	--/--/1B./No	Scattered locations in the Central Valley in Alameda, Butte, Fresno, Kings, Kern, Madera, Merced, Stanislaus, Tulare counties.	Alkaline, sandy soils. Chenopod scrub, playas, valley and foothill grassland. May-October.
California alkali grass *Puccinellia simplex*	--/--/1B.2/No	Scattered locations in the Central Valley to Utah.	Saline flats, mineral springs. March-May
Heartscale *Atriplex cordulata var. cordulata*	--/--/1B.2/Yes	Central Valley and interior valleys of the Coast Range from Butte to Kern counties.	Saline or alkaline sandy soils in grassland or saltbush scrub. March-October.
Sanford's arrowhead *Sagittaria sanfordii*	--/--/1B.2/Yes	Its historic range in California is the Central Valley from Butte County to Fresno County and along the coast from Del Norte County to Ventura County. It is mostly extirpated from the Central Valley due to channel and flow alteration of the major waterways.	Shallow, slow moving waters. Although its natural habitat is along streams and rivers, it also is sometimes found along man-made channels. May-October.

Species	*Status (Fed./CA/ CNPS/SJMSCP)*	*Geographic Distribution*	*Habitat and Blooming Period*
Saline clover *Trifolium hydrophilum*	--/--/1B.2/No	Eastern and Northern San Francisco Bay region, the Delta, western San Joaquin Valley, southern San Jose.	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), and Vernal pools. April-June.
San Joaquin spearscale *Extriplex joaquinana*	--/--/1B.2/No	Delta region, central valley and central coast.	Alkaline. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland. April-October.
Delta tule pea *Lathyrus jepsonii var. jepsonii*	--/--/1B.2/Yes	Primarily from the water's edge in the brackish and fresh-water portions of the Delta region, there are also records of this species from Fresno, Marin, San Benito, and Santa Clara counties. Within San Joaquin County.	Closely associated with the waterways of the Delta. May-July.
Alkali milk-vetch *Astragalus tener var. tener*	--/--/1B.2/Yes	Eastern San Francisco Bay region, the Delta, and western San Joaquin Valley south to the lower Salinas and San Benito valleys.	Grassy alkaline flats and vernally moist meadows at elevations below 500 ft. March-June.
Suisun Marsh aster *Symphyotrichum lentum*	--/--/1B.2/Yes	Delta region. Primarily the Bouldin Island, Isleton, Holt, Terminous, and Woodward Island quad.	Water's edge, in places where water is brackish and there is some tidal influence. May-November.
Woolly rose-mallow *Hibiscus lasiocarpos var. occidentalis*	--/--/1B.2/Yes	Central Valley of California, as well as populations in eastern North America.	All along the waterways of the Delta. June-September.
Watershield *Brasenia schreberi*	--/--/2B.3/No	Central Valley of California and western North America.	Freshwater Marshes and swamps. June-September.

NOTES: CNPS = CALIFORNIA NATIVE PLANT SOCIETY
SJMSCP = SAN JOAQUIN MULTI-SPECIES HABITAT CONSERVATION AND OPEN SPACE PLAN

FEDERAL
E = ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
STATE
E = ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE FEDERAL CALIFORNIA ENDANGERED SPECIES ACT.
R = RARE UNDER THE CALIFORNIA ENDANGERED SPECIES ACT
CALIFORNIA NATIVE PLANT SOCIETY
1B = RARE, THREATENED, OR ENDANGERED IN CALIFORNIA AND ELSEWHERE.
2 = RARE, THREATENED, OR ENDANGERED IN CALIFORNIA, BUT MORE COMMON ELSEWHERE.
3 = A REVIEW LIST – PLANTS ABOUT WHICH MORE INFORMATION IS NEEDED.
4 = PLANTS OF LIMITED DISTRIBUTION – A WATCH LIST
.1 = SERIOUSLY ENDANGERED IN CALIFORNIA (OVER 80% OF OCCURRENCES THREATENED-HIGH DEGREE AND IMMEDIACY OF THREAT).
.2 = FAIRLY ENDANGERED IN CALIFORNIA (20-80% OCCURRENCES THREATENED).
.3 = NOT VERY ENDANGERED IN CALIFORNIA (<20% OF OCCURRENCES THREATENED).

Special Status Plant Species

There are eighteen special status plants identified as having the potential to occur on the project site based on known occurrences in the region. These include: Big tarplant (*Blepharizonia plumose*), Slough thistle (*Cirsium crassicaule*), Recurved larkspur (*Delphinium recurvatum*), Round-leaved filaree (*Erodium macrophyllum*), Palmate-bracted bird's-beak

Chloropyron palmatum), Delta button-celery (*Eryngium racemosum*), Wright's trichocoronis (*Trichocoronis wrightii var. wrightii*), and Greene's tuctoria *(Tuctoria greenei),* Lesser saltscale (*Atriplex minuscula),* California alkali grass (*Puccinellia simplex),* Heartscale *(Atriplex cordulata var. cordulata), and* Sanford's arrowhead *(Sagittaria sanfordii).*Of the eighteen species, there are two federal listed species, three state listed species (endangered), sixteen CNPS 1B listed species (including the state listed species), and two CNPS 2 listed species. The majority of state listed species and CNPS 1B listed species are covered species under the SJMCP. Only one of The CNPS 2 listed species are not covered under the SJMCP.

Field surveys and habitat evaluations were performed on May 9th 2019, which coincides with the blooming period, however, the site was essentially void of natural vegetation based on the tilling operations on the project site and there is no possibility for presence of these species.

Table 3: Special-Status Wildlife and Fish Species Which May Occur in Project Area

Species	***Status (Fed/CA/ SJMSCP)***	***Geographic Distribution***	***Habitat Requirements***
Invertebrates			
Vernal pool fairy shrimp *Branchinecta lynchi*	T/--/Yes	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County	Common in vernal pools; they are also found in sandstone rock outcrop pools.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/--/Yes	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds.
Molestan blister beetle *Lytta molesta*	--/--/Yes	Distribution of this species is poorly known.	Annual grasslands, foothill woodlands or saltbush scrub.
Sacramento anthicid beetle *Anthicus sacramento*	--/--/No	Found in several locations along the Sacramento and San Joaquin rivers, from Shasta to San Joaquin counties, and at one site along the Feather River.	Sand dune area, sand slipfaces among bamboo and willow, but may not depend on these plants.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/--/Yes	Stream side habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.
Midvalley fairy shrimp *Branchinecta mesovallensis*	--/--/Yes	Extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County and along the central Coast Range from northern Solano County to Pinnacles National Monument in San Benito County.	Vernal pools with tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands.

Species	*Status (Fed/CA/ SJMSCP)*	*Geographic Distribution*	*Habitat Requirements*
California linderiella *Linderiella occidentalis*	--/--/No	Ranges from near Redding in the north to as far south as Fresno County, mainly to the east of the Sacramento and San Joaquin Rivers.	Natural, and artificial, seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities.
Conservancy fairy shrimp *Branchinecta conservatio*	E/--/Yes	Sacramento Valley and the northern San Joaquin Valley, and the eastern flank of the central coastal range.	Large to very large vernal pools and vernal lakes although they also have been found in alkaline pools.
Western bumble bee *Bombus occidentalis*	--/--/No	Western North America, ranging from the tundra region in Alaska and Yukon south along the west coast to southern British Columbia to central California, Arizona and New Mexico and east into southern Saskatchewan and northwestern Great Plains	Open coniferous, deciduous and mixed-wood forests, wet and dry meadows, montane meadows and prairie grasslands, meadows bordering riparian zones, and along roadsides in taiga adjacent to wooded areas, urban parks, gardens and agricultural areas, subalpine habitats and more isolated natural areas.
Obscure bumble bee *Bombus caliginosus*	--/--/No	Coast ranges from southern British Columbia and northern Washington to southern California, with scattered records from the east side of California's Central Valley.	Open grassy coastal prairies and coast range meadows.
Crotch bumble bee *Bombus crotchii*	--/--/No	Central California south to Baja California del Norte, Mexico, and includes coastal areas east to the edges of the deserts and the Central Valley.	Open grassland and scrub.
Amphibians			
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	T/SSC/Yes	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grass-lands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.
Western Spadefoot *Spea hammondii*	T/SSC/Yes	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County	Permanent and semi-permanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.
Birds			
Aleutian goose *Branta canadensis leucopareia*	D/--/Yes	The entire population winters in Butte Sink, then moves to Los Banos, Modesto, the Delta, and East Bay reservoirs; stages near Crescent City during spring before migrating to breeding grounds.	Roosts in large marshes, flooded fields, stock ponds, and reservoirs; forages in pastures, meadows, and harvested grainfields; corn is especially preferred

Species	*Status (Fed/CA/ SJMSCP)*	*Geographic Distribution*	*Habitat Requirements*
Burrowing owl *Athene cunicularia*	BCC/SSC/Yes	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows
Loggerhead shrike *Lanius ludovicianus*	BCC/SSC/Yes	Resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches
Nuttalls woodpecker *Branta canadensis leucopareia*	BCC/--/No	Year-round distribution occurs from northern California and southward to northwestern Baja California.	Found primarily in oak woodlands, but also found in riparian woodlands. Tree nest cavity excavated by males with little assistance from females; male may roost in cavity as it nears completion.
Oak titmouse *Baeolophus inornatus*	BCC/S/No	Nonmigratory species that breeds from Oregon, through California and to northwest Baja California, Mexico.	Live in warm, open, dry oak or oak-pine woodlands. Many will use scrub oaks or other brush as long as woodlands are nearby. Nests are built in tree cavities. Occasionally, Oak Titmice nest in stumps, fenceposts, pipes, eaves, or holes in riverbanks. They will also use nest boxes.
Song sparrow (Modesto Population) *Melospiza melodia*	BCC/SSC/Yes	Restricted to California, where it is locally numerous in the Sacramento Valley, Sacramento–San Joaquin River Delta, and northern San Joaquin Valley. Exact boundaries of range uncertain.	Found in emergent freshwater marshes dominated by tules (*Scirpus* spp.) and cattails (*Typha* spp.) as well as riparian willow (*Salix* spp.) thickets. They also nest in riparian forests of Valley Oak (*Quercus lobata*) with a sufficient understory of blackberry (*Rubus* spp.), along vegetated irrigation canals and levees, and in recently planted Valley Oak restoration sites.
Swainson's hawk *Buteo swainsoni*	BCC/T/Yes	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields
Merlin *Falco columbarius*	--/--/Yes	Does not nest in California. Rare but widespread winter visitor to the Central Valley and coastal areas	Forages along coastline in open grasslands, savannas, and woodlands. Often forages near lakes and other wetlands

Species	*Status (Fed/CA/ SJMSCP)*	*Geographic Distribution*	*Habitat Requirements*
Tricolored blackbird *Agelaius tricolor*	BCC/C (SSC)/Yes	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	T (BCC)/E/Yes	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak riparian habitats where scrub jays are abundant
Yellow-billed magpie *Pica nuttalli*	BCC/--/No	The year-round range of Yellow-billed Magpies is entirely in California.	Resides in oak savanna, open areas with large trees, and along streams. This species also forages in grassland, pasture, fields, and orchards.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	--/SSC/Yes	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds.	Nests only where large insects such as odonatan are abundant, nesting timed with maximum emergence of aquatic insects.
California Horned Lark *Eremophila alpestris actia*	--/--/Yes	Central Valley and coastal valleys and foothills.	Forage in large groups in open grasslands, nesting in hollows on the ground, and are also regularly found breeding on the Valley floor in suitable habitat.
Least bell's vireo *Vireo bellii pusillus*	E/E/No	Central Valley of California and other low-elevation river valleys.	Dense brush, mesquite, willow-cottonwood forest, streamside thickets, and scrub oak.
White-tailed kite *Elanus leucurus*	--/--/Yes	Gulf Coast in Texas and Mexico and in the valley and coastal regions of central and southern California.	Grasslands, marshes, row crops and alfalfa, where they hover while foraging for rodents and insects.
Costa's hummingbird *Calypte costae*	BCC/--/No	Central California, southern Nevada, and southwestern Utah south to southern Baja California, southern Arizona, and southwestern New Mexico.	Desert and semi-desert, especially washes, and arid brushy foothills and chaparral.
Spotted Towhee *Pipilo maculatus clementae*	BCC/--/No	Southern British Columbia, southern Alberta, and southern Saskatchewan south to southern California, northwestern Baja California, southern Nevada, Arizona, and through the Mexican highlands to Chiapas and central Guatemala, and east to the central Dakotas, north-central and western Nebraska, central	Shrubby habitats characterized by deep litter and humus on ground, and sheltering vegetation overhead. Undergrowth of open woodland, forest edge, second growth, brushy areas, chaparral, riparian thickets, woodland.

Species	*Status (Fed/CA/ SJMSCP)*	*Geographic Distribution*	*Habitat Requirements*
		Colorado, eastern New Mexico, and extreme western Texas.	
Common yellowthroat *Geothlypis trichas sinuosa*	--/SSC/No	Wide distribution over North America.	Marshes (especially cattail), thickets near water, bogs, brushy pastures, old fields, and, locally, undergrowth of humid forest.
Fish			
Delta smelt *Hypomesus transpacificus*	T/T/Yes	Primarily in the Sacramento–San Joaquin Estuary but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay.	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand.
Hardhead *Mylopharodon conocephalus*	--/SSC/No	Tributary streams in the San Joaquin drainage; large tributary streams in the Sacramento River and the main stem	Resides in low to mid-elevation streams and prefer clear, deep pools and runs with slow velocities. They also occur in reservoirs.
Central Valley steelhead *Oncorhynchus mykiss*	T/--/No	Sacramento River and tributary Central Valley rivers.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8°C to 18°C. Habitat types are riffles, runs, and pools.
Longfin smelt *Spirinchus thaleichthys*	--/SSC/Yes	Occurs in estuaries along the California coast. Adults concentrated in Suisun, San Pablo, and North San Francisco Bays.	Prior to spawning, these fish aggregate in deepwater habitats available in the northern Delta, including, primarily, the channel habitats of Suisun Bay and the Sacramento River. Spawning occurs in fresh water on the San Joaquin River below Medford Island and on the Sacramento River below Rio Vista.
Mammals			
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E/SSC, FP/Yes	Historical distribution along the San Joaquin, Stanislaus, and Tuolumne Rivers, and Caswell State Park in San Joaquin, Stanislaus, and Merced Counties; presently limited to San Joaquin County at Caswell State Park and a possible second population near Vernalis	Riparian habitats with dense shrub cover, willow thickets, and an oak overstory
Riparian brush rabbit *Sylvilagus bachmani riparius*	E/E/Yes	Limited to San Joaquin County at Caswell State Park near the confluence of the Stanislaus and San Joaquin Rivers and Paradise Cut area on Union Pacific right-of-way lands	Native valley riparian habitats with large clumps of dense shrubs, low-growing vines, and some tall shrubs and trees

Species	*Status (Fed/CA/ SJMSCP)*	*Geographic Distribution*	*Habitat Requirements*
Pallid bat *Antrozous pallidues*	--/SSC/No	Western North America from south-central British Columbia south through the western United States to southern Baja California, central Mexico, southern Kansas, and southern Texas.	Mountainous areas, intermontane basins, lowland desert scrub, arid deserts and grasslands.
Reptiles			
Giant garter snake *Thamnophis couchi gigas*	T/T/Yes	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; they are also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.
Northern california legless lizard *Anniella pulchra*	--/SSC/No	Spotty distribution in California, extending from near Antioch, California, south to the vicinity of Santa Barbara and the Antelope Valley at the western margin of the Mohave Desert	Loose soil, especially in semi-stabilized sand dunes and in other areas with sandy soil, including habitats vegetated with oak or pine-oak woodland, or chaparral.

STATUS EXPLANATIONS:
FEDERAL
E = ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
PE = PROPOSED FOR ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
PT = PROPOSED FOR THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
C = CANDIDATE SPECIES FOR LISTING UNDER THE FEDERAL ENDANGERED SPECIES ACT.
D = DELISTED FROM FEDERAL LISTING STATUS.
BCC = BIRD OF CONSERVATION CONCERN
STATE
E = ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
C = CANDIDATE SPECIES FOR LISTING UNDER THE STATE ENDANGERED SPECIES ACT.
FP = FULLY PROTECTED UNDER THE CALIFORNIA FISH AND GAME CODE.
SSC = SPECIES OF SPECIAL CONCERN IN CALIFORNIA.

Special Status Wildlife Species

Invertebrates: There are eleven special-status invertebrates that are documented within a 10-mile radius of the project site according to the CNDDB including: Molestan blister beetle (*Lytta molesta*), Sacramento anthicid beetle (*Anthicus sacramento*), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Midvalley fiary shrimp (*branchinecta mesovallensis*), Calfiornia linderiella (*linderiella occidentalis*), Conservancy fairy shrimp (*branchinecta conservation*), Western bumble bee (*bombus accidentalis*), Obscure bumble bee (*bombus caliginosus*), and Crotch bumble bee (*bombus crotchii*). In addition, the Vernal pool fairy shrimp (*Branchinecta lynchi*) and Vernal pool tadpole shrimp (*Lepidurus packardi*) are documented in the USFWS IPAC database as potentially occurring within the region.

Vernal pool fairy shrimp (VPFS) is a federal threatened invertebrate found in the Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. They are commonly found in vernal pools and in sandstone rock outcrop pools. VPFS is not anticipated to

be directly affected by any individual phase or component of the proposed project because there in not appropriate vernal pool habitat on the project site.

Vernal pool tadpole shrimp (VPTS) is a federal endangered invertebrate found in vernal pools and stock ponds from Shasta county south to Merced county. VPTS is not anticipated to be directly affected by any individual phase or component of the proposed project because there in not appropriate vernal pool habitat on the project site.

Valley elderberry longhorn beetle (VELB) is a federal threatened insect, proposed for delisting. Elderberry (*Sambucus* sp.), which is a primary host species for VELB. VELB is not anticipated to be directly affected by the proposed project.

Essential habitat for Molestan blister beetle and Sacramento anthicid beetle is not present on the project site.

No special-status invertebrates are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

Reptile and amphibian species: There are three special-status amphibian that are documented within a 10-mile radius of the project site according to the CNDDB including: California tiger salamander (*Ambystoma californiense*), Giant garter snake (*Thamnophis couchi gigas*) and Western spadefoot *(Spea hammondii)*. In addition, the California red-legged frog (*Rana aurora draytoni*) is documented in the USFWS IPAC database as potentially occurring within the region. There is no essential habitat for any of these four species within the project.

No special-status reptiles or amphibians are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

Birds: Special-status birds that are documented in the CNDDB within a ten-mile radius of the project site include: Aleutian goose (*Branta canadensis leucopareia*), Loggerhead shrike (*Lanius ludovicianus*), Yellow-headed blackbird (*Xanthocephalus xanthocephalus*), Swainson's hawk (*Buteo swainsoni*), song sparrow (Modesto population) (*Melospiza melodia*), Merlin (*Falco columbarius*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), burrowing owl (*Athene cunicularia*), Tricolored blackbird (*Agelaius tricolor*), California horned lark (*Eremophila alpestris actia*), Least Bell's Vireo (*vireo belli pusillus*), White-tailed kite (*elanus leucurus*). In

addition, the common yellowthroat (Geothlypis trichas sinuosa), costa's hummingbird (Calypte costae), nuttal's woodpecker (Picoides nuttallii), oak titmouse (Baeolophus inornatus), song sparrow (Melospiza melodia), spotted towhee (Pipilo maculatus clementae), and yellow-billed magpie (Pica nuttalli) are documented in the USFWS IPAC database as potentially occurring within the region. The project site may provide suitable foraging habitat for a variety of potentially occurring special-status birds, including those listed above. Potential nesting habitat is present in a variety of trees located within the project site and in the vicinity. There is also the potential for other special-status birds that do not nest in this region and represent migrants or winter visitants to forage on the project site.

Year-round birds: Special-status birds that can be present in the region throughout the year include: burrowing owl (*Athene cunicularia*), loggerhead shrike *(Lanius ludovicianus*), Nuttalls woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), song sparrow (Modesto population) (*Melospiza melodia*), tricolored blackbird *(Agelaius tricolor*), yellow-billed magpie (*Pica nuttalli*), among others. Some of these species are migratory, but also reside year-round in California.

Summering Birds: Special-status birds that are only present in the region in the spring and summer months include: Aleutian goose (*Branta canadensis leucopareia*), least bittern (*Ixobrychus exilis*), Swainson's hawk (*Buteo swainsoni*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and yellow-billed magpie (*Pica nuttalli*).

Overwintering Birds: Special-status birds that are only present in the region in the fall and winter months include the merlin *(Falco columbarius*).

Nesting Raptors (Birds of Prey): All raptors (owls, hawks, eagles, falcons), including species and their nests, are protected from take pursuant to the Fish and Game Code of California Section 3503.5, and the federal Migratory Bird Treaty Act, among other federal and State regulations. Special-status raptors that are known to occur in the region include: bald eagle (*Haliaeetus leucocephalus*), burrowing owl (*Athene cunicularia*), Cooper's hawk *(Accipiter cooperii*), ferruginous hawk *(Buteo rega*), golden eagle *(Aquila chrysaetos*), great horned owl *(Bubo virginianus),* prairie falcon *(Falco mexicanus*), red-tailed hawk *(Buteo jamaicensis),* short-eared owl (*Asio flammeus*), Swainson's hawk *(Buteo swainsoni*), and white-tailed kite *(Elanus leucurus*), among others.

Analysis: While the project site contains very limited nesting habitat, there are powerlines and trees located in the region that represent potentially suitable nesting habitat for a variety of special-status birds. Additionally, the agricultural land represents potentially suitable nesting habitat for the ground-nesting birds where disturbance is less frequent. In general, most nesting occurs from late February and early March through late July and early August, depending on various environmental conditions. The nearest documented CNDDB occurrence for Swainson's hawk is located approximately 1.7 miles northwest of the project site. However, a single Swainson's hawk was observed perched on a tree limb immediately adjacent to the project site. The Swainson's hawk proceeded to chase other birds in the vicinity and then perch in various locations. The individual hawk was not paired and there was no nest in the immediate vicinity. Swainson's hawk is a highly mobile species and can be found throughout the regional vicinity. The nearest documented CNDDB occurrence for burrowing owl is located approximately 1.71 miles northwest of the project site. This species was not observed on the project site or vicinity. In addition to the species described above, common raptors may nest in or adjacent to the project site in any given year.

New sources of noise and light during the construction and operational phases of the project could adversely affect nesters if they located adjacent to the project site in any given year. Additionally, the proposed project would eliminate the agricultural areas on the project site, which serve as potential foraging habitat for birds throughout the year. Mitigation Measure BIO-1 requires participation in the SJMSCP. As part of the SJMSCP, SJCOG requires preconstruction surveys for projects that occur during the avian breeding season (March 1 – August 31). When active nests are identified, the biologists develop buffer zones around the active nests as deemed appropriate until the young have fledged. SJCOG also uses the fees to purchase habitat as compensation for the loss of foraging habitat. Implementation of the proposed project, with the Mitigation Measure BIO-1, would ensure that potential impacts to special status birds are reduced.

Mammals: Special-status mammals that are documented within a 10-mile radius of the project site include: Riparian (San Joaquin Valley) woodrat (*Neotoma fuscipes riparia*), Riparian brush rabbit (*Sylvilagus bachmani riparius*), and Pallid bat (*Antrozous pallidues*).

Riparian (San Joaquin Valley) woodrat and riparian brush rabbit: The project site does not contain appropriate habitat for riparian (San Joaquin Valley) woodrat and riparian brush rabbit.

Special-status bats: The project site provides potential habitat for Pallid bat (antrozous pallidues). This species is not federal or state listed; however, they are tracked by the CNDDB. Development of the project site would eliminate foraging habitat for special status bats by removing the agricultural areas. These special status bat species are not covered by the SJMSCP.

Conclusion

No special-status species are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species. Therefore, the proposed project would have a ***less than significant*** impact relative to this topic.

Mitigation Measure(s)

Mitigation Measure BIO-1*: Prior to commencement of any grading activities, the project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.*

Responses b): There is no riparian habitat on the project site. The CNDDB record search revealed documented occurrences of four sensitive habitats within 10 miles of the project site including:

Elderberry Savanna, Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, and Great Valley Oak Riparian. None of these sensitive natural communities occur within the portion of the project site. Implementation of the proposed project would have a ***less than significant*** impact on riparian habitats or natural communities.

Response c): The project site does not contain protected wetlands or other jurisdictional areas and there is no need for permitting associated with the federal or state Clean Water Acts. The irrigation ditches are man-made isolated facilities with the sole purpose of agricultural irrigation. These ditches are exempt from permitting. Absent any wetlands or jurisdictional waters, implementation of the proposed project would have ***less than significant*** impact relative to this topic.

Response d): The CNDDB record search did not reveal any documented wildlife corridors or wildlife nursery sites on or adjacent to the project site. Special status fish species documented within the region include: Delta smelt (*Hypomesus transpacificus*), Hardhead (*Mylopharodon conocephalus*), Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley fall- /late fall-run Chinook salmon (*Oncorhynchus tshawytscha*), and Longfin smelt (*Spirinchus thaleichthys*). The closest major natural movement corridor for native fish that are documented in the region is the San Joaquin River, located to the west of the project site. The land uses within the project site would not have any direct disturbance to the San Joaquin River or its tributaries, and therefore, would not have any direct disturbance to the movement corridor or habitat.

The ongoing operational phase of the proposed project requires discharge of stormwater into the City storm drainage system, which ultimately discharges into the Delta. The discharge of stormwater could result in indirect impacts to special status fish and wildlife if stormwater was not appropriately treated through BMPs prior to its discharge to the Delta. The Manteca Municipal Code Title 13 (Public Services) Chapter 13.28 (Stormwater Management and Discharges) establish minimum storm water management requirements and controls. Storm water drainage is managed through the implementation of best management practices to the extent they are technologically achievable to prevent and reduce pollutants. The City requires reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. The management of water quality through BMPs is intended to ensure that water quality does not degrade to levels that would interfere or impede fish or wildlife. Implementation of these required measures would ensure that this potential impact is reduced to a ***less than significant*** level.

Responses e): The proposed project is subject to the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). The proposed project does not conflict with the SJMSCP. Therefore, the proposed project would have a ***less than significant*** impact relative to this topic. Mitigation Measure presented in this Initial Study requires participation in the SJMSCP.

Responses f): The Resource Conservation Element of the General Plan establishes numerous policies and implementation measures related to biological resources as listed below:

Conservation Element Policies

RC-P-31. Minimize impact of new development on native vegetation and wildlife.

- ***Consistent****: This Initial Study includes an in-depth analysis of impacts for sensitive plants and wildlife, as well as habitat. Where impacts are identified, mitigation measures are presented to minimize, avoid, or compensate to the extent practicable.*

RC-P-33. Discourage the premature removal of orchard trees in advance of development, and discourage the removal of other existing healthy mature trees, both native and introduced.

- ***Consistent****: The proposed project will not require the removal of orchard trees.*

RC-P-34. Protect special status species and other species that are sensitive to human activities.

- ***Consistent****: This Initial Study includes an in-depth analysis of impacts for sensitive plants and wildlife, as well as habitat. Where impacts are identified, mitigation measures are presented to minimize, avoid, or compensate to the extent practicable.*

RC-P-35. Allow contiguous habitat areas.

- ***Consistent****: Habitat areas in the vicinity of the project site include agricultural plant communities which provide habitat for a variety of biological resources in the region. Agricultural areas occur throughout the region and are generally flat and well drained, and as a result are well suited for many crops. Alfalfa fields, hay, row crops, orchards, dominate the agricultural areas in the vicinity. The proposed project does not require contiguous habitat areas to change or convert to another use.*

RC-P-36. Consider the development of new drainage channels planted with native vegetation, which would provide habitat as well as drainage.

- ***Consistent****: The project does not include new drainage channels.*

Municipal Code

The Manteca Municipal Code calls for the avoidance of heritage trees as defined under section 17.61.030. Heritage trees are any natural woody plant rooted in the ground and having a diameter of 30 inches or more when measured two feet above the ground. The project site contains 21 sparsely clustered trees located along the northern project site boundary, surrounding the existing residences. There are no heritage trees on the project site.

Section 17.19.060 calls for the protection of all existing trees having a diameter of six inches or more when measured 4½ feet above the ground. The City planning department must be notified of planned construction or grade changes within the proximity of existing mature trees. Existing trees must be protected from construction equipment, machinery, grade changes, and excavation for utilities, paving, and footers. Replacement of existing trees is subject to approval from the planning director and must be with a minimum 24-inch box tree of compatible species for the development site and be consistent with Section 17.19.030. There is an existing mature tree located along the southeast boundary of the project site near the neighboring orchard.

Section 12.08.070 of the municipal code prohibits cutting, pruning, removing, injuring, or interference with any tree, shrub, or plant upon or in any street tree area or other public place in the City without prior approval from the superintendent. The City is authorized to grant such permission at their discretion and where necessary. Except for utility companies, as provided in Section 12.08.080, no such permission shall be valid for a longer period than 30 days after its issuance.

The project site contains ornamental landscaping and shade trees in association with the existing residences along the northern boundary. Trees that cannot remain in the final design must be

replaced in accordance with the *Manteca Municipal Code (17.19.060)* if deemed applicable at the time of removal.

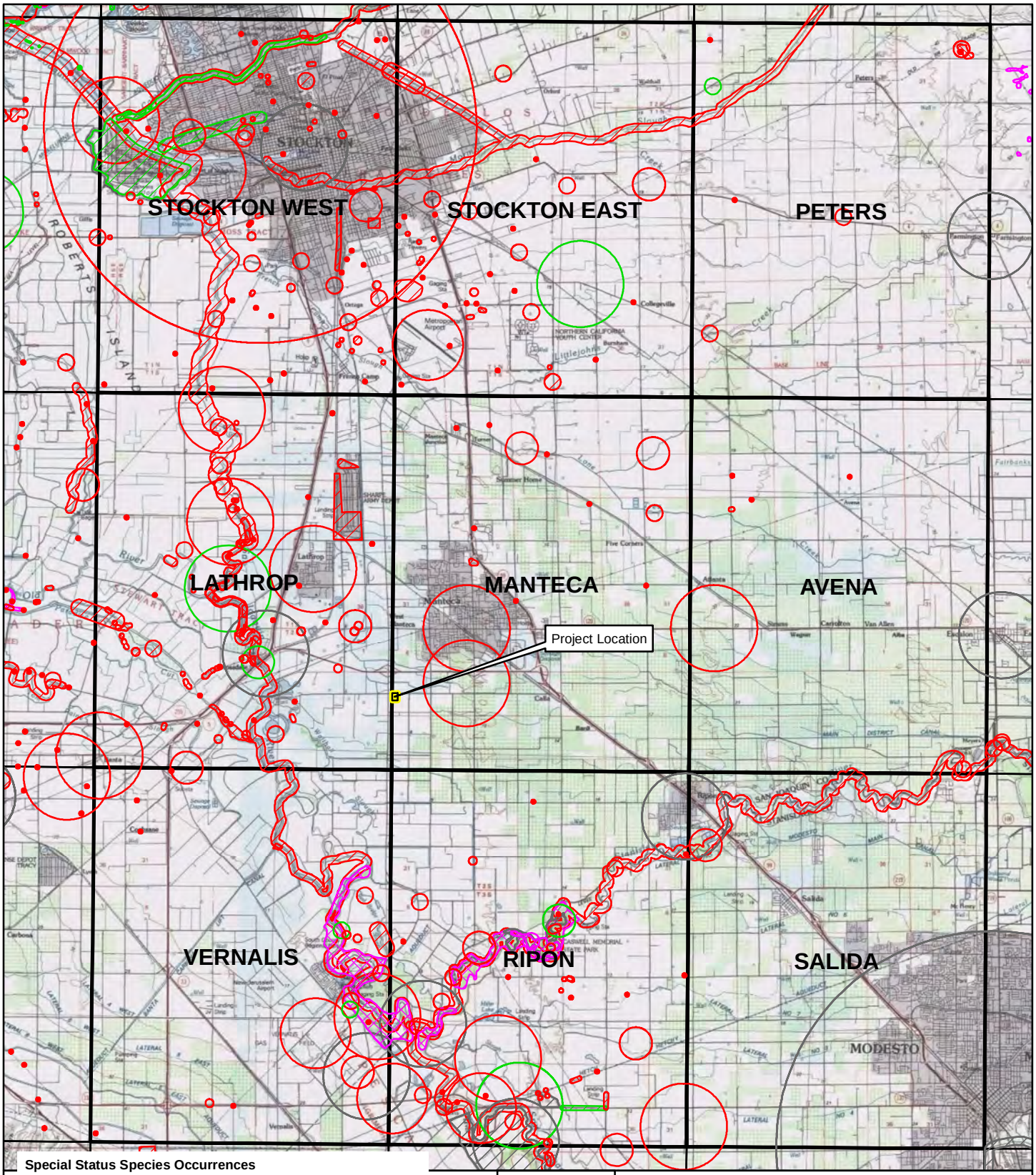
The following mitigation measures would require compliance with the Manteca Municipal Code for removal and replacement of trees. With the implementation of the following mitigation measures, the proposed project would have a ***less than significant*** impact relative to this topic.

Mitigation Measure(s)

Mitigation Measure BIO-2*: Prior to the approval of improvement plans, the applicant shall provide a landscape plan that includes tree planting specifications established by the Manteca Municipal Code (17.19.060) for the replacement of any trees, excluding orchard and non-native trees, to be removed at a ratio of 1:1. Replacement trees shall be planted on-site at a location that is agreeable to the City.*

Mitigation Measure BIO-3*: Prior to the commencement of grading activities or other ground disturbing activities on the Project site, the Project applicant shall arrange for a qualified biologist to conduct a preconstruction survey for nesting raptors in accordance with SJMSCP requirements. If no nests are detected, then construction activities may commence. If occupied nests are discovered, then the Project applicant shall coordinate with SJCOG regarding the appropriate buffer needed to avoid the particular bird species. If burrowing owl is discovered during the non-breeding season (September 1 through January 31) they should be evicted from the project site by passive relocation as described in the California Department of Fish and Game's Staff Report on Burrowing Owls (Oct., 1995). Implementation of this mitigation shall occur prior to grading or site clearing activities. SJCOG shall be responsible for monitoring and a qualified biologist shall conduct surveys and relocate owls as required.*

Mitigation Measure BIO-4*: Prior to commencement of any grading activities, the Project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through payment of development fees for conversion of open space lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. In addition, coverage includes incidental take avoidance and minimization measures for species that could be affected as a result of the proposed Project. There are a wide variety of incidental take avoidance and minimization measures contained in the SJMSCP that were developed in consultation with the USFWS, CDFW, and local agencies. The applicability of incidental takes avoidance and minimization measures are determined by SJCOG on a Project basis. The process of obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a) and California Fish and Game Code Section 2081. The Section 10(a) permit also serves as a special-purpose permit for the incidental take of those species that are also protected under the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species. The SJMSCP includes the implementation of an ongoing Monitoring Plan to ensure success in mitigating the habitat impacts that are covered. The SJMSCP Monitoring Plan includes an Annual Report process, Biological Monitoring Plan, SJMSCP Compliance Monitoring Program, and the SJMSCP Adaptive Management Plan SJCOG.*



Special Status Species Occurrences

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terrestrial Comm. (specific)
- Terrestrial Comm. (circular)
- Multiple (non-specific)
- Multiple (circular)

CNDDB version 05/2019. Please Note: the occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area. Basemap: ArcGIS Online Topographic Map Service. Map date: May 31, 2019.

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Miles

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 7.
California Natural Diversity Database
9-Quad Search

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

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V. CULTURAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c) Disturb any human remains, including those interred outside of formal cemeteries?		X		

Responses to Checklist Questions

Responses a), b): Records of previously recorded cultural resources and cultural resource investigations were examined by the Central California Information Center of the California Historical Resources Information System on for the project area and a one-eighth mile radius (CCIC File # 11090L) on May 30, 2019. The project area has never been surveyed. No historic or prehistoric cultural resources have been recorded within the project area. At the western edge of the search area, the transmission line has been recorded as #P-39-005337.

The property was surveyed on May 31, 2019, by Michael Lawson of Peak & Associates by walking linear transects spaced no more than ten meters apart across the entire property. The landform is flat, possibly leveled for agricultural purposes, but no irrigation equipment or ditches were observed. Disked furrows were observed in both the smaller square field between the houses, as well as the larger rectangular field behind them to the west. The soil is uniformly tan in color and sandy loam in texture, with occasional pebbles of native stone (quartzite). Soil visibility was excellent due to recent plowing and vegetation control. There is no evidence of prehistoric period use or occupancy of the property. Two residences are present on the property, with one slated for demolition at the northwest corner of the property. The other home, at the northeast corner, will remain within the development. The residence proposed for demolition is more than 50 years in age, and has been formally recorded. The resource is a single-story, irregular shaped, single family residence that was constructed sometime before 1949 according to USGS topographic maps based on aerial photographs. The residence has multiple roof planes and appears to have been constructed during two different periods (large addition of south side). The northern portion of the residence appears to be a Gable-and-Wing Roof subtype of the Minimal Traditional architectural style (McAlester 2017:586-595). The southern portion is basically a large square addition with a gable roof that has been integrated into the earlier structure. The roof is covered with asphalt shingles and the sides are covered with stucco. There are a mixture of modern aluminum frame windows and older double sash, divided horizontal windows enclosed with a slipsill. There is no particular architectural style for the residence at 4764 East Woodward Avenue as it appears to have been constructed at two different periods with an existing Minimal Traditional Gable-and-Wing Roof subtype home added onto and modified at a later date. Although unlikely, there is always a slight possibility that a site may exist in the project area and be obscured by vegetation, siltation or historic activities, leaving no surface evidence. In order to assist in the recognition of cultural resources, a training session for all workers should be conducted in advance of the initiation of construction activities at the site. The training session will provide information on recognition of artifacts, human remains, and cultural deposits to help in the recognition of potential issues. Should artifacts or unusual amounts of stone, bone, or shell be uncovered during construction activities, an archeologist would be consulted for an

evaluation. Implementation of the following mitigation measure would require investigations and avoidance methods in the event that a previously undiscovered cultural resource is encountered during construction activities. With implementation of the following mitigation measure, development of the proposed project would have a ***less than significant*** impact on historical and archaeological resources.

Mitigation Measure(s)

Mitigation Measure CUL-1: *If cultural resources (i.e., prehistoric sites, historic sites, isolated artifacts/features, and paleontological sites) are discovered during construction, work shall be halted immediately within 50 meters (165 feet) of the discovery, the City of Manteca shall be notified, and a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology (or a qualified paleontologist in the event paleontological resources are found) shall be retained to determine the significance of the discovery. The City of Manteca shall consider recommendations presented by the professional for any unanticipated discoveries and shall carry out the measures deemed feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. Specific measures are developed based on the significance of the find.*

Response c): Indications are that humans have occupied the Central Valley for at least 10,000 years and it is not always possible to predict where human remains may occur outside of formal burials. Therefore, excavation and construction activities, regardless of depth, may yield human remains that may not be interred in marked, formal burials. Under CEQA, human remains are protected under the definition of archaeological materials as being "any evidence of human activity." Additionally, Public Resources Code Section 5097 has specific stop-work and notification procedures to follow in the event that human remains are inadvertently discovered during construction. Implementation of the following mitigation measure would reduce this potential impact to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure CUL-2: *If any human remains are found during grading and construction activities, all work shall be halted immediately within 50 meters (165 feet) of the discovery and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed. Additionally, if the Native American resources are identified, 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, may also be required and, if required, shall be retained at the applicant's expense.*

VI. ENERGY

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

Responses to Checklist Questions

Responses a), b): Appendix F of the State CEQA Guidelines requires consideration of the potentially significant energy implications of a project. CEQA requires mitigation measures to reduce "wasteful, inefficient and unnecessary" energy usage (Public Resources Code Section 21100, subdivision [b][3]). According to Appendix F of the CEQA Guidelines, the means to achieve the goal of conserving energy include decreasing overall energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. In particular, the proposed project would be considered "wasteful, inefficient, and unnecessary" if it were to violate state and federal energy standards and/or result in significant adverse impacts related to project energy requirements, energy inefficiencies, energy intensiveness of materials, cause significant impacts on local and regional energy supplies or generate requirements for additional capacity, fail to comply with existing energy standards, otherwise result in significant adverse impacts on energy resources, or conflict or create an inconsistency with applicable plan, policy, or regulation.

The proposed project includes the construction of 60 single-family residential units. The amount of energy used at the project site would directly correlate to the size of the proposed units, the energy consumption of associated unit appliances, and outdoor lighting. Other major sources of proposed project energy consumption include fuel used by vehicle trips generated during project construction and operation, and fuel used by off-road construction vehicles during construction.

The following discussion provides calculated levels of energy use expected for the proposed project, based on commonly used modelling software (i.e. CalEEMod v.2016.3.2 and the California Air Resource Board's EMFAC2014). It should be noted that many of the assumptions provided by CalEEMod are conservative relative to the proposed project. Therefore, this discussion provides a conservative estimate of proposed project emissions.

Electricity and Natural Gas

Electricity and natural gas used by the proposed project would be used primarily to power on-site buildings. Total annual unmitigated and mitigated electricity (kWh) and natural gas (kBTU) usage associated with the operation of the proposed project are shown in Tables 4 and 5, below (as provided by CalEEMod). The proposed project incorporates feasible mitigation to reduce the proposed project's operational electricity and natural gas consumption.

According to Calico's *Appendix A: Calculation Details for CalEEMod*, CalEEMod uses the California Commercial End Use Survey (CEUS) database to develop energy intensity value for non-residential buildings. The energy use from residential land uses is calculated based on the Residential Appliance Saturation Survey (RASS). Similar to CEUS, this is a comprehensive energy use assessment that includes the end use for various climate zones in California.

Table 4: Project Operational Natural Gas and Electricity Usage (Unmitigated Scenario)

Emissions[a]	*Natural Gas (kBTU/year)*	*Electricity (kWh/year)*
Single Family Housing	1,550,080	506,627
Total	**1,550,080**	**506,627**

NOTE: [A] NUMBERS PROVIDED HERE MAY NOT ADD UP EXACTLY TO TOTAL DUE TO ROUNDING.
SOURCE: CALEEMOD (V.2016.3.2.)

Table 5: Project Operational Natural Gas and Electricity Usage (Mitigated Scenario)

Emissions[a]	*Natural Gas (kBTU/year)*	*Electricity (kWh/year)*
Single Family Housing	1,341,750	485,071
Total	**1,341,750**	**485,071**

NOTE: [A] NUMBERS PROVIDED HERE MAY NOT ADD UP EXACTLY TO TOTAL DUE TO ROUNDING.
SOURCE: CALEEMOD (V.2016.3.2.)

As shown in Tables 4 and 5, project operational energy usage would be reduced with implementation of project components considered mitigation by CalEEMod (note: given the limited mitigation options available in the current version of CalEEMod, the reduction attributable to mitigation represents a conservative analysis). As described in Section III, Air Quality, the proposed project incorporates feasible mitigation that would reduce the proposed project's energy consumption, as compared to the unmitigated scenario. The mitigation measures included in Section III would require further mitigation that would reduce proposed project operational electricity and natural gas emissions. These reductions in overall proposed project energy usage also reflect a reduction in the project's energy intensity.

On-Road Vehicles (Operation)

The proposed project would generate vehicle trips during its operational phase. According to the Transportation Impact Analysis Report prepared for the proposed project (Fehr & Peers, 2019), the project would generate approximately 566 new daily vehicles trips. In order to calculate operational on-road vehicle energy usage and emissions, default trip lengths generated by CalEEMod were used, which are based on the project location and urbanization level parameters De Novo (the Initial Study consultant) selected within CalEEMod (i.e. "San Joaquin Valley Air Pollution Control District" project location and "Urban" setting, respectively). These values are provided by the individual districts or use a default average for the state, depending on the location of the proposed project (CAPCOA, 2017). Based on default factors provided by CalEEMod, the average distance per trip was conservatively calculated to be approximately 8.53 miles. Therefore, the proposed project would generate at total of approximately 4,830 average daily vehicle miles travelled (Average Daily VMT). Using fleet mix data provide by CalEEMod (v2016.3.2), and Year 2021 gasoline and diesel MPG (miles per gallon) factors for individual vehicle classes as provided by EMFAC2014, De Novo derived weighted MPG factors for operational on-road vehicles of approximately 26.2 MPG for gasoline and 8.8 MPG for diesel vehicles. With this information, De Novo calculated as a conservative estimate that the unmitigated proposed project would generate vehicle trips that would use a total of approximately 174 gallons of gasoline and 57 gallons of diesel fuel per day, on average, or 63,624 gallons of gasoline and 20,863 annual gallons of diesel fuel per year.

On-Road Vehicles (Construction)

The proposed project would also generate on-road vehicle trips during project construction (from construction workers and vendors). Estimates of vehicle fuel consumed were derived based on the assumed construction schedule, vehicle trip lengths and number of workers per

construction phase as provided by CalEEMod, and Year 2020 gasoline MPG factors provided by EMFAC2014. For the purposes of simplicity, it was assumed that all vehicles used gasoline as a fuel source (as opposed to diesel fuel or alternative sources). Table 6, below, describes gasoline and diesel fuel used by on-road mobile sources during each phase of the construction schedule. As shown, the vast majority of on-road mobile vehicle fuel used during the construction of the proposed project would occur during the building construction phase. See Appendix A for a detailed calculation.

Table 6: On-Road Mobile Fuel Generated by Project Construction Activities – By Phase

Construction Phase	*# of Days*	*Total Daily Worker Trips[(a)]*	*Total Daily Vendor Trips[(a)]*	*Gallons of Gasoline Fuel[(b)]*	*Gallons of Diesel Fuel[(b)]*
Site Preparation	10	18	-	76	-
Grading	30	20	-	252	-
Building Construction	300	22	6	2,776	1,940
Paving	20	15	-	126	-
Architectural Coating	20	4	-	34	-
Total	**N/A**	**N/A**	**N/A**	**3,264**	**1,940**

NOTE: [(A)] PROVIDED BY CALEEMOD. [(B)]SEE APPENDIX A FOR FURTHER DETAIL

SOURCE: CALEEMOD (V.2016.3.2); EMFAC2014.

Off-Road Vehicles (Construction)

Off-road construction vehicles would use diesel fuel during the construction phase of the proposed project. A non-exhaustive list of off-road constructive vehicles expected to be used during the construction phase of the proposed project includes: cranes, forklifts, generator sets, tractors, excavators, and dozers. Based on the total amount of CO_2 emissions expected to be generated by the proposed project (as provided by the CalEEMod output), and a CO_2 to diesel fuel conversion factor (provided by the U.S. Energy Information Administration), the proposed project would use a total of approximately 13,149 gallons of diesel fuel for off-road construction vehicles (during the site preparation and grading phases of the proposed project). Detailed calculations are provided in Appendix A.

Other

Proposed project landscape maintenance activities would generally require the use fossil fuel (i.e. gasoline) energy. For example, lawn mowers require the use of fuel for power. As an approximation, it is estimated that landscape care maintenance would require approximately four individuals one full day per week, or 1,677 hours per year (or 416.8 hours per year per landscaper). Assuming an average of approximately 0.5 gallons of gasoline used per person-hour, the proposed project would require the use of approximately 839 gallons of gasoline per year to power landscape maintenance equipment. The energy used to power landscape maintenance equipment would not differ substantially from the energy required for landscape maintenance for similar project.

The proposed project could also use other sources of energy not identified here. Examples of other energy sources include alternative and/or renewable energy (such as solar PV) and/or on-site stationary sources (such as on-site diesel generators) for electricity generation. The proposed project would be solar-ready, which could reduce the need for fossil fuel-based energy (for proposed project buildings), including for electricity.

Conclusion

The proposed project would use energy resources for the operation of project buildings (electricity and natural gas), for on-road vehicle trips (e.g. gasoline and diesel fuel) generated by the proposed project, and from off-road construction activities associated with the proposed project (e.g. diesel fuel). Each of these activities would require the use of energy resources. The proposed project would be responsible for conserving energy, to the extent feasible, and relies heavily on reducing per capita energy consumption to achieve this goal, including through Statewide and local measures.

The proposed project would be in compliance with all applicable Federal, State, and local regulations regulating energy usage. For example, PG&E is responsible for the mix of energy resources used to provide electricity for its customers, and it is in the process of implementing the Statewide Renewable Portfolio Standard (RPS) to increase the proportion of renewable energy (e.g. solar and wind) within its energy portfolio. PG&E is expected to achieve at least a 33% mix of renewable energy resources by 2020, and 50% by 2030. Additionally, energy-saving regulations, including the latest State Title 24 building energy efficiency standards ("part 6"), would be applicable to the proposed project (note: as provided under Mitigation Measure 3.7-1, the proposed project would achieve a 15% increase in energy efficiency beyond the 2016 version of the Title 24 Energy code). Other Statewide measures, including those intended to improve the energy efficiency of the statewide passenger and heavy-duty truck vehicle fleet (e.g. the Pavley Bill and the Low Carbon Fuel Standard), would improve vehicle fuel economies, thereby conserving gasoline and diesel fuel. These energy savings would continue to accrue over time. Furthermore, as described previously, the incorporation of the mitigation measures described previously in this section would further reduce project energy consumption.

As a result, the proposed project would not result in any significant adverse impacts related to project energy requirements, energy use inefficiencies, and/or the energy intensiveness of materials by amount and fuel type for each stage of the project including construction, operations, maintenance, and/or removal. PG&E, the electricity and natural gas provider to the site, maintains sufficient capacity to serve the proposed project. The proposed project would comply with all existing energy standards, including those established by the City of Manteca, and would not result in significant adverse impacts on energy resources. Furthermore, existing connections exist between the project site and nearby pedestrian and bicycle pathways, and public transit access exists nearby, reducing the need for local motor vehicle travel. Although improvements to the City's pedestrian, bicycle, and public transit systems would provide further opportunities for alternative transit, the proposed project would be linked closely with existing networks that, in large part, are sufficient for most residents of the proposed project and the City of Manteca as a whole. For these reasons, the proposed project would not be expected cause an inefficient, wasteful, or unnecessary use of energy resources nor cause a significant impact on any of the threshold as described by Appendix F of the CEQA Guidelines. This is a ***less than significant*** impact.

VII. GEOLOGY AND SOILS

Would the project:	***Potentially Significant Impact***	***Less Than Significant with Mitigation***	***Less Than Significant Impact***	***No Impact***
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
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.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?		X		
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?		X		
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?		X		
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?		X		
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?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

Responses to Checklist Questions

Responses a.i), a.ii): Figure 8 shows the earthquake faults in the vicinity of the project site. As shown in the figure, the site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone, and known surface expression of active faults does not exist within the site. However, the site is located within a seismically active region. The U.S. Geological Survey identifies potential seismic sources within 32.2 kilometers (20 miles) of the project site. Two of the closest known faults classified as active by the U.S. Geological Survey are the Vernalis fault east of the City of Tracy, located approximately 6 miles to the west, and the San Joaquin fault, located approximately 15 miles to the southwest. The Midway fault is located approximately 15

miles to the west. Other faults that could potentially affect the proposed project include the Corral Hollow-Carnegie fault, the Greenville fault, the Antioch fault, and the Los Positas fault.

Geologic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake could generally be classified as primary and secondary. The primary seismic hazard is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and ground lurching.

Ground Rupture

Because the property does not have known active faults crossing the site, and the site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property. This is a less than significant impact.

Ground Shaking

According to the California Geological Survey's Probabilistic Seismic Hazard Assessment Program, Manteca is considered to be within an area that is predicted to have a 10 percent probability that a seismic event would produce horizontal ground shaking of 10 to 20 percent within a 50-year period. This level of ground shaking correlates to a Modified Mercalli intensity of V to VII, light to strong. As a result of these factors the California Geological Survey has defined the entire county as a seismic hazard zone. There will always be a potential for groundshaking caused by seismic activity anywhere in California, including the project site.

In order to minimize potential damage to the buildings and site improvements, all construction in California is required to be designed in accordance with the latest seismic design standards of the California Building Code. The California Building Code, Title 24, Part 2, Chapter 16 addresses structural design and Chapter 18 addresses soils and foundations. Collectively, these state requirements, which have been adopted by the City of Manteca, include design standards and requirements that are intended to minimize impacts to structures in seismically active areas of California. Section 1613 specifically provides structural design standards for earthquake loads. Section 1803.5.11 and 1803.5.12 provide requirements for geotechnical investigations for structures assigned varying Seismic Design Categories in accordance with Section 1613. Design in accordance with these standards and policies would reduce any potential impact to a less than significant level.

Landslides

The proposed project site is not susceptible to landslides because the area is essentially flat. This is a less than significant impact.

Conclusion

In order to minimize potential damage to the buildings and site improvements, all construction in California is required to be designed in accordance with the latest seismic design standards of the California Building Code. The California Building Code, Title 24, Part 2, Chapter 16 addresses structural design and Chapter 18 addresses soils and foundations. Collectively, these state requirements, which have been adopted by the City of Manteca, include design standards and requirements that are intended to minimize impacts to structures in seismically active areas of California. Section 1613 specifically provides structural design standards for earthquake loads.

Section 1803.5.11 and 1803.5.12 provide requirements for geotechnical investigations for structures assigned varying Seismic Design Categories in accordance with Section 1613. Additionally, the City of Manteca has adopted Design and Construction Standards and incorporated numerous policies relative to seismicity to ensure the health and safety of all people. Design in accordance with these standards and policies would reduce any potential impact to a less than significant level. Because all development in the project site must be designed in conformance with these state and local standards and policies, any potential impact would be considered ***less than significant***.

Responses a.iii), c), d): Liquefaction normally occurs when sites underlain by saturated, loose to medium dense, granular soils are subjected to relatively high ground shaking. During an earthquake, ground shaking may cause certain types of soil deposits to lose shear strength, resulting in ground settlement, oscillation, loss of bearing capacity, landsliding, and the buoyant rise of buried structures. The majority of liquefaction hazards are associated with sandy soils, silty soils of low plasticity, and some gravelly soils. Cohesive soils are generally not considered to be susceptible to liquefaction. In general, liquefaction hazards are most severe within the upper 50 feet of the surface, except where slope faces or deep foundations are present.

As noted above, California Geological Survey has defined the entire county as a seismic hazard zone. Significant liquefaction induced settlement is not generally anticipated at the site. However, based on the anticipated site conditions, some seismic settlement is generally anticipated.

Expansive soils are those that undergo volume changes as moisture content fluctuates; swelling substantially when wet or shrinking when dry. Soil expansion can damage structures by cracking foundations, causing settlement and distorting structural elements. Expansion is a typical characteristic of clay-type soils. Expansive soils shrink and swell in volume during changes in moisture content, such as a result of seasonal rain events, and can cause damage to foundations, concrete slabs, roadway improvements, and pavement sections.

Soil expansion is dependent on many factors. The more clayey, critically expansive surface soil and fill materials will be subjected to volume changes during seasonal fluctuations in moisture content. Figure 9 shows the soils within the project site. The soils encountered at the site consist of mainly Timor loamy sands, with some Delhi loamy sands in the northeastern corner of the project site. The Timor series consists of deep to hardpan, moderately well drained soils that formed in granitic alluvium. The Delhi series consists of very deep, somewhat excessively drained soils that formed in wind modified material weathered from granitic rock sources. The potential for soil expansion to occur at the project site is generally considered low as shown in Figure 10.

Future development of the project could expose people or structures to adverse effects associated with liquefaction and/or soil expansion. Construction of the project would be required to comply with the City's General Plan policies related to geologic and seismic hazards. These policies obligate the City to require that new development mitigate the potential impacts of geologic hazards through building plan review (Policy S-P-2) and mitigate the potential impacts of seismic-induced settlement of uncompacted fill and liquefaction due to the presence of a high-water table (Policy S-P-2). To that end, General Plan Policy S-P-1 requires that all proposed development prepare geological reports and/or geological engineering reports for projects located in areas of potentially significant geological hazards, including potential subsidence (collapsible surface soils) due to groundwater extraction.

With implementation of the following mitigation measure, this potential impact would be ***less than significant***.

Mitigation Measure(s)

Mitigation Measure GEO-1*: Prior to earthmoving activities, the Project applicant shall have a final geotechnical evaluation prepared as required by the requirements of the California Building Code. The evaluation shall be prepared in accordance with the standards and requirements that addresses structural design, tests and inspections, and soils and foundation standards. The final geotechnical evaluation shall include design recommendations to ensure that soil conditions do not pose a threat to the health and safety of people or structures, including threats from liquefaction or lateral spreading. The grading and improvement plans, as well as the storm drainage and building plans shall be designed in accordance with the recommendations provided in the final geotechnical evaluation.*

Response b): The majority of the project site is currently vacant and undeveloped with the exception of the two existing single-family residences are both northern corners of the project site. According to the project site plans prepared for the proposed project, development of the proposed project would result in the creation of new impervious surface areas throughout the project site. The development of the project site would also cause ground disturbance of top soil. The ground disturbance would be limited to the areas proposed for grading and excavation, including the proposed driveway areas, residential building pads, and drainage, sewer, and water infrastructure improvements. After grading and excavation, and prior to overlaying the disturbed ground surfaces with impervious surfaces and structures, the potential exists for wind and water erosion to occur, which could adversely affect downstream storm drainage facilities.

Without implementation of appropriate Best Management Practices (BMPs) related to prevention of soil erosion during construction, development of the project would result in a potentially significant impact with respect to soil erosion. Implementation of the following mitigation measure would ensure the impact is ***less than significant***.

Mitigation Measure(s)

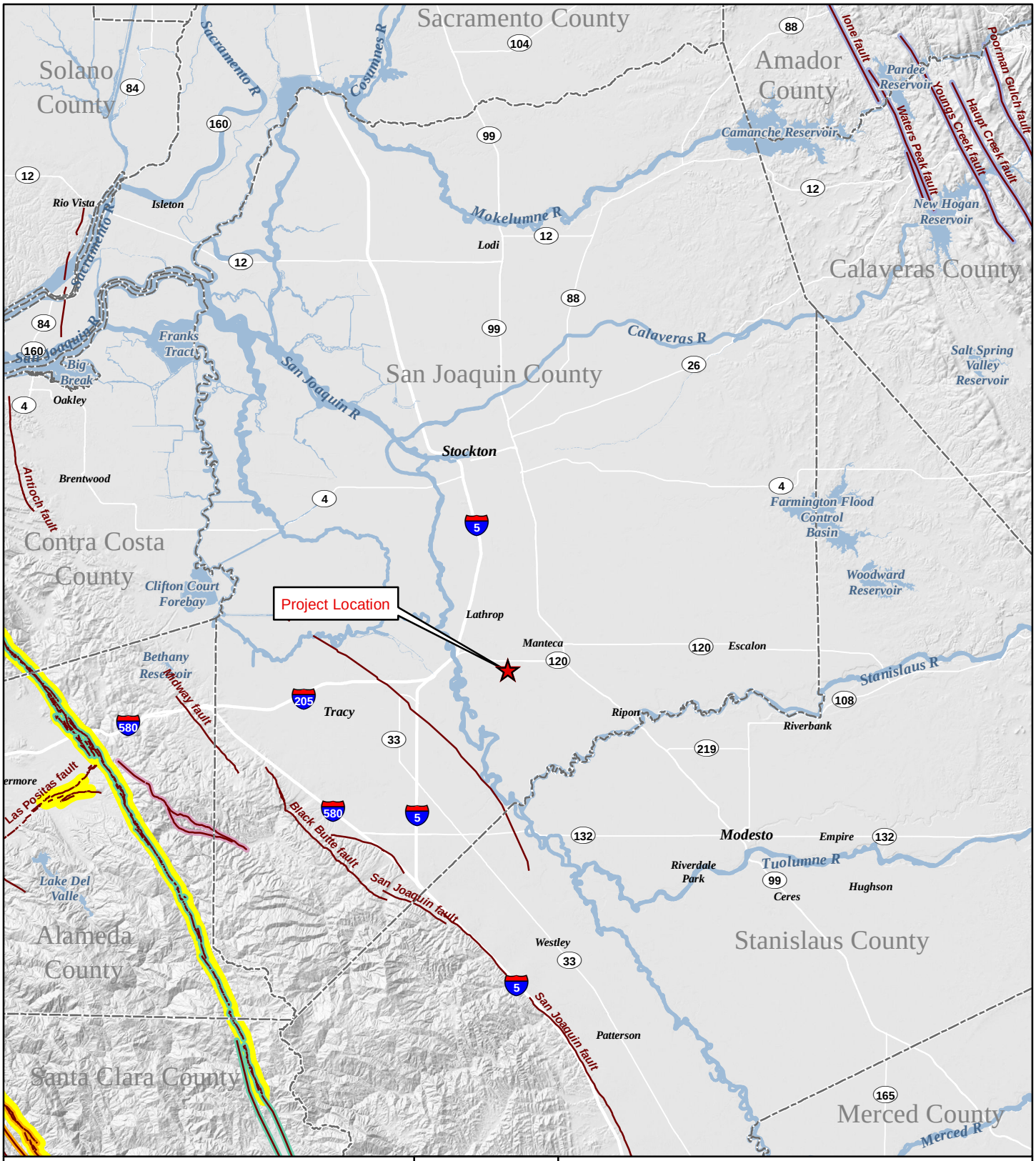
Mitigation Measure GEO-2*: The project applicant shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall be designed to control pollutant discharges utilizing Best Management Practices (BMPs) and technology to reduce erosion and sediments. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater runoff from the project site. Measures shall include temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) that will be employed to control erosion from disturbed areas. Final selection of BMPs will be subject to approval by the City of Manteca and the RWQCB. The SWPPP will be kept on site during construction activity and will be made available upon request to representatives of the RWQCB.*

Response e): The project has been designed to connect to the existing City sewer system and septic systems will not be used. Therefore, ***no impact*** would occur related to soils incapable of adequately supporting the use of septic tanks.

Response f): Known paleontological resources or sites are not located on the project site. Additionally, unique geologic features are not located on the site. The site is currently undeveloped and surrounded by existing or future urban development. As discussed in Section V, Cultural Resources, should artifacts or unusual amounts of stone, bone, or shell be uncovered during construction activities, an archeologist should be consulted for an evaluation. Implementation of Mitigation Measure CUL-1 would require investigations and avoidance methods in the event that a previously undiscovered cultural resource is encountered during

construction activities. With implementation of Mitigation Measure CUL-1, impacts to paleontological resources or unique geologic features are not expected. This is a ***less than significant*** impact.

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CITY OF MANTECA
WACKERLY PROPERY SUBDIVISION ANNEXATION

Figure 8. Earthquake Fault Map

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

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Legend

- Project Boundary
- Manteca City Boundary
- Tinnin loamy coarse sand, 0-2% slopes

N

0 125 250

Feet

Sources: NRCS Web Soil Survey, San Joaquin County, California (CA077), Version 12, Sep14, 2018; San Joaquin County; ArcGIS Online World Imagery Map Service.
Map date: May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 9. Project Site Soils

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Legend

- Project Boundary
- Manteca City Boundary
- Low Shrink-Swell Potential* (Linear Extensibility <3%)

**Shrink-Swell Potential is determined by linear extensibility. Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Soils are considered to have low potential when the linear extensibility is less than 3%, moderate if 3-6%, high if 6-9%, and very high if greater than 9%.*

Sources: NRCS Web Soil Survey, San Joaquin County, California (CA077}, Version 12, Sep14, 2018; San Joaquin County; ArcGIS Online World Imagery Map Service. Map date: May 31, 2019.

N

0 125 250

Feet

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 10. Expansive Soils Map

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VIII. GREENHOUSE GAS EMISSIONS

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?		X		
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gasses?		X		

Background

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters 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.

Naturally occurring greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, solely a product of industrial activities. Although the direct greenhouse gases CO_2, CH_4, and N_2O occur naturally in the atmosphere, human activities have changed their atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2011, concentrations of these three greenhouse gases have increased globally by 40, 150, and 20 percent, respectively (Intergovernmental Panel on Climate Change [IPCC], 2013).

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 (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs).

The emissions from a single project will not cause global climate change, however, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. Therefore, the analysis of GHGs and climate change presented in this section is presented in terms of the proposed project's contribution to cumulative impacts and potential to result in cumulatively considerable impacts related to GHGs and climate change.

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. In determining the significance of a proposed project's contribution to anticipated adverse future conditions, a lead agency should generally undertake a two-step analysis. The first question is whether the *combined* effects from *both* the proposed project *and* other projects would be cumulatively significant. If the agency answers this inquiry in the affirmative, the second question is whether "the proposed project's *incremental* effects are cumulatively considerable" and thus significant in and of themselves. The cumulative project list for this issue (climate change) comprises anthropogenic (i.e., human-made) GHG emissions sources across the globe and no project alone would reasonably be expected to contribute to a noticeable incremental change to the global

climate. However, legislation and executive orders on the subject of climate change in California have established a statewide context and process for developing an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs. Small contributions to this cumulative impact (from which significant effects are occurring and are expected to worsen over time) may be potentially considerable and, therefore, significant.

Significance Thresholds

Governor's Office of Planning and Research's (OPR's) Guidance does not include a quantitative threshold of significance to use for assessing a project's GHG emissions under CEQA. Moreover, the CARB has not established such a threshold or recommended a method for setting a threshold for project-level analysis. In the absence of a consistent statewide threshold, a threshold of significance for analyzing the project's GHG emissions was developed. The issue of setting a GHG threshold is complex and dynamic, especially in light of the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife* (referred to as the Newhall Ranch decision hereafter). The California Supreme Court ruling also highlighted the need for the threshold to be tailored to the specific project type, its location, and the surrounding setting. Therefore, the threshold used to analyze the project is specific to the analysis herein and the City retains the ability to develop and/or use different thresholds of significance for other projects in its capacity as lead agency and recognizing the need for the individual threshold to be tailored and specific to individual projects.

The SJVAPCD provides guidance for addressing GHG emissions under CEQA. The SJVAPCD guidance regarding evaluating GHG significance notes that if a project complies with an adopted statewide, regional, or local plan for reduction or mitigation of GHG emissions, then impacts related to GHGs would be less than significant. The applicable plan for reduction or mitigation of GHG emissions for the proposed project is the Manteca Climate Action Plan. Additionally, the SJVAPCD requires quantification of GHG emissions for all projects which the lead agency has determined that an EIR is required. Although an EIR is not required for the proposed project, the GHG emissions are quantified below, followed by a consistency analysis with the SJCOG Regional Transportation Plan (RTP) / Sustainable Communities Strategy (RTP/SCS) and the Manteca Climate Action Plan.

RESPONSES TO CHECKLIST QUESTIONS

Responses a) and b):

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on Earth. A project's GHG emissions are at a micro-scale relative to global emissions, but could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of CO_2 and other GHG pollutants, such as CH_4 and N_2O, from mobile sources and utility usage.

The proposed project's short-term construction-related and long-term operational GHG emissions for Buildout of the proposed Project, were estimated using CalEEMod™ (v.2016.3.2). CalEEMod is a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify GHG emissions from land use

projects. The model quantifies direct GHG emissions from construction and operation (including vehicle use), as well as indirect GHG emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. Emissions are expressed in annual metric tons of CO_2 equivalent units of measure (i.e., $MTCO_2e$), based on the global warming potential of the individual pollutants.

Short-Term Construction GHG Emissions

Estimated increases in GHG emissions associated with construction of the proposed project are summarized in Table 7.

Table 7: Construction GHG Emissions (Unmitigated Metric Tons/Yr)

Year	*Bio-CO_2*	*NBio-CO_2*	*Total CO_2*	*CH_4*	*N_2O*	*CO_2e*
2020	0.0000	312.9096	312.9096	0.0804	0.0000	314.9188
2021	0.0000	241.7914	241.7914	0.0542	0.0000	243.1456
Maximum	**0.0000**	**312.9096**	312.9096	**0.0804**	**0.0000**	**314.9188**

SOURCE: CALEEMOD (V.2016.3.2).

As presented in the table, maximum short-term annual construction emissions of GHG associated with development of the project are estimated to be 314.9188 $MTCO_2e$ (2019) with a low of 243.1456 $MTCO_2e$ (2019) emitted. These construction GHG emissions are a one-time release and are comparatively much lower than emissions associated with operational phases of a project. Cumulatively, these construction emissions would not generate a significant contribution to global climate change.

Long-Term Operational GHG Emissions

The long-term operational GHG emissions estimate for buildout of the proposed Project, incorporates the potential area source and vehicle emissions, and emissions associated with utility and water usage, and wastewater and solid waste generation. The modeling included the following inputs for the year 2021:

Traffic

- Project Setting: Low Density Suburban
- Increase Density: 60 du/13.08 ac = 4.59 du/ac
- Increase Destination Accessibility: Distance to Downtown/Job Center is 2.32 miles (from project site to downtown Manteca)
- Increase Transit Accessibility: Distance to Transit is 0.89 miles (Manteca Transit Routes 2 and 3 stop near the project site at the intersection of Union Road and W. Atherton Drive)
- Improve Pedestrian Network: Project Site and Connecting Off-Site

Energy

- Install High Efficiency Appliances: within all residences

Area

- Only Natural Gas Hearth

Water

- Install Low-flow Bathroom Faucets
- Install Low-flow Kitchen Faucets
- Install Low-flow Toilets
- Install Low-flow Showers
- Use Water-Efficient Irrigation Systems: CalEEMod Default % Reduction

Estimated GHG emissions associated with the buildout of the proposed project with and without the above mitigation incorporated are summarized in Tables 8 and 9. As shown in the tables, the annual GHG emissions associated with buildout of the proposed project would be 935.5214 $MTCO_2e$ with the above referenced mitigation incorporated and 984.3945 $MTCO_2e$ without mitigation. The mitigation results in a decrease of 48.8731 $MTCO_2e$.

Table 8: Operational GHG Emissions 2021 (Unmitigated Metric Tons/Yr)

Category	*Bio-CO_2*	*NBio-CO_2*	*Total CO_2*	*CH_4*	*N_2O*	*CO_2e*
Area	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923
Energy	0.0000	149.3603	149.3603	8.2500e-003	2.9000e-003	150.4299
Mobile	0.0000	762.3067	762.3067	0.0366	0.0000	763.2207
Waste	13.9577	0.0000	13.9577	0.8249	0.0000	34.5795
Water	1.2402	3.9172	5.1574	0.1278	3.0900e-003	9.2722
Total	**15.1979**	**942.3049**	**957.5027**	**0.9987**	**6.4700e-003**	**984.3945**

SOURCE: CALEEMOD (V.2016.3.2).

Table 9: Operational GHG Emissions 2021 (Mitigated Metric Tons/Yr)

Category	*Bio-CO_2*	*NBio-CO_2*	*Total CO_2*	*CH_4*	*N_2O*	*CO_2e*
Area	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923
Energy	0.0000	149.3608	149.3608	8.2500e-003	2.9000e-003	150.4299
Mobile	0.0000	715.1615	715.1615	0.0353	0.0000	716.0429
Waste	13.9577	0.0000	13.9577	0.8249	0.0000	34.5795
Water	0.9922	3.2914	4.2836	0.1022	2.4700e-003	7.5768
Total	**14.9498**	**894.5340**	**909.4838**	**0.9718**	**5.8500e-003**	**935.5214**

SOURCE: CALEEMOD (V.2016.3.2).

Regional Transportation Plan/Sustainable Communities Strategy

SJCOG adopted the Final Draft of the RTP/SCS on June 2018. The RTP/SCS reflects a region-specific, balanced multimodal plan that only achieves the intent and promise of SB 375 and can be implemented through existing and planned programs or policies. The RTP/SCS foundation comprises recent household and job growth forecasts, market demand and economic studies, and transportation studies including SJCOG's Smart Growth Transit Oriented Development Plan, Goods Movement Study, and Regional Bike/Pedestrian/Safe Routes to School Master Plan.

Chapter 3 of the RTP/SCS contains policies and supportive strategies in order to address the transportation needs of the San Joaquin region and quantify regional needs in the 25-year planning horizon. One of the strategies in Table 3.1 of the SJCOG RTP/SCS aims to optimize public

transportation to provide efficient and convenient access for users at all income levels. Another strategy aims to provide transportation improvements to facilitate non-motorized travel. Manteca Transit Routes 2 and 3 currently run near the project site on W. Atherton Drive. Route 2 originates at the City's Transit Center and travels clockwise along South Main Street, Atherton Drive, Daniels Street, Fishback Road, Yosemite Avenue, West Center Street, Union Road, Northgate Drive, London Avenue, Lathrop Road, and Main Street before returning back to the Transit Center. Route 3's alignment starts at the City's Transit Center and travels along North Main Street, Northgate Drive, Lathrop Road, London Avenue, Union Road, Cherry Lane, Center Street, Yosemite Avenue, Winters Drive, Fishback Road, Daniels Street, and Atherton Drive before returning to the Transit Center. Route 3 operates as a counter-clockwise loop complementing Route 2.

The Manteca Transit Center is located approximately 2.3 miles northeast of the project site. Manteca Transit provides a Route 2 and Route 3 bus stop near the intersection of Union Road and W. Atherton Drive, located approximately 0.89 miles northeast of the project site. Therefore, the proposed project would be located in an area that is currently served by Manteca Transit.

As demonstrated above, the proposed project would be generally consistent with the goals and strategies of the RTP/SCS.

Manteca Climate Action Plan

The City of Manteca Climate Action Plan (2013) sets forth a feasible strategy to reduce community-generated GHG emissions, consistent with statewide GHG reduction efforts for consideration and potential adoption by the City Council.

The Climate Action Plan contains strategies by emissions sector (i.e., land use and transportation, transportation facilities and demand strategies, energy conservation, waste diversion and recycling and energy recovery, strategies for existing development, and municipal strategies). Only some of the reduction measures would apply to the proposed project. For example, Strategy CD-1 encourages projects that are consistent with the development densities allowed by the General Plan and are contiguous to existing development. The proposed project is consistent with the densities allowed by the LDR land use designation and is adjacent to existing residential and commercial development. Strategy MUD-1 encourages mixed use residential developments that either allow for sufficient population to support commercial development within the project or are constructed in an area with an existing variety of commercial development within walking distance and is already supported by surrounding residential development. The project site is adjacent to an existing commercial development to the northwest and is already supported by surrounding residential development.

Additionally, Strategy ENB-1 requires all new development to exceed Title 24 standards by at least 10 percent. The proposed project will comply with Title 24, Part 6 of the California Code of Regulations, known as the Building Energy Efficiency Standards. This includes the CALGreen requirements for new buildings to reduce water consumption by 20 percent, and install low pollutant-emitting materials. Further, Strategies POD-1 through POD-5 encourage the development of pedestrian infrastructure. The project would incorporate continuous sidewalks along the northern site boundary and internally throughout the site. All together they would provide pedestrian connections to the adjacent commercial development.

As demonstrated above, the proposed project would be generally consistent with the goals and strategies of the Manteca Climate Action Plan.

Conclusion

The maximum short-term annual construction emissions of GHG associated with development of the project are estimated to be 314.9188 $MTCO_2e$ (2019) with a low of 243.1456 $MTCO_2e$ (2019) emitted. As stated previously, short-term construction GHG emissions are a one-time release of GHGs and are not expected to significantly contribute to global climate change over the lifetime of the proposed project. The annual GHG emissions associated with buildout of the proposed project would be 935.5214 $MTCO_2e$ with the above referenced mitigation incorporated and 984.3945 $MTCO_2e$ without mitigation. The mitigation results in a decrease of 48.8731 $MTCO_2e$.

Additionally, the project would be generally consistent with the goals, policies, and measures of the RTP/SCS and the Manteca Climate Action Plan. The project is currently served by Manteca Transit who provides bus services close to the project site. The project would also comply with Strategies CD-1, MUD-1, ENB-1, and POD-1 through POD-5 of the Climate Action Plan. Therefore, with implementation of Mitigation Measure GHG-1, impacts related to GHG emissions and global climate change would be considered ***less than significant***.

Mitigation Measure(s)

Mitigation Measure GHG-1*: To reduce greenhouse gas emissions and energy consumption, the project applicant shall institute measures to reduce wasteful, inefficient, and unnecessary consumption of energy during construction, operation, and maintenance/landscaping. As the project is further designed and reviewed by the City of Manteca, an explanation as to why certain measures were incorporated in the individual phases and why other measures were dismissed shall be provided. The measures to reduce wasteful, inefficient, and unnecessary consumption of energy during construction, operation, and maintenance/landscaping include the following:*

- *Ensure that the pedestrian network within the project area connects to offsite pedestrian networks;*
- *Install high efficiency lighting and appliance within all buildings;*
- *Install low-flow faucets, toilets, and showers as applicable;*
- *Use water-efficient irrigation systems throughout the project area.*

IX. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
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?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
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 it create a significant hazard to the public or the environment?			X	
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 result in a safety hazard or excessive noise for people residing or working in the project area?			X	
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			X	

Responses to Checklist Questions

Responses a), b):

Construction Phase Impacts

Construction equipment and materials would likely require the use of petroleum-based products (oil, gasoline, diesel fuel), and a variety of chemicals including paints, cleaners, and solvents. The use of these materials at a construction site will pose a reasonable risk of release into the environment if not properly handled, stored, and transported. A release into the environment could pose significant impacts to the health and welfare of people and/or wildlife, and could result in contamination of water (groundwater or surface water), habitat, and countless important resources.

Like most agricultural and farming operations in the Central Valley, agricultural practices in the area have used agricultural chemicals including pesticides and herbicides as a standard practice. Although no contaminated soils have been identified on the project site or the vicinity above

applicable levels, residual concentrations of pesticides may be present in soil as a result of historic agricultural application and storage. Continuous spraying of crops over many years can potentially result in a residual buildup of pesticides, in farm soils. Of highest concern relative to agrichemicals are chlorinated herbicides, organophosphate pesticides, and organochlorine pesticides, such as Mecoprop (MCPP), Dinoseb, chlordane, dichloro-diphenyltrichloroethane (DDT), and dichloro-diphenyl-dichloroethylene (DDE). There are no records of soil contamination on the project site.

There are two single-family residences with associated sheds and garage structures, as well as areas that are used for farm equipment storage. The home and associated structures in the northwestern corner of the site will be removed prior to any construction. The home in the northeastern corner of the site will remain. Demolition of the home in the northwestern corner of the site will require evaluation for asbestos and lead containing materials. If such materials are present in the demolition of the structures, special demolition and disposal practices are required in accordance with state regulations to ensure their safe handling. Additionally, the residence that will be demolished has an existing well house, propane tank, and septic tank. The proper well abandonment permit and septic tank abandonment permit would be obtained. The septic tank would also be destroyed by removing or filling with earth, sand or other approved materials. The San Joaquin County Environmental Health Department is responsible for regulating the abandonment of such facilities.

Mitigation measures presented below also require a Soils Management Plan (SMP) to be submitted and approved by the San Joaquin County Department of Environmental Health prior to the issuance of a grading permit. The SMP will establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. Compliance would ensure that human health and the environment are not exposed to hazardous materials.

Operational Phase Impacts

The operational phase of the project will occur after construction is completed and residents move in to occupy the structures and facilities on a day-to-day basis. The proposed project would place residential uses in an area of the City that currently contains residential, agricultural and commercial uses. The proposed residential land uses do not routinely transport, use, or dispose of hazardous materials, or present a reasonably foreseeable release of hazardous materials, with the exception of common hazardous materials such as household cleaners, paint, etc. The operational phase of the proposed project does not pose a significant hazard to the public or the environment.

Mitigation Measure(s)

Mitigation Measure HAZ-1*: A Soils Management Plan (SMP) shall be submitted and approved by the San Joaquin County Department of Environmental Health prior to the issuance of a grading permit for each phase of the project. The SMP shall establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. The approved SMP shall be posted and maintained onsite during construction activities and all construction personnel shall acknowledge that they have reviewed and understand the plan.*

Mitigation Measure HAZ-2: *The applicant shall hire a qualified consultant to perform additional testing prior to the issuance of grading permits and demolition permits for construction activities in the following areas that have been deemed to have potentially hazardous conditions present:*

- *The residential unit and adjoining structures.*
- *The remnant construction and/or farming materials (i.e. remnant pipes, etc.).*
- *The soils in the area where above ground tanks have been stored.*

The intent of the additional testing is to investigate whether any of the buildings, facilities, or soils contain hazardous materials so that an appropriate disposal plan can be established. If asbestos-containing materials and/or lead are found in the buildings, a Cal-OSHA certified ACBM and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and California Occupational Safety and Health Administration (Cal/OSHA) standards. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal/OSHA asbestos and lead worker construction standards. The ACBM and lead shall be disposed of properly at an appropriate offsite disposal facility. If surface staining is found on the Project site, a hazardous waste specialist shall be engaged to further assess the stained area.

Mitigation Measure HAZ-3*: Prior to initiation of any ground disturbance activities within 50 feet of a well, the applicant shall hire a licensed well contractor to obtain a well abandonment permit from San Joaquin County Environmental Health Department, and properly abandon the on-site wells, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.*

Mitigation Measure HAZ-4*: Prior to initiation of any ground disturbance activities within 50 feet of the on-site septic tank, the applicant shall hire a licensed contractor to obtain an Onsite Wastewater Treatment System permit for the destruction of the septic tank from San Joaquin County Environmental Health Department, and properly abandon the on-site septic tank, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.*

Response c): The project site is not located within ¼ mile of an existing school. The closest school is Veritas School which is located approximately 1.07 miles or further northeast of the site. The operations of a residential subdivision would not emit hazardous emissions or result in the storage or handling of hazardous or acutely hazardous materials, substances or waste above the level of existing conditions. Implementation of the proposed project would result in a ***less than significant*** impact relative to this topic.

Response d): According the California Department of Toxic Substances Control (DTSC) there are no Federal Superfund Sites, State Response Sites, or Voluntary Cleanup Sites on, or in the near vicinity of the project site. The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5. The nearest investigation sites include:

- Karlson Trucking, Manteca (site SL185882949): This site is a Cleanup Program Site which has a current status of Completed – Case Closed as of May 20, 2009. The site had potential soil contamination of petroleum/fuel.

- Sand Lane Elementary (site # 39020001): This site is a School Investigation which has a current status of No Further Action as of July 24, 2002. This 18-acre site is currently being used as a pasture for cattle grazing. The site consists of two rural residential structures and farming structures. The site has primarily been used as fallow field or pasture land from at least 1937. The site had potential soil contamination of metals and/or pesticides.

Implementation of the proposed project would result in a ***less than significant*** impact relative to this environmental topic.

Response e): The Federal Aviation Administration (FAA) establishes distances of ground clearance for take-off and landing safety based on such items as the type of aircraft using the airport. The project site is not located within the vicinity of a private airstrip or public airport. The closest airport or airstrip is the Stockton Metropolitan Airport, located approximately 8.5 miles north of the project site. Implementation of the proposed project would have a ***less than significant*** impact with regards to this environmental issue.

Response f): The Office of Emergency Services (OES) maintains an Emergency Operations Plan (EOP) that serves as the official Emergency Plan for San Joaquin County. It includes planned operational functions and overall responsibilities of County Departments during an emergency situation. The Emergency Plan also contains a threat summary for San Joaquin County, which addresses the potential for natural, technological and human-caused disasters (County Code, Title 4-3007).

The County OES also prepared a Hazardous Materials Area Plan (§2720 H&S, 2008) that describes the hazardous materials response system developed to protect public health, prevent environmental damage and ensure proper use and disposal of hazardous materials. The plan establishes effective response capabilities to contain and control releases, establishes oversight of long-term cleanup and mitigation of residual releases, and integrates multi-jurisdiction and agency coordination. This plan is now implemented by the San Joaquin County Environmental Health Department.

The San Joaquin County Environmental Health Department maintains a Hazardous Materials Management Plan/ Hazardous Materials Business Plan (HMMP/HMBP). The HMMP/HMBP describes agency roles, strategies and processes for responding to emergencies involving hazardous materials. The Environmental Health Department maintains a Hazardous Materials Database and Risk and Flood Maps available to the public on its website.

In San Joaquin County, all major roads are available for evacuation, depending on the location and type of emergency that arises. The proposed project does not include any actions that would impair or physically interfere with any of San Joaquin County's emergency plans or evacuation routes. Future uses on the project site will have access to the County resources that establish protocols for safe use, handling and transport of hazardous materials. Construction activities are not expected to result in any unknown significant road closures, traffic detours, or congestion that could hinder the emergency vehicle access or evacuation in the event of an emergency. Implementation of the proposed project would have a ***less than significant*** impact with regards to this environmental issue.

Response g): The risk of wildfire is related to a variety of parameters, including fuel loading (vegetation), fire weather (winds, temperatures, humidity levels and fuel moisture contents), and topography (degree of slope). Steep slopes contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. Fuels such as grass are highly flammable because they have a high surface area to mass ratio and require less heat to reach the ignition point, while fuels such as trees have a lower surface area to mass ratio and require more heat to reach the ignition point.

The City has areas with an abundance of flashy fuels (i.e., grassland) in the outlying residential parcels and open lands that, when combined with warm and dry summers with temperatures often exceeding 100 degrees Fahrenheit, create a situation that results in higher risk of wildland fires. Most wildland fires are human caused, so areas with easy human access to land with the appropriate fire parameters generally result in an increased risk of fire.

The City of Manteca contains areas with "moderate" and "non-wildland fuel" ranks. The areas warranting "moderate" fuel ranks possess combustible material in sufficient quantities combined with topographic characteristics that pose a wildfire risk. CalFire data for the areas immediately surrounding the Planning Area also include "moderate" and "non-wildland fuel" ranks. Areas west of Interstate 5, approximately 15 miles or further southwest of the Planning Area, are designated as "moderate" and "high" fuel ranks.

The project site is located in an area with a "moderate" rank. The site is not located on a steep slope, and the site is essentially flat. The project site is also located in an urban area, with existing or future urban development located on all sides. The project will comply with city standards for fire hydrants and fire sprinklers, and access to and from the project site is sufficient. Therefore, this is a ***less than significant*** impact and no mitigation is required.

X. HYDROLOGY AND WATER QUALITY

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
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:		X		
(i) Result in substantial erosion or siltation on- or off-site;			X	
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;		X		
(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		X		
(iv) Impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?		X		

Responses to Checklist Questions

Response a): Implementation of proposed project would not violate any water quality or waste discharge requirements. Construction activities including grading could temporarily increase soil erosion rates during and shortly after project construction. Construction-related erosion could result in the loss of soil and could adversely affect water quality in nearby surface waters. The RWQCB requires a project specific SWPPP to be prepared for each project that disturbs an area one acre or larger. The SWPPP is required to include project specific best management measures that are designed to control drainage and erosion. Mitigation Measure GEO-3 would require the preparation of a SWPPP to ensure that the proposed project prepares and implements a SWPPP throughout the construction phase of the project. Furthermore, the proposed project includes a preliminary grading and drainage plan that has a specific drainage plan designed to control storm water runoff and erosion, both during and after construction. The SWPPP (Mitigation Measure GEO-3) and the project specific drainage plan would reduce the potential for the proposed project to violate water quality standards during construction. Implementation of the proposed project would result in a ***less-than-significant*** impact relative to this topic.

Response b): The proposed project would connect to the City of Manteca water system. The City's municipal water supply includes deliveries from the South San Joaquin Irrigation District's (SSJID) South County Water Supply Program (SCWSP), and local groundwater pumped from the City's wells.

The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). The City's 2023 General Plan designates the project area as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 105 units and an associated population of 334 persons within the project area.

Project construction would add additional impervious surfaces to the project site; however, various areas of the project site would remain largely pervious, which would allow infiltration to underlying groundwater. For example, the project proposes to include a large drainage basin at the southwest corner of the project site. Additionally, the project includes ample landscaping areas that would remain pervious. The areas would continue to contribute to groundwater recharge following construction of the project. Furthermore, the project is not anticipated to significantly affect groundwater quality because sufficient stormwater infrastructure would be constructed as part of project to detain and filter stormwater runoff and prevent long-term water quality degradation. Therefore, project construction and operation would not substantially deplete or interfere with groundwater supply or quality. This impact would be ***less than significant***.

Responses c), e): When land is in a natural or undeveloped condition, precipitation will infiltrate/percolate the soils and mulch. Much of the rainwater that falls on natural or undeveloped land slowly infiltrates the soil and is stored either temporarily or permanently in underground layers of soil. When the soil becomes completely soaked or saturated with water or the rate of rainfall exceeds the infiltration capacity of the soil, the rainwater begins to flow on the surface of land to low lying areas, ditches, channels, streams, and rivers. Rainwater that flows off of a site is defined as storm water runoff. When a site is in a natural condition or is undeveloped, a larger percentage of rainwater infiltrates into the soil and a smaller percentage flows off the site as storm water runoff.

The infiltration and runoff process is altered when a site is developed with urban uses. Houses, buildings, roads, and parking lots introduce asphalt, concrete, and roofing materials to the landscape. These materials are relatively impervious, which means that they absorb less rainwater. As impervious surfaces are added to the ground conditions, the natural infiltration process is reduced. As a result, the volume and rate of storm water runoff increases. The increased volumes and rates of storm water runoff can result in flooding in some areas if adequate storm drainage facilities are not provided.

There are no rivers, streams, or water courses located on or immediately adjacent to the project site. As such, there is no potential for the project to alter a water course, which could lead to on or offsite flooding. Drainage improvements associated with the project site would be located on the project site, and the project would not alter or adversely impact offsite drainage facilities.

The proposed project would require the installation of storm drainage infrastructure to ensure that storm waters properly drain from the project site. The proposed utility plan includes an

engineered network of storm drain lines, bioswales, and a bio-retention basin. The project proposes to include a drainage basin: a basin in the southwest corner of the site (with 0.96 ac-ft of storage potential). The utility plan was designed and engineered to ensure proper construction of storm drainage infrastructure to control runoff and prevent flooding, erosion, and sedimentation.

The ongoing operational phase of the proposed project requires the final discharge of stormwater into the on-site bio-retention basin. The discharge of stormwater must be treated through BMPs prior to its discharge. The City of Manteca implements best management practices to the extent they are technologically achievable to prevent and reduce pollutants. Under the City's standard practices, the owner or operator shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

Mitigation Measure HYDRO-1 will require that the storm drainage plan be designed to ensure that post-project runoff is equal to or less than pre-project runoff. The storm drainage plan will require the construction of new storm water drainage facilities on the project site; however, the construction of these facilities would not substantially alter the existing drainage pattern of the area, or alter the course of a stream or river. Implementation of the proposed project with the following mitigation measures would have a ***less-than-significant*** impact relative to this environmental topic.

Mitigation Measure(s)

Mitigation Measure HYDRO-1*: Prior to the issuance of a building or grading permit, the project applicant shall submit a drainage plan to the City of Manteca for review and approval. The plan shall include an engineered storm drainage plan that demonstrates attainment of pre-project runoff requirements prior to release at the outlet canal and describes the volume reduction measures and treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.*

Mitigation Measure HYDRO-2*: The project applicant shall implement the following nonstructural BMPs that focus on preventing pollutants from entering stormwater:*

- *Pollution Prevention/Good Housekeeping*
    - *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the project, the project proponent shall develop a spill response and prevention plan as a component of (1) SWPPPs prepared for construction activities, (2) SWPPPs for facilities subject to the NPDES Stormwater Permit, and (3) spill prevention control and countermeasure plans for qualifying facilities. The spill response and prevention plan shall be implemented during all construction activities.*
- *Operation and Maintenance (O&M) of Treatment Controls*
    - *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the project, the project proponent shall develop an Operation and Maintenance (O&M) Plan for the storm drainage facilities to ensure long-term performance. The O&M plan shall incorporate the manufacturers' recommended maintenance procedures and include (1) provisions for debris removal, (2) guidance for addressing public health or safety issues, and (3) methods and criteria for assessing the efficacy of the storm drainage system. An annual*

report shall be submitted to the City certifying that maintenance of the facilities was conducted according to the O&M plan.

Response d): As shown in Figure 11, the project site is located within Flood Zone X (LEVEE), which is an area protected from the 100-year flood zone by a levee. The closest 100-year flood zone is located to the south, outside of the project site. The project site is located outside of the 200-year flood zone. The closest 200-year flood zone is located to the west, outside of the project site.

Further, in 2007, the State of California passed a series of laws referred to as Senate Bill (SB) 5 directing the Department of Water Resources (DWR) to prepare flood maps for the Central Valley flood system and the State Plan of Flood Control, which includes a system of levees and flood control facilities located in the Central Valley. This legislation also set specific locations within the area affected by the 200-year flood event as the urban level of flood protection (ULOP) for the Central Valley.

SB5 "requires all cities and counties within the Sacramento-San Joaquin Valley, as defined in California Government Code Sections 65007(h) and (j), to make findings related to an ULOP or national Federal Emergency Management Agency (FEMA) standard of flood protection before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone." The City of Manteca completed its General Plan update in May 2016 to meet the requirements of SB 5.

As shown in Figure 12, the project site is located within a dam inundation area for the New Melones Dam and the San Luis Dam. Dam failure is generally a result of structural instability caused by improper design or construction, instability resulting from seismic shaking, or overtopping and erosion of the dam. Larger dams that are higher than 25 feet or with storage capacities over 50 acre-feet of water are regulated by the California Dam Safety Act, which is implemented by the California Department of Water Resources, Division of Safety of Dams (DSD). The DSD is responsible for inspecting and monitoring these dams. The Act also requires that dam owners submit to the California Office of Emergency Services inundation maps for dams that would cause significant loss of life or personal injury as a result of dam failure. The County Office of Emergency Services is responsible for developing and implementing a Dam Failure Plan that designates evacuation plans, the direction of floodwaters, and provides emergency information.

Regular inspection by DSD and maintenance by the dam owners ensure that the dams are kept in safe operating condition. As such, failure of these dams is considered to have an extremely low probability of occurring and is not considered to be a reasonably foreseeable event.

The proposed project would not expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam.

The project site is not anticipated to be inundated by a tsunami because it is located at an elevation of 27 to 28 feet above sea level and is approximately 60 miles away from the Pacific Ocean which is the closest ocean waterbody.

The project site is not anticipated to be inundated by a seiche because it is not located in close proximity to a water body capable of creating a seiche.

Implementation of the proposed project would have a ***less than significant*** impact relative to flood hazards, seiches, and tsunamis.



Legend

Project Location

FEMA Designation

0.2% Annual Chance Flood Hazard (500-yr Flood)

Area with Reduced Risk Due to Levee

Sources: FEMA's National Flood Hazard Layer (Official); San Joaquin County. Map date: May 31, 2019.

N

0 250 500

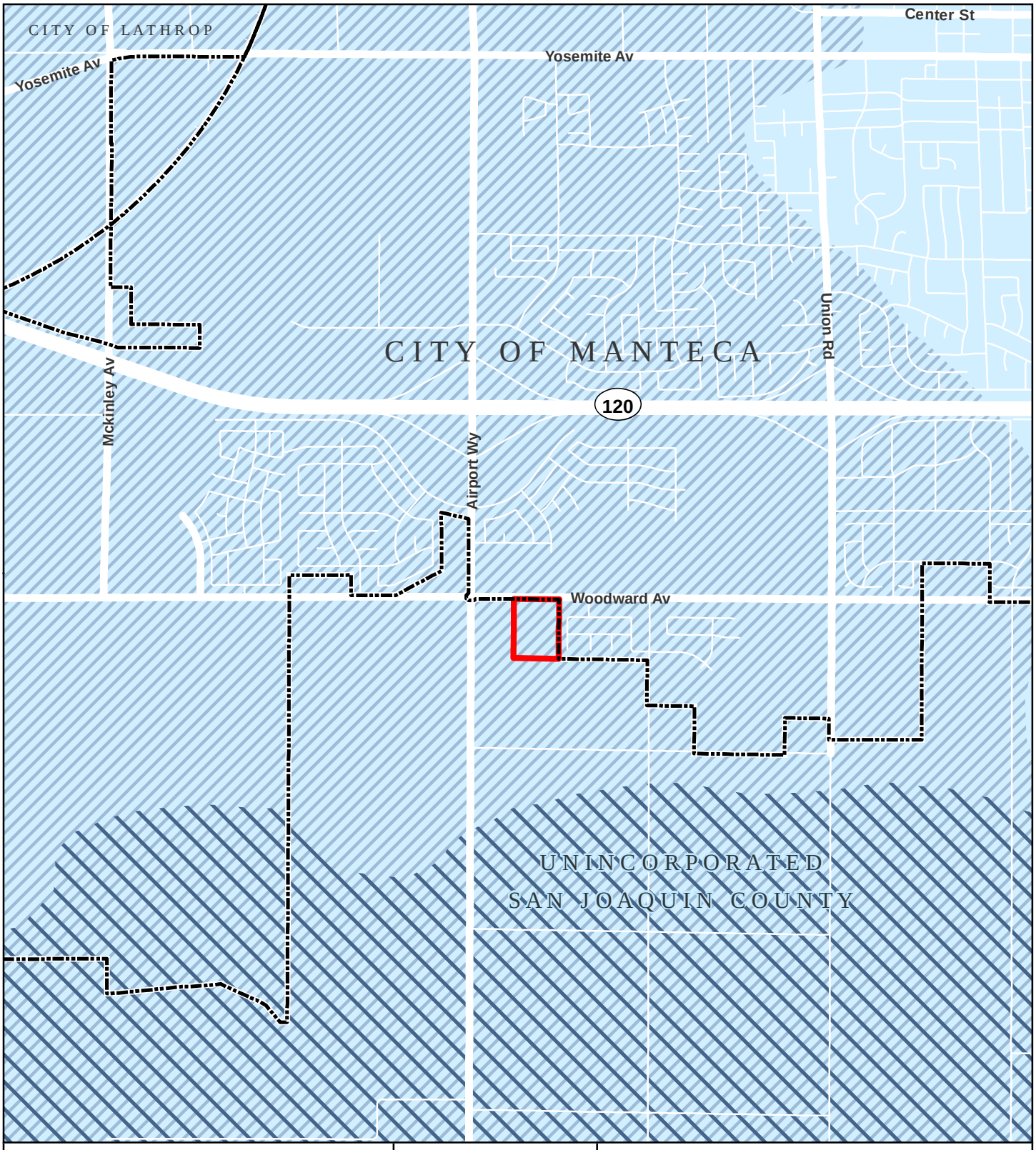
Feet

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 11. FEMA Flood Insurance Rate Map

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A Land Use Planning, Design, and Environmental Firm

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Legend

- Manteca City Boundary
- New Melones Dam Inundation Area
- San Luis Dam Inundation Area
- Tulloch Dam Inundation Area

N

0 1,000 2,000

Feet

Sources: Cal OES; San Joaquin County. Map date:May 31, 2019.

CITY OF MANTECA
WACKERLY PROPERTY SUBDIVISION ANNEXATION

Figure 12. Dam Inundation Map

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XI. LAND USE AND PLANNING

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Physically divide an established community?			X	
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?			X	

Responses to Checklist Questions

Response a): The project site is located outside the Manteca city limits in unincorporated San Joaquin County. It is adjacent primarily to residential uses, neighborhood commercial uses, and vacant agricultural land. The proposed single-family residential project is consistent with surrounding land uses and would not physically divide an established community. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Response b): The key planning documents that are directly related to, or that establish a framework within which the proposed project must be consistent, include:

- City of Manteca General Plan; and
- City of Manteca Zoning Ordinance.

The project site is currently designated R/L by the San Joaquin County General Plan Land Use Map and is zoned AU-20. The project site is designated as LDR by the City's General Plan Land Use Map and will be pre-zoned as R-1.

The City's LDR land use establishes a mix of dwelling unit types and character determined by the individual site and market conditions. The density range allows substantial flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs. The type of dwelling units anticipated in this density range include small lots and clustered lots as well as conventional large lot detached residences. The low-density residential concept is intended for housing that include a substantial amount of open space between neighboring structures. These zones are meant for a small number of residential homes, and exclude large industries, apartment complexes, and other large structures. Home businesses, community organizations, and some types of commercial and agricultural use are allowed if they meet specific standards; however, the low-density residential zone is primarily intended to provide community members with a place of a residence. Unlike higher density and mixed-use land use designations, these sites rely heavily on commuting by vehicle instead of walking or biking for many local trips. The allowed density within the City's LDR designation is 2.1 to 8 dwelling units per acre. With 60 units on approximately 13.08 acres, the proposed density would be 4.6 dwelling units per acre, which is within the allowed density range.

The LDR zone accommodates a low-density single-family residential use. The proposed project includes low density single family residential uses.

The San Joaquin County Local Agency Formation Commission (LAFCo) will require the project site to be pre-zoned by the City of Manteca in conjunction with the proposed annexation.

The project site is currently zoned AU-20 by the San Joaquin zoning map. The City's pre-zoning for the entire site will be R-1, which is consistent with the LDR land use designation of the Manteca General Plan. The proposed project is supportive to the utility demands for residential use. Therefore, impacts to land use compatibility would be ***less than significant***.

XII. MINERAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

Responses to Checklist Questions

Response a): There are no significant deposits of mineral resources located on the project site, as delineated by the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP). The project site is not designated as a Mineral Resource Zone (MRZ). Additionally, there are no oil and gas extraction wells within or near the property. Implementation of the proposed project would have ***no impact*** relative to this issue.

Response b): The project site does not contain a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. The proposed project would not result in loss of a mineral resource. Implementation of the proposed project would have ***no impact*** relative to this issue.

XIII. NOISE

Would the project result in:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Generation of excessive groundborne vibration or groundborne noise levels?		X		
c) For a project located within the vicinity of a private airstrip or 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?				X

EXISTING SETTING

The following is based on the *Environmental Noise Analysis* that was completed for the project by Saxelby Acoustics (March 2019).

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dB) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dB is generally perceived as a doubling in loudness. For example, a 70-dB sound is half as loud as an 80-dB sound, and twice as loud as a 60-dB sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. CNEL is similar to L_{dn}, but includes a +5-dB penalty for evening noise. Table 10 lists several examples of the noise levels associated with common situations.

Table 10: Typical Noise Levels

Common Outdoor Activities	*Noise Level (dB)*	*Common Indoor Activities*
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

SOURCE: CALTRANS, TECHNICAL NOISE SUPPLEMENT, TRAFFIC NOISE ANALYSIS PROTOCOL. SEPTEMBER 2013.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dBA per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

Existing Noise Levels – Traffic Noise

To predict existing noise levels due to traffic, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the project (KD Anderson, April 2019). Truck percentages and vehicle speeds on the local area roadways were estimated from field observations.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each project-area roadway segment. Where traffic noise barriers are predominately along a roadway segment, a -5 offset was added to the noise prediction model to account for various noise barrier heights. A -5 to dB offset was also applied where outdoor activity areas are shielded by intervening buildings. In some locations, sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the project-area roadway segments analyzed in this section.

Table 11 shows the existing traffic noise levels in terms of L_{dn} at closest sensitive receptors along each roadway segment. A complete listing of the FHWA Model input data is contained in Appendix B of Appendix C.

Table 11: Existing Traffic Noise Levels

Roadway	*Segment*	*Exterior Traffic Noise Level, dB L_{dn}*
Airport Way	North of Woodward	62.4
Airport Way	South of Woodward	58.6
Union Road	North of Woodward	56.3
Union Road	South of Woodward	60.5
Woodward Ave.	West of Airport	55.4
Woodward Ave.	Airport to Union	60.6
Woodward Ave.	East of Union	57.4

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KIMLEY HORN AND SAXELBY ACOUSTICS. 2019.

The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Table 11 are generally considered to be conservative estimates of noise exposure along the project-area roadways.

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the Project Vicinity, short-term and continuous (24-hour) noise level measurements were conducted on the Project site on May 7th – May 8th, 2019. The noise measurement locations are shown on Figure 13. The noise level measurement survey results are provided in Table 12. Appendix B of Appendix C shows the complete results of the noise monitoring survey.

Table 12: Summary of Existing Background Noise Measurement Data

Site	*Location*	*CNEL/ L_{dn}*	*Average Measured Hourly Noise Levels, dBA*					
			Daytime (7am-10pm)			*Nighttime (10pm-7am)*		
			L_{eq}	*L_{50}*	*L_{max}*	*L_{eq}*	*L_{50}*	*L_{max}*
Continuous (24-hour) Noise Level Measurements								
LT-1	North side of site, 45 ft to centerline of Woodward Ave.	62	60	52	79	54	47	73
Short-Term Noise Level Measurements								
ST-1	North side of site	N/A	52	48	66	Primary noise source is traffic on E Woodward Ave. Lmax caused by SUV		
ST-2	West side of site	N/A	44	44	55	Primary noise source is traffic on E Woodward Ave. and Airport Way. Lmax caused by wind.		

Site	Location	CNEL/ L_{dn}	Average Measured Hourly Noise Levels, dBA					
			Daytime (7am-10pm)			Nighttime (10pm-7am)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
ST-3	South side of site	N/A	43	44	47	Primary noise source is traffic on Airport Way. Lmax caused by wind.		
ST-4	East side of site	N/A	44	44	50	Primary noise source is traffic on E. Woodward Ave. Lmax caused by activity from existing residential community to the east.		

SOURCE: SAXELBY ACOUSTICS, 2019.

The sound level meters were programmed to collect hourly noise level intervals at each site during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

Larson Davis Laboratories (LDL) Model 820, Model 812, and Model 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Regulatory Setting – Manteca General Plan

The City of Manteca General Plan Noise Element contains goals, policies, and implementation measures for assessing noise impacts within the City. Listed below are the noise goals, policies, and implementation measures that are applicable to the proposed project:

Goals

N-1. Protect the residents of Manteca from the harmful and annoying effects of exposure to excessive noise.

N-3. Ensure that the downtown core noise levels remain acceptable and compatible with commercial and higher density residential land uses.

N-4. Protect public health and welfare by eliminating existing noise problems where feasible, by establishing standards for acceptable indoor and outdoor noise, and by preventing significant increases in noise levels.

N-5. Incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

Policies

N-P-2. New development of residential or other noise-sensitive land uses will not be permitted in noise-impacted areas unless effective mitigation measures are incorporated into the project design to satisfy the performance standards in Table 9-1 (Table 13 of this section).

N-P-3. The City may permit the development of new noise-sensitive uses only where the noise level due to fixed (non-transportation) noise sources satisfies the noise level standards of Table 9-2 (Table 14 of this section). Noise mitigation may be required to meet Table 9-2 performance standards (Table 14 of this section).

N-P-5. In accord with the Table 9-2 (Table 14 of this section) standards, the City shall regulate construction-related noise impacts on adjacent uses.

Implementation Measures

N-I-1. New development in residential areas with an actual or projected exterior noise level of greater than 60 dB L_{dn} will be conditioned to use mitigation measures to reduce exterior noise levels to less than or equal to 60 dB L_{dn}.

N-I-3. In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:

- the resulting noise levels
- the duration and frequency of the noise
- the number of people affected
- the land use designation of the affected receptor sites
- public reactions or controversy as demonstrated at workshops or hearings, or by correspondence
- prior CEQA determinations by other agencies specific to the project

N-I-4. Control noise at the source through use of insulation, berms, building design and orientation, buffer space, staggered operating hours and other techniques. Use noise barriers to attenuate noise to acceptable levels.

Table 13: Maximum Allowable Noise Exposure Mobile Noise Sources

Land Use[4]	*Outdoor Activity Areas[1]*	*Interior Spaces*	
		Ldn/CNEL, dB	*Leq/CNEL, dB[3]*
Residential	60[2]	45	--
Transient Lodging	60[2]	45	--
Hospitals, Nursing Homes	60[2]	45	--
Theatres, Auditoriums, Music Halls	--	--	35
Churches, Music Halls	60[2]	--	40
Office Buildings	65	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

NOTES:

[1] OUTDOOR ACTIVITY AREAS FOR RESIDENTIAL DEVELOPMENT ARE CONSIDERED TO BE BACKYARD PATIOS OR DECKS OF SINGLE FAMILY DWELLINGS, AND THE COMMON AREAS WHERE PEOPLE GENERALLY CONGREGATE FOR MULTI-FAMILY DEVELOPMENTS. OUTDOOR ACTIVITY AREAS FOR NON-RESIDENTIAL DEVELOPMENTS ARE CONSIDERED TO BE THOSE COMMON AREAS WHERE PEOPLE GENERALLY CONGREGATE, INCLUDING PEDESTRIAN PLAZAS, SEATING AREAS, AND OUTSIDE LUNCH FACILITIES. WHERE THE LOCATION OF OUTDOOR ACTIVITY AREAS IS UNKNOWN, THE EXTERIOR NOISE LEVEL STANDARD SHALL BE APPLIED TO THE PROPERTY LINE OF THE RECEIVING LAND USE.

[2] IN AREAS WHERE IT IS NOT POSSIBLE TO REDUCE EXTERIOR NOISE LEVELS TO 60 DB LDN OR BELOW USING A PRACTICAL APPLICATION OF THE BEST NOISE-REDUCTION TECHNOLOGY, AN EXTERIOR NOISE LEVEL OF UP TO 65 LDN WILL BE ALLOWED.

[3] DETERMINED FOR A TYPICAL WORST-CASE HOUR DURING PERIODS OF USE.

[4] WHERE A PROPOSED USE IS NOT SPECIFICALLY LISTED ON THE TABLE, THE USE SHALL COMPLY WITH THE NOISE EXPOSURE STANDARDS FOR THE NEAREST SIMILAR USE AS DETERMINED BY THE CITY.

SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-1.

Table 14: Performance Standards for Stationary Noise Sources or Projects Affected by Stationary Noise Sources [1,2]

Noise Level Descriptor	*Daytime (7 AM – 10 PM)*	*Nighttime (10 PM – 7 AM)*
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65

NOTES:
[1] EACH OF THE NOISE LEVELS SPECIFIED ABOVE SHOULD BE LOWERED BY FIVE (5) DB FOR SIMPLE NOISE TONES, NOISES CONSISTING PRIMARILY OF SPEECH OR MUSIC, OR RECURRING IMPULSIVE NOISES. SUCH NOISES ARE GENERALLY CONSIDERED BY RESIDENTS TO BE PARTICULARLY ANNOYING AND ARE A PRIMARY SOURCE OF NOISE COMPLAINTS.
[2] NO STANDARDS HAVE BEEN INCLUDED FOR INTERIOR NOISE LEVELS. STANDARD CONSTRUCTION PRACTICES SHOULD, WITH THE EXTERIOR NOISE LEVELS IDENTIFIED, RESULT IN ACCEPTABLE INTERIOR NOISE LEVELS.
SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-2.

Regulatory Setting – Manteca Noise Ordinance

Section 9.52.030 of the City of Manteca Municipal Code prohibits excessive or annoying noise or vibration to residential and commercial properties in the City. The following general rules are outline in the ordinance:

9.52.030 Prohibited noises—General standard

No person shall make, or cause to suffer, or permit to be made upon any public property, public right-of-way or private property, any unnecessary and unreasonable noises, sounds or vibrations which are physically annoying to reasonable persons of ordinary sensitivity or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to cause or contribute to the unnecessary and unreasonable discomfort of any persons within the neighborhood from which said noises emanate or which interfere with the peace and comfort of residents or their guests, or the operators or customers in places of business in the vicinity, or which may detrimentally or adversely affect such residences or places of business. (Ord. 1374 § 1(part), 2007)

17.58.050 D. Exempt Activities

Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.

17.58.050 E. Prohibited Activities

Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

R*esponses to Checklist Questions*
Response a):

Construction Noise

The new development, maintenance of roadways, installation of public utilities, and infrastructure improvements associated with the project will require construction activities. These activities include the use of heavy equipment and impact tools. As indicated in Table 15,

activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

Construction could result in periods of elevated ambient noise levels and the potential for annoyance. However, predicted maximum noise levels associated with project construction are predicted to be less than existing average maximum (L_{max}) noise levels, as measured at the nearest sensitive receptors. The City of Manteca General Plan establishes allowable hours of operation and noise limits for construction activities as noted above.

Table 15: Construction Equipment Noise

Type of Equipment	*Maximum Level, dB*	
	25 feet	*50 feet*
Backhoe	84	78
Compactor	89	83
Compressor (air)	84	78
Concrete Saw	96	90
Dozer	88	82
Dump Truck	82	76
Excavator	87	81
Generator	87	81
Jackhammer	94	89
Pneumatic Tools	91	85

SOURCE: ROADWAY CONSTRUCTION NOISE MODEL USER'S GUIDE. FEDERAL HIGHWAY ADMINISTRATION. FHWA-HEP-05-054. JANUARY 2006.

All construction activities will be subject to the requirements of the City of Manteca Noise Ordinance with respect to limits on construction noise. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Operational Noise at Existing Receptors

As noted above, to describe future noise levels due to traffic, the FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. Inputs to the model included traffic volumes provided by Fehr & Peers. The FHWA model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict L_{dn}/CNEL values, it is necessary to determine the day/night distribution of traffic and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

The CEQA Guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas".

Implementation Measure N-I-3 of the City of Manteca General Plan Noise Element provides specific guidance for assessing increases in ambient noise, as follows:

> *In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:*

- *the resulting noise levels*
- *the duration and frequency of the noise*
- *the number of people affected*
- *the land use designation of the affected receptor sites*
- *public reactions or controversy as demonstrated at workshops or hearings, or by correspondence*
- *prior CEQA determinations by other agencies specific to the project*

Table 16 shows the existing versus existing plus project traffic noise levels, and Table 17 shows the cumulative versus cumulative plus project traffic noise levels. Based upon Tables 16 and 17, the proposed project is predicted to result in a maximum traffic noise level increase of 0.3 dB. This is less than the City's substantial increase criteria of 5 to 10 dB.

Table 16: Existing and Existing Plus Project Traffic Noise Levels

Roadway	Segment	Noise Levels (Ldn, dB) at Nearest Sensitive Receptors				
		Existing	Existing + Project	Change	Criteria[1]	Signif-icant?
Airport Way	North of Woodward	62.4	62.5	0.1	+5-10 dBA	No
Airport Way	South of Woodward	58.6	58.6	0.0	>60 dBA	No
Union Rd.	North of Woodward	56.3	56.4	0.1	>60 dBA	No
Union Rd.	South of Woodward	60.5	60.5	0.0	+5-10 dBA	No
Woodward Ave.	West of Airport	55.4	55.5	0.1	>60 dBA	No
Woodward Ave.	Airport to Union	60.6	60.9	0.3	+5-10 dBA	No
Woodward Ave.	East of Union	57.4	57.5	0.1	>60 dBA	No

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS AND SAXELBY ACOUSTICS. 2019.

Table 17: Cumulative and Cumulative + Project Traffic Noise Levels

Roadway	Segment	Noise Levels (Ldn, dB) at Nearest Sensitive Receptors				
		Cumulative	Cumulative + Project	Change	Criteria1	Signif-icant?
Airport Way	North of Woodward	67.5	67.5	0.0	+5-10 dBA	No
Airport Way	South of Woodward	63.1	63.1	0.0	+5-10 dBA	No
Union Rd.	North of Woodward	60.6	60.6	0.0	+5-10 dBA	No
Union Rd.	South of Woodward	64.2	64.2	0.0	+5-10 dBA	No
Woodward Ave.	West of Airport	61.1	61.2	0.0	+5-10 dBA	No
Woodward Ave.	Airport to Union	64.7	64.7	0.1	+5-10 dBA	No
Woodward Ave.	East of Union	61.5	61.5	0.1	+5-10 dBA	No

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS AND SAXELBY ACOUSTICS. 2019.

The proposed project would not cause increased noise levels exceeding the City of Manteca exterior noise level standard at existing noise-sensitive residential receptors. Therefore, this impact would be considered ***less than significant*** relative to this topic.

Operational Noise at Proposed Receptors

The proposed residents would be subject to traffic noise from area roadways These noise sources are discussed in detail below.

Traffic Noise at Proposed Receptors – Exterior

Cumulative plus project traffic noise levels are predicted to be 65 dB L_{dn} at a distance of 50 feet from the centerline of Woodward Avenue, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 50 feet from the centerline Woodward Avenue. Therefore, maximum exterior noise levels of 65 dB L_{dn} are predicted for these uses.

Mitigation Measure NOI-1 requires construction of a noise barrier along a portion of the Woodward Avenue right-of-way in order to reduce exterior noise levels. The recommended sound wall location is shown in Figure 14. With implementation of this mitigation measure, impacts associated with exterior noise levels would be ***less than significant***.

Traffic Noise at Proposed Receptors - Interior

Modern construction typically provides a 25 dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, will typically comply with the City of Manteca 45 dB L_{dn} interior noise level standard. Additional noise reduction measures, such as acoustically rated windows, are generally required for exterior noise levels exceeding 70 dB L_{dn}. It should be noted that exterior noise levels are typically two to three dB higher at second floor locations. Additionally, noise barriers do not reduce exterior noise levels at second floor locations.

The proposed residential uses are predicted to be exposed to unmitigated first floor exterior transportation noise levels up to 65 dB L_{dn}. Therefore, second floor facades are predicted to be exposed to exterior noise levels of up to 69 dB L_{dn}. Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 44 dB L_{dn}. Accordingly, predicted interior noise levels along the first row of residential uses along Woodward are predicted to comply with the City's 45 dB L_{dn} interior noise level standard.

Overall, implementation of the following mitigation measures would ensure consistency with the City's noise standards and would reduce this potentially significant impact to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure NOI-1: *A minimum 6-foot tall sound wall shall be constructed along the Woodward Avenue frontage, adjacent to proposed residential uses, in order to achieve the City's exterior noise standards. Final wall height selection would be at the discretion of the City. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department.*

Mitigation Measure NOI-2: *Mechanical ventilation shall be provided to allow occupants to keep doors and windows closed for acoustic isolation.*

Mitigation Measure NOI-3: *Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure NOI-4: *All construction equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Response b): 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 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. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by several factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 18 indicates that the threshold for damage to structures ranges from 0.2 to 0.6 peak particle velocity in inches per second (in/sec p.p.v). A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

Table 18 Effects of Vibration on People and Buildings

Peak Particle Velocity		***Human Reaction***	***Effect on Buildings***
mm/sec.	***in./sec.***		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

SOURCE: CALTRANS. TRANSPORTATION RELATED EARTHBORN VIBRATIONS. TAV-02-01-R9601 FEBRUARY 20, 2002.

The primary vibration-generating activities associated with the proposed project would happen during construction when activities such as grading, utilities placement, and road construction occur. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located approximately 25 to 50 feet or further from the project site. At this distance, construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours.

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural damage. Table 19 shows the typical vibration levels produced by construction equipment.

Table 19: Vibration Levels for Various Construction Equipment

Type of Equipment	*Peak Particle Velocity @ 25 feet (inches/second)*	*Peak Particle Velocity @ 100 feet (inches/second)*
Large Bulldozer	0.089	0.011
Loaded Trucks	0.076	0.010
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.011
Jackhammer	0.035	0.004
Vibratory Hammer	0.070	0.009
Vibratory Compactor/roller	0.210	0.026

SOURCE: FEDERAL TRANSIT ADMINISTRATION, TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT GUIDELINES, MAY 2006

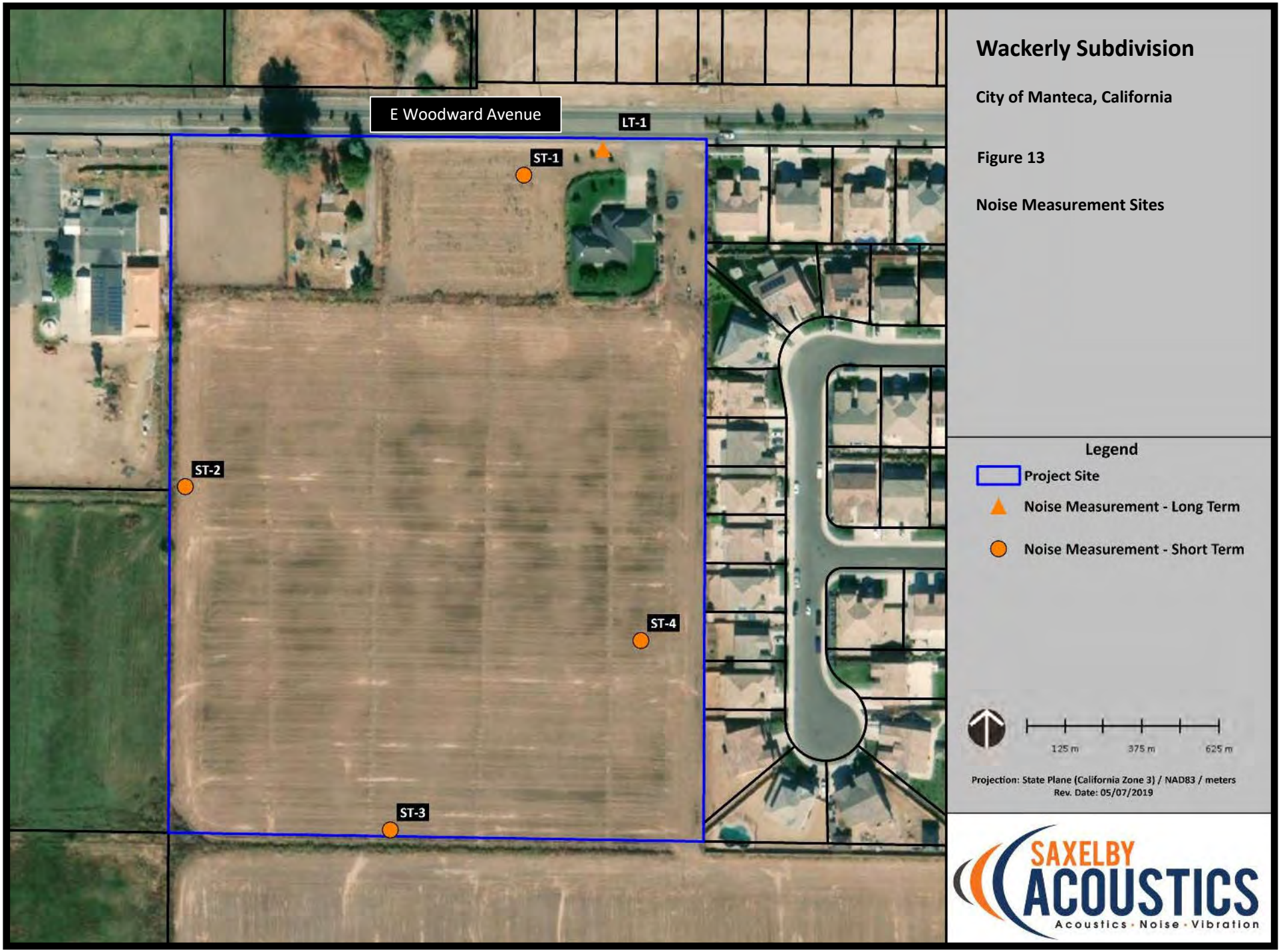
With the exception of vibratory compactors, the Table 19 data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at a distance of 25 feet. Use of vibratory compactors within 26 feet of the adjacent buildings could cause vibrations in excess of 0.2 in/sec. Sensitive receptors which could be impacted by construction-related vibrations, especially vibratory compactors/rollers, are located approximately 10-15 feet, or further, from the project site. Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure NOI-5: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

Response c): The project site is not located within the vicinity of 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 closest airport or airstrip is the Stockton Metropolitan Airport, located approximately 8.5 miles north of the project site. The proposed project would, therefore, not expose people residing or working in the project area to excessive noise levels associated with such airport facilities. The project site is not located within the vicinity of a private airstrip. The proposed project would, therefore, not expose people residing or working in the project area to excessive noise levels

associated with such private airport facilities. Implementation of the proposed project would have ***no impact*** relative to this topic.



Wackerly Subdivision

City of Manteca, California

Figure 13

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement - Long Term
- Noise Measurement - Short Term

125 m 375 m 625 m

Projection: State Plane (California Zone 3) / NAD83 / meters
Rev. Date: 05/07/2019

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

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Wackerly Subdivision

City of Manteca, California

Figure 14

Recommended Sound Walls



NorthStar Engineering Group, Inc.
• CIVIL ENGINEERING • SURVEYING • PLANNING •
620 12th Street Modesto, CA 95354
(209) 524-3525 Phone (209) 524-3526 Fax

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XIV. POPULATION AND HOUSING

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?			X	

Responses to Checklist Questions

Response a): According to the 2018 US Census population estimates, the population in Manteca is 81,592 people, and the average persons per household is 3.18. The proposed project would result in the construction of residential housing that would generate an estimated 191 people. This is an estimated 0.003 percent growth in Manteca. An estimated 0.003 percent growth in Manteca is not considered substantial growth in Manteca or the region and it is consistent with the assumed growth in the General Plan. The 191 people may come from Manteca or surrounding communities. The proposed project would not include upsizing of offsite infrastructure or roadways. However, the project does include stubbed infrastructure at the southwestern corner of the site at the street labeled Street F on the project site plan. The proposed infrastructure at Street F would eventually connect to an adjacent future subdivision(s) in the area to the south and west, which are planned for residential uses by the City of Manteca's General Plan. The installation of new infrastructure would be limited to the internal single family residences. The sizing of the infrastructure would be specific to the number of units proposed within the project site. Implementation of the proposed project would not induce substantial population growth in an area, either directly or indirectly. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

Response b): The majority of the project site is currently undeveloped with the exception of the two single family residences on-site. As discussed in the project description, the existing home and garage located on the northeast corner of the site will remain, and the existing home and garage located on the northwest corner will be demolished prior to construction with the approval of the homeowner. The removal of one single family residence is not considered substantial displacement of existing people or housing and the proposed project does not necessitate the construction of housing elsewhere. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

XV. PUBLIC SERVICES

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) 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 of the public services:				
Fire protection?			X	
Police protection?			X	
Schools?			X	
Parks?		X		
Other public facilities?				X

Responses to Checklist Questions

Response a):

Fire Protection

The Manteca Fire Department is responsible for the primary provision of fire service and emergency medical response for the City of Manteca and its residents. The Manteca Fire Department serves approximately 72,880 residents throughout approximately 17.0 square miles within the City limits. The Manteca Fire Department operates out of four (4) facilities that are strategically located in the City of Manteca. The Manteca Fire Department is headquartered in Station 242 located at 1154 S. Union Road. This building serves as the Fire Department headquarters and the Fire Prevention Bureau. Fire training and emergency medical services are managed out of Station 241. The nearest fire station to the project site is located at 1154 Union Road, approximately 1.13 miles northeast of the project site.

The Manteca Fire Department maintains a goal for the initial company of three (3) firefighters to arrive on scene for fire and emergency medical service (EMS) incidents within five (5) minutes 90% of the time (Response Effectiveness). In 2014, the Department averaged a 4:18 response time City-wide and was on scene within five minutes 77% of the time. In 2015, the Department averaged a 4:40 response time City-wide. Additionally, in 2015, 6,615 calls were made to the Department, which is the greatest number of calls in the history of the Manteca Fire Department.[4]

The Department is not currently meeting the Response Effectiveness goal. In May of 2016, the Department arrived on-scene within 5 minutes approximately 66% of the time.[5] The percentage continues to decline. The Department has recently seen increased calls and expanded areas of coverage. The proposed project will be served by the Department's most impacted fire station (Station No. 2, 1154 S. Union Rd). To combat the increased calls in the southern areas of Manteca,

[4] City of Manteca Fire Department. 2015. City of Manteca Fire Department 2015 Annual Report.
[5] Personal Communication with Lantz Rey, City of Manteca Fire Department Fire Marshal. July 19, 2016.

the Department has recently staffed a "Rescue" in District 2. The additional unit will help relieve the significant call volume in south Manteca.

On September 11, 2013, Fire Station No. 4 opened in northwest Manteca. Fire Station No. 4 was one factor that helped to improve both the average response time and the percent of response effectiveness in 2014.

The construction of Fire Station No. 5, which is planned in southeast Manteca, will have a similar impact on response times and response effectiveness. The City is in the process of completing 30 percent of the design of this station with the intent of constructing and staffing this station by the 2019/2020 fiscal year. Funding for this station is dependent on additional annexations and development in the area. The construction and staffing of Fire Station No. 5 will allow the City the ability to achieve the full alarm standard outlined by the National Fire Protection Association 1710 for the first time in the City's History; this will directly affect the Insurance Services Office (ISO) rating, enhance service to the citizens of Manteca, and improve the department's ability to obtain grants.

The proposed project would add 60 residential units, which is anticipated to add 191 people to the City of Manteca. The additional of 191 people in the City of Manteca would place additional demands for fire service on the Manteca Fire Department.

The City of Manteca receives funds for the provision of public services through development fees, property taxes, and connection and usage fees. As land is developed within the City and annexed into the City of Manteca, these fees apply. The City of Manteca reviews these fee structures on an annual basis to ensure that they provide adequate financing to cover the provision of city services. The City's Community Development, Public Works, and Finance Departments are responsible for continual oversight to ensure that the fee structures are adequate. The City reviews the referenced fees and user charges on an annual basis to determine the correct level of adjustment required to reverse any deficits and assure funding for needed infrastructure going forward. The City intends to include discussion of these fees and charges as part of the annual budget hearings.

The City of Manteca General Plan 2023 includes policies and implementation measures that would allow for the Department to continue providing adequate facilities and staffing levels. Below is a list of relevant policies:

- The City shall endeavor to maintain an overall fire insurance (ISO) rating of 4 or better (Policy PF-P-42).
- The City shall endeavor through adequate staffing and station locations to maintain the minimum feasible response time for fire and emergency calls (PF-P-43).
- The City shall provide fire services to serve the existing and projected population (PF-P-44).
- The City will establish the criteria for determining the circumstances under which fire service will be enhanced (PF-P-45).
- The Fire Department shall continuously monitor response times and report annually on the results of the monitoring (PF-I-24).
- The City shall encourage a pattern of development that promotes the efficient and timely development of public services and facilities (LU-P-3).

Impact fees from new development are collected based upon projected impacts from each development. The adequacy of impact fees is reviewed on an annual basis to ensure that the fee

is commensurate with the service. Payment of the applicable impact fees by the project applicant, and ongoing revenues that would come from property taxes, sales taxes, and other revenues generated by the proposed project, would fund capital and labor costs associated with fire protection services. Therefore, the impact of the proposed project on the need for additional fire services facilities is ***less than significant***.

Police Protection

The project site is currently under the jurisdiction of the Manteca Police Department. The Manteca Police Department operates out of its headquarters located at 1001 W. Center Street. The project site is located approximately 1.98 miles Northeast of the headquarters.

The Manteca Police Department is organized into two divisions: Operations and Services. Additionally, the Police Department operates a Public Affairs Unit. For budgeting purposes, the Police Department is organized into the following programs: administration, patrol, investigations, support services, dispatch, code enforcement, jail services, and animal services.

The proposed project would add 60 residential units, which is anticipated to add 191 people to the City of Manteca. The additional of 191 people in the City of Manteca would place additional demands for police service on the Manteca Police Department.

The City of Manteca receives funds for the provision of public services through development fees, property taxes, and connection and usage fees. As land is developed within the City and annexed into the City of Manteca, these fees apply. The City of Manteca reviews these fee structures on an annual basis to ensure that they provide adequate financing to cover the provision of city services. The City's Community Development, Public Works, and Finance Departments are responsible for continual oversight to ensure that the fee structures are adequate. The City reviews the referenced fees and user charges on an annual basis to determine the correct level of adjustment required to reverse any deficits and assure funding for needed infrastructure going forward. The City intends to include discussion of these fees and charges as part of the annual budget hearings.

The City's General Plan 2023 includes policies and implementation measures that would allow for the Manteca Police Department to continue providing adequate staffing levels. Below is a list of relevant policies:

- The City shall endeavor through adequate staffing and patrol arrangements to maintain the minimum feasible police response times for police calls (PF-P-39). The City currently has 63 sworn officers. With a population of 72,880, that equates to a staffing level of .86 officers per 1000 residents.
- The City shall provide police services to serve the existing and projected population. The Police Department will continuously monitor response times and report annually on the results of the monitoring.
- The City shall provide police services to serve the existing and projected population (PF-P-40).
- The City will establish the criteria for determining the circumstances under which police service will be enhanced (PF-P-41).

Impact fees from new development are collected based upon projected impacts from each development. The adequacy of impact fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the project applicant,

and ongoing revenues that would come from property taxes, sales taxes, and other revenues generated by the proposed project, would fund capital and labor costs associated with police services.

Based on the current adequacy of existing response times and the ability of the Manteca Police Department to serve the City, it is anticipated that the existing police department facilities are sufficient to serve the proposed project. Consequently, any impacts would be ***less than significant***.

Schools

The project site is located within the service boundaries of the Manteca Unified School District (MUSD). MUSD provides school services for grades K through 12 within the communities of Manteca, Lathrop, Stockton, and French Camp. The District is approximately 113 square miles and serves more than 23,000 students. MUSD operates 14 elementary and middle schools (grades K-8), four high schools (grades 9-12), one community day school (grades 7-12), and one vocational academy (grades 11-12). The schools in the City had a total enrollment of approximately 14,279 students, of which 9,416 were enrolled in elementary and middle school (grades K – 8) and 4,863 were enrolled in high school (grades 9 – 12).

The proposed project includes residential units that would directly increase the student population in the area. The proposed project would include the development of 60 single family dwelling units, which would directly cause population growth and increase enrollment in the local school districts. Utilizing the student generation rates provided by the MUSD in the School Mitigation Fee Justification Study (dated March 2017), the proposed project would be expected to generate roughly 39 new students, broken down by grades as follows:

- K–8: 26 students
- 9–12: 13 students

The MUSD collects impact fees from new developments under the provisions of SB 50. Payment of the applicable impact fees by the project applicant, and ongoing revenues that would come from taxes, would fund capital and labor costs associated with school services. The adequacy of fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the project applicant, and ongoing revenues that would come from property taxes and other revenues generated by the proposed project, would fund improvements associated with school services.

The provisions of State law are considered full and complete mitigation for the purposes of analysis under CEQA for school construction needed to serve new development. In fact, State law expressly precludes the City from reaching a conclusion under CEQA that payment of the Leroy F. Greene School Facilities Act school impact fees would not completely mitigate new development impacts on school facilities. Consequently, the City of Manteca is without the legal authority under CEQA to impose any fee, condition, or other exaction on the project for the funding of new school construction other than the fees allowed by the Leroy F. Greene School Facilities Act. Although MUSD may collect higher fees than those imposed by the Leroy F. Greene School Facilities Act, no such fees are required to mitigate the impact under CEQA. Because the project would pay fees as required by The Leroy F. Greene School Facilities Act, this impact would be ***less than significant***.

Parks

The proposed project directly increases the number of persons in the area as a result of employment potential, and residential uses. The proposed project includes 60 residential units, which is projected to increase the population by an estimated 191 people (based on 3.18 persons per household). For the purposes of extractive and collecting fees to mitigate for increase park demands (Quimby Act), the California Government Code Section 66477 states: *The amount of land dedicated or fees paid shall be based upon the residential density, which shall be determined on the basis of the approved or conditionally approved tentative map or parcel map and the average number of persons per household. There shall be a rebuttable presumption that the average number of persons per household by units in a structure is the same as that disclosed by the most recent available federal census or a census taken pursuant to Chapter 17 (commencing with Section 40200) of Part 2 of Division 3 of Title 4.*

The City's General Plan identifies a park standard based on a goal of five acres of developed parkland per 1,000 residents within the city limits. Further, the City's Parks and Recreation Master Plan (December 2016) states that the City currently strives to provide 3.5 acres of Neighborhood Park land per thousand residents, and 1.5 acres of Community Park land. Due to the active sports needs of the community, the recommendation of the City's Master Plan is to shift the acreage goals to achieve a better balance of park land in the future, resulting in a new goal for developing adequate Special Use Park land. The total goal of 5 acres per 1,000 residents remains intact, and the summary of the goals is broken down below:

- Neighborhood Park: 3 acres / 1,000 residents
- Community Park: 1 acre / 1,000 residents
- Special Use Park: 1 acre / 1,000 residents

According to the Master Plan, the City currently has a deficit of 5.67 acres of Neighborhood Park, and a surplus of Community Parks (5.58 acres) and Special Use Parks (18.06 acres). Using the above parkland goals, the proposed project would be required to provide:

- Neighborhood Park: 0.57 acres
- Community Park: 0.19 acres
- Special Use Park: 0.19 acres

No amenities are proposed with the project and the project does not include any Neighborhood Parks, Community Parks, or Special Use Parks. As such, the proposed project is subject to the City park dedication in-lieu fees. The payment of the City park dedication in-lieu fees would serve as an adequate offset for the park demand. As such, with the implementation of Mitigation Measure PUBLIC-1, the proposed project will result in a ***less-than-significant*** impact.

Mitigation Measure(s)

Mitigation Measure PUBLIC-1: *The applicant shall pay applicable park in-lieu fees or dedicate parkland in accordance with the City of Manteca Municipal Code standards outlined in Chapter 3.20. Proof of payment of the in-lieu fees shall be submitted to the City Engineer.*

Other Public Facilities

The proposed project would not result in a need for other public facilities that are not addressed above, or in Section XIX, Utilities and Service Systems. Implementation of the proposed project would have ***no impact*** relative to this issue.

XVI. RECREATION

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

Responses to Checklist Questions

Responses a): The project would result in the construction of 60 single-family residential homes. The proposed project would result in an estimated 191 individuals. The estimated new demand for parks is 0.95 acres (including 0.57 acres of Neighborhood Park, 0.19 acres of Community Park, and 0.19 acres of Special-Use Park). The project does not include the construction of new parks; therefore, the developer would be required to pay in-lieu fees. The in-lieu fees would ultimately fund the construction of new park land to offset the increased demand for these facilities. With implementation of Mitigation Measure PUBLIC-1, this potential impact would be reduced to a ***less-than-significant*** level.

Responses b): The proposed project does not include the construction of public recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Implementation of the proposed project would have ***no impact*** relative to this topic.

XVII. TRANSPORTATION

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?		X		
b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?		X		
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		
d) Result in inadequate emergency access?			X	

Background

The *Transportation Impact Analysis Report* (June 2019) was prepared by Fehr & Peers for the proposed project. The following is a summary of the report, which is contained in Appendix D.

Existing Roadway Network

The following is a detailed description of the roadways that could be affected by the project:

- **Airport Way** is a north-south arterial in the City of Manteca extending from SR 120 and W. Ripon Road to the south and French Camp Road and the City of Stockton to the north. Near the project site, Airport Way provides one travel lane in each direction. Between SR 120 and Woodward Avenue, Airport Way has an Average Daily Traffic (ADT) volume of approximately 8,600 vehicles.
- **Union Road** is a north-south arterial road that runs parallel to Airport Way extending from SR 120 and W. Ripon Road to the south and French Camp Road to the north. Near the project site, Union Road provides two travel lanes in each direction north of the Union Road/Woodward Avenue intersection and one travel lane in each direction south of the intersection. Between SR 120 and Woodward Avenue, Union Road has an ADT volume of approximately 8,600 vehicles.
- **Woodward Avenue** is an east-west minor collector extending from west of Airport Way to Moffat Boulevard. Near the project site, Woodward Avenue consists of one travel lane in each direction. Between Airport Way and Union Road, Woodward Avenue has an ADT volume of approximately 4,600 vehicles.

Study Intersections

The following four study intersections have been included in the analysis:

1. Airport Way / Woodward Avenue;
2. Union Road / Woodward Avenue;
3. Woodward Avenue / Street A;
4. Woodward Avenue / Street B.

Traffic Analysis Scenarios

The study intersections were evaluated for the following four scenarios:

- **Scenario 1: Existing Conditions** –Analyzes operations as they exist today.
- **Scenario 2: Existing Plus Project Conditions** – Analyzes existing operations with the addition of trips generated from the proposed project.
- **Scenario 3: Cumulative Conditions** – Analyzes cumulative year (2042) volumes based on the City of Manteca / SJCOG Travel Demand Forecasting (TDF) Model, assuming the project site remains in its current state.
- **Scenario 4: Cumulative Plus Project Conditions** – Analyzes cumulative year volumes with the addition of trips generated from the proposed project.

Intersection Analysis Methodology

The study intersections were analyzed using procedures and methodologies contained in the *Highway Capacity Manual – 6th Edition* (Transportation Research Board, 2016). These methodologies were applied using Synchro 10 software which considers traffic volumes, lane configurations, signal timings, signal coordination, and other pertinent parameters of intersection operations.

The following describes the specific inputs, model parameters, and other aspects of the Synchro modeling, based on data collected in May 2019:

- Existing roadway geometrics and intersection lane configurations.
- The peak hour factor (PHF) observed at each intersection during each peak hour was used. The PHF, which is a measure of peaking (lower values represent more peaking) during the busiest 15-minutes of the hour, ranges from 0.79 to 0.94 depending on the intersection and the peak hour.
- The heavy vehicle percentage observed at each intersection during each peak hour was used. The heavy vehicle percentage ranges from one percent (1%) to six percent (6%) depending on the intersection and the peak hour.
- A minimum volume of five pedestrians and five bicyclists were entered at each intersection approach/crosswalk (if observed volumes were lower than five).

Level of Service (LOS) Criteria and Standard

Each study intersection was analyzed using the concept of Level of Service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. For signalized intersections and all-way stop controlled intersections, LOS is based on the average delay experienced by all vehicles passing through the intersection. For side-street stop-controlled intersections, the delay and LOS for the overall intersection is reported along with the delay for the worst-case movement. Table 20 displays the delay range associated with each LOS category for signalized and unsignalized intersections.

Table 20: LOS Criteria – Intersections

LOS	*Description (for Signalized Intersections)*	*Average Delay (Seconds/Vehicle)*	
		Signalized Intersections	*Unsignalized Intersections*
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	< 10.0	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, and long cycle lengths. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

NOTE: LOS = LEVEL OF SERVICE; V/C RATIO= VOLUME-TO-CAPACITY RATIO. LOS AT SIGNALIZED INTERSECTIONS AND ROUNDABOUTS BASED ON AVERAGE DELAY FOR ALL VEHICLES. LOS AT UNSIGNALIZED INTERSECTIONS IS REPORTED FOR ENTIRE INTERSECTION AND FOR MINOR STREET MOVEMENT WITH GREATEST DELAY.
SOURCE: TRANSPORTATION RESEARCH BOARD 2016.

Manteca General Plan Policy C-P-2 establishes the following City of Manteca LOS policy: To the extent feasible, the City shall strive for a vehicular LOS of D or better at all streets and intersections, except in the Downtown area where right-of-way is limited, pedestrian, bicycle, and transit mobility are most important and vehicular LOS is not a consideration.

Existing Intersection LOS

Existing traffic operations were analyzed at the two existing study intersections. Based on the results presented in Table 21 for Existing AM and PM peak hour analysis, the intersections operate acceptably during both peak hours.

Table 21: Peak Hour Intersection LOS – Existing Conditions

Intersection	*Control*	*AM Peak Hour*		*PM Peak Hour*	
		Delay[1]	*LOS*	*Delay[1]*	*LOS*
1) Airport Way/Woodward Ave.	AWSC	12	B	15	B
2) Union Rd./Woodward Ave.	AWSC	16	C	18	C

NOTE: LOS = LEVEL OF SERVICE; AWSC = ALL-WAY STOP
[1]FOR ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES
SOURCE: FEHR & PEERS, 2019.

Transit Service

Transit service in the City of Manteca is provided by Manteca Transit. Transit Route 2 (northbound / westbound) and Transit Route 3 (southbound / eastbound) provide fixed route service near the study area. The closest transit stop for Routes 2 and 3 are located on Atherton Street, east of Union Road, which is approximately one-mile northeast of the project site.

Bicycle and Pedestrian Facilities

Bicycle infrastructure near the project site consists of a Class II bike lane on Oleander Avenue east of the project site. A Class II bike lane is defined in the Manteca Bicycle Master Plan (City of Manteca, 2003) as a bike lane that provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Woodward Avenue consists of shoulders in each direction, which are suitable for bicycle travel, though pavement markings and signage is not provided to designate them as such.

The pedestrian network in the study area includes sidewalks present along the developed frontages of Airport Way, Union Road and Woodward Avenue. Sidewalks in the area are being constructed as development occurs; therefore, significant gaps in the pedestrian network currently exist. However, these gaps will be reduced, if not eliminated, as the area continues to build out.

Responses to Checklist Questions
Responses a-b):

Project Trip Generation

Table 22 presents the estimated trips generated by the proposed project for weekday daily, AM and PM peak hour conditions. As shown below, the project would generate approximately 566 daily vehicle trips, 44 AM peak hour trips, and 59 PM peak hour trips. The trips generated by the residential land uses are based on trip rates from the *Trip Generation Manual 10th Edition* (Institute of Transportation Engineers, 2017).

Table 22: Project Trip Generation

ITE Land Use (Code)	Quantity (dwelling units)	Vehicle Trips						
		Daily			AM		PM	
		Total	In	Out	Total	In	Out	Total
Single Family Detached (210)	60	566	11	33	44	37	22	59

NOTES: [1] TRIP RATES ARE BASED ON THE TRIP GENERATION MANUAL 10TH EDITION (INSTITUTE OF TRANSPORTATION ENGINEERS 2017).
SOURCE: FEHR & PEERS, 2019.

Project Trip Distribution

Project trips were distributed throughout the study area and assigned to project driveways based on proposed permitted turning movements and existing directional travel patterns on Airport Way, Union Road, and Woodward Avenue during morning and evening commute time periods. The westerly Street A access would be restricted to right-turns only via the existing raised median on Woodward Avenue, while the easterly Street B access would permit all turning movements via a two-way left-turn lane that is present.

Based on existing travel patterns, approximately 33 percent of project trips during the AM peak hour and 31 percent of project trips during the PM peak hour will head west on Woodward Avenue while 67 percent of project trips during the AM peak hour and 69 percent of project trips during the PM peak hour will head east.

Existing Plus Project Intersection LOS

The "project only" trips developed through the trip generation and distribution processes were assigned to the roadway network by adding those new trips to existing traffic volumes. Table 23 displays the results of the Existing Plus Project operations analysis.

Table 23: Peak Hour Intersection LOS – Existing Plus Project Conditions

Intersection	*Control*	*Existing Conditions*				*Existing Plus Project Conditions*			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay[1]	*LOS*	*Delay[1]*	*LOS*	*Delay[1]*	*LOS*	*Delay[1]*	*LOS*
1) Airport Way/ Woodward Ave.	AWSC	12	B	15	B	12	B	15	C
2) Union Rd./ Woodward Ave.	AWSC	16	C	18	C	16	C	19	C
3) Woodward Ave./Street A (west project driveway)	SSSC	N/A	N/A	N/A	N/A	0 (9)	A (A)	0 (10)	A (A)
4) Woodward Ave./Street B (east project driveway)	SSSC	N/A	N/A	N/A	N/A	1 (10)	A (B)	1 (11)	A (B)

NOTES:
LOS = LEVEL OF SERVICE, AWSC = ALL-WAY STOP CONTROL; SSSC = SIDE-STREET STOP-CONTROL
IN SOME CASES, REPORTED INTERSECTION DELAY IS THE SAME; HOWEVER, LOS VARIES. THIS IS DUE TO ROUNDING AND OCCURS WHEN INTERSECTION DELAY AT THE DELAY THRESHOLD BETWEEN TWO DIFFERENT LEVELS OF SERVICE.
[1] FOR ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES. FOR SIDE-STREET STOP-CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION AND (WORST-CASE MOVEMENT) DELAY IN SECONDS PER VEHICLE IS REPORTED.
SOURCE: FEHR & PEERS, 2019.

According to this table, the addition of project generated traffic to the four study intersections will only result in minor changes to intersection LOS.

During both morning and evening peak hours, the Airport Way/Woodward Avenue all-way stop control intersection will continue to operate at acceptable LOS B conditions.

During both morning and evening peak hours, the Union Road/Woodward Avenue all-way stop control intersection will continue to operate at acceptable LOS C conditions.

Queuing Analysis

Because Intersection 4 (Woodward Avenue/Street B [east project driveway]) proposes full access, a queuing analysis was completed for the westbound left-turn ingress turning movement from Woodward Avenue. The estimated maximum queue is approximately 50 feet (two vehicles). Approximately 185 feet of deceleration and storage would be provided between Street B and the beginning of the raised median located to the east of the project. Thus, no queuing impacts are expected at this location.

Cumulative No Project Intersection LOS

Table 24 presents the results of the Cumulative No Project operations analyses. According to this table, the intersections operate acceptably during both peak hours. The City of Manteca Public Facilities Impact Fee Program includes traffic signals at both existing study intersections under cumulative conditions; therefore, traffic signals were assumed at Intersections 1 and 2 in the Cumulative No Project scenario.

Table 24: Peak Hour Intersection LOS – Cumulative No Project Conditions

Intersection	*Control*[1]	*Existing Conditions*				*Cumulative No Project Conditions*			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay[2]	*LOS*	*Delay*[2]	*LOS*	*Delay*[2]	*LOS*	*Delay*[2]	*LOS*
1) Airport Way/ Woodward Ave.	AWSC/ Signal	12	B	15	B	34	C	38	D
2) Union Rd./ Woodward Ave.	AWSC/ Signal	16	C	18	C	29	C	22	C

NOTES:

LOS = LEVEL OF SERVICE, AWSC = ALL-WAY STOP CONTROL; SSSC = SIDE-STREET STOP CONTROL

[1] UNDER EXISTING CONDITIONS, INTERSECTION CONTROL FOR BOTH STUDY INTERSECTIONS IS AWSC. UNDER CUMULATIVE CONDITIONS, INTERSECTION CONTROL FOR BOTH STUDY INTERSECTIONS IS A TRAFFIC SIGNAL.

[2] FOR SIGNALIZED INTERSECTIONS AND ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES.

SOURCE: FEHR & PEERS, 2019.

The Airport Way/Woodward Avenue intersection is projected to operate at acceptable LOS C during the AM peak hour and acceptable LOS D during the PM peak hour. The Union Road/Woodward Avenue intersection is projected to operate at acceptable LOS C during both AM and PM peak hours.

Cumulative Plus Project Intersection LOS

Table 25 presents the results of the Cumulative Plus Project operations analyses. According to this table, the addition of project generated traffic to the four study intersection will result in all intersections operating acceptably at LOS D or better during both peak hours.

During the morning peak hour, the Airport Way/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions. During the evening peak hour the Airport Way/Woodward Avenues signalized intersection will continue to operate at acceptable D conditions. During the morning and evening peak hour, the Union Road/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions

During the morning peak hour, the Airport Way/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions and acceptable LOS D conditions in the evening peak hour. During both morning and evening peak hours, the Union Road/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions.

Table 25: Peak Hour Intersection LOS –Cumulative Plus Project Conditions

Intersection	*Control*[1]	*Cumulative No Project Conditions*				*Cumulative Plus Project Conditions*			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay[2]	*LOS*	*Delay*[2]	*LOS*	*Delay*[2]	*LOS*	*Delay*[2]	*LOS*
1) Airport Way/ Woodward Ave.	Signal	34	C	38	D	34	C	40	D
2) Union Rd./ Woodward Ave.	Signal	29	C	22	C	29	C	23	C
3) Woodward Ave./Street A (west project driveway)	SSSC	N/A	N/A	N/A	N/A	0 (10)	A (A)	0 (13)	A (B)
4) Woodward Ave./Street B (east project driveway)	SSSC	N/A	N/A	N/A	N/A	1 (13)	A (B)	0 (17)	A (C)

NOTES: LOS = LEVEL OF SERVICE, AWSC = ALL-WAY STOP CONTROL; SSSC = SIDE-STREET STOP CONTROL

[1] UNDER CUMULATIVE CONDITIONS, INTERSECTION CONTROL FOR INTERSECTIONS 1 AND 2 IS A TRAFFIC SIGNAL.

[2] FOR SIGNALIZED INTERSECTIONS AND ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES. FOR SIDE-STREET STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION AND (WORST-CASE MOVEMENT) DELAY IN SECONDS PER VEHICLE IS REPORTED.

SOURCE: FEHR & PEERS, 2019.

At the Woodward Avenue/Street A (west project driveway) side street stop controlled intersection, the southbound right-turn movement will continue to operate at acceptable LOS A conditions during the AM peak hour and the PM peak hour. At the Woodward Avenue/Street B (east project driveway) street stop controlled intersection, the southbound left-turn movement will operate at acceptable LOS A during the AM peak hour and the PM peak hour

Signal Warrant and Queuing Analysis

A signal warrant analysis (for peak hour conditions), consistent with the methodologies in the *California MUTCD 2014 Edition*, and queuing analysis were performed for the Woodward Avenue/Street B intersection under Cumulative Plus Project conditions. The intersection does not satisfy the warrant for installation of a traffic signal.

A queuing analysis was completed to determine the maximum queue for the westbound left-turn ingress turning movement. Results of the analysis estimate a maximum queue of approximately 75 feet (3 vehicles). Approximately 185 feet of deceleration and storage would be provided between Street B and the beginning of the raised median located to the east of project. Thus, no queuing problems are expected at this location.

Policy Consistency Analysis

The Manteca General Plan was adopted by the City in 2003 and amended most recently in 2016. The following 2011 General Plan Circulation Element goals and policies are relevant to circulation in Manteca.

Goals:

- Goal C-1. Provide for a circulation system that allows for the efficient movement of people, goods, and services within and through Manteca while minimizing public costs to build and maintain the system.
- Goal C-2. Provide complete streets designed to serve a broad spectrum of travel modes, including automobiles, public transit, walking, and bicycling.
- Goal C-3. Develop attractive streetscapes that include landscaping, street trees, planted berms, and landscaped medians.
- Goal C-4. Support the development of a Downtown area that is highly accessible to all modes of travel, focusing primarily on pedestrians, bicyclists, and transit riders.
- Goal C-5. Balance the level of service for all modes so that residents and visitors have a variety of transportation choices.
- Goal C-6. Maintain a safe transportation system for all modes.
- Goal C-7. Accommodate truck and freight movements by developing city-wide truck routes and encouraging the development of freight and warehousing centers near existing rail lines and spurs.
- Goal C-8. Establish reasonable parking requirements (minimum and maximum rates for uses) that limit parking encroachment while minimizing the amount of land consumed by parking lots.
- Goal C-9. Provide a safe, secure, and convenient bicycle route system that connects to retail, employment centers, public facilities, and parks.
- Goal C-10. Provide for safe and convenient pedestrian circulation.
- Goal C-11. Maintain a coordinated, efficient bus service that provides both an effective alternative to automobile use and serves members of the community that cannot drive.
- Goal C-12. Support and encourage regional transit connections that link Manteca to other cities.

Policies:

The policies in the Circulation Element are organized by topic. Policies for each topic most relevant to this project are summarized below.

- Level of Service: Policies C-P-1 through CP-3 promote balanced levels of service (LOS) across all modes and vehicular LOS of D or better, except in downtown and certain other locations where other goals predominate.
- Street System: Policies C-P-8 through C-P-11 and C-P-17 promote access and connectivity for all modes. Policy C-P-12 promotes use of roundabouts.
- Transportation Safety: Policies C-P-20 through C-P-22 promote hazard reduction, maintenance of sight distances, and development of landscape separated sidewalks, respectively.
- Parking: Policy C-P-23 notes that future growth in traffic volumes may require removal of on-street parking.
- Bikeways and Pedestrian Facilities: Policies C-P-29 through C-P-40 promote development of safe and complete bicycle and pedestrian networks across the city.
- Public Transportation: Policies C-P-41 through C-P-43 promote interregional bus and rail connections. Policy C-P-44 promotes intermodal connectivity. Policy C-P-45 and C-P-46 promote ridesharing. Policy C-P-48 promotes inclusion of transit on future roadways.

- Goods Movement: Policies C-P-50 and C-P-52 promote truck access where appropriate. Policy C-P-51 promotes rail access within the City.
- Transportation Demand Management: Policies C-P-53 through C-P-56 support programs which encourage alternatives to reduce the number and length of automobile trips.

The proposed project does not conflict with any of the above listed General Plan Circulation Element policies and goals. The proposed project would not generate a significant increase in traffic in the area and would not decrease LOS to unacceptable levels. In addition, the proposed project would not change the design of any existing pedestrian or bicycle facilities or create any new safety problems in the area. The proposed project will add a small amount of both pedestrians and bicyclists who will utilize existing, planned, and proposed facilities connecting the project site with the community at large. The internal pedestrian circulation system will be designed to the City's standard for pedestrian sidewalks.

The proposed project would not interfere with any existing bus routes and would not remove or relocate any existing bus stops. Based on the size of the project, the project would be expected to generate increased transit ridership to Manteca Transit Route 2 (northbound / westbound) and Transit Route 3 (southbound / eastbound) on Atherton Drive. The proposed project would not conflict with any transit plans or goals of the City of Manteca.

Conclusion

Under Existing Plus Project Conditions, all four unsignalized study intersection would continue to operate at acceptable LOS C or better under AM and PM peak hour conditions. The queuing analysis for Existing Plus Project conditions indicate that no queuing problems are expected at the westbound left-turn ingress turning movement from Woodward Avenue as a result of increased traffic volumes on westbound Woodward Avenue.

Under Cumulative Plus Project Conditions, the addition of vehicle traffic generated by the proposed project would result in only a minor change in average vehicle delay. During the morning peak hour, the Airport Way/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions. During the evening peak hour, the Airport Way/Woodward Avenue signalized intersection will continue to operate at acceptable LOS D conditions. During both morning and evening peak hours, the Union Road/Woodward Avenue signalized intersection will continue to operate at acceptable LOS C conditions.

Under Cumulative Plus Project Conditions, at the Woodward Avenue/Street A (west project driveway) side street stop controlled intersection, the southbound right-turn movement will continue to operate at acceptable LOS A conditions during the AM peak hour and the PM peak hour. At the Woodward Avenue/Street B (east project driveway) street stop controlled intersection, the southbound left-turn movement will operate at acceptable LOS A during the AM peak hour and the PM peak hour.

The signal warrant analysis for Cumulative Plus Project Conditions indicate that the intersection of Woodward Avenue/Street B does not meet peak hour signal warrants for either AM and PM peak hour conditions as a result of increased traffic volumes on eastbound / westbound Woodward Avenue. The applicant would be required to pay the City's PFIP fees in order to develop the project site. Impacts would be considered ***less than significant*** with mitigation incorporated.

Mitigation Measure(s)

Mitigation Measure TRANS-1: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Airport Way/Woodward Avenue intersection. The improvements include:*

- *Signalize the Airport Way/Woodward Avenue intersection; and*
- *Retiming and optimizing the intersection.*

Mitigation Measure TRANS-2: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Union Road/Woodward Avenue intersection. The improvements include:*

- *Signalize the Union Road / Woodward Avenue intersection; and*
- *Retiming and optimizing the intersection.*

Responses c): No site circulation or access issues have been identified that would cause a traffic safety problem/hazard or any unusual traffic congestion or delay. The volumes on the internal roadways and drive aisles would be relatively low such that no significant conflicts would be expected with through traffic on Woodward Avenue.

Although not an LOS impact, some motorists heading westbound on Woodward Avenue may opt to exit the development from Street A and make a u-turn after the median break. To discourage this behavior, installation of a "No-U-Turn" sign is recommended at the median break." With implementation of the following mitigation measure, the proposed project would have a ***less than significant*** impact related to tribal cultural resources.

Mitigation Measure(s)

Mitigation Measure TRANS-3: *A "No U-turn" sign shall be installed at the median break on Woodward Avenue fronting "Street A" on the project site. This sign shall be installed per city of Manteca standard specifications and shall be visible to all westbound incoming motorists. This measure shall be shown on the project improvements plans.*

Responses d): All emergency vehicles arriving to and from the proposed project would be able to enter via Woodward Avenue. All accesses would be designed to City standards that accommodate turning requirements for fire trucks. These multiple entry/exit points provide flexibility for emergency vehicles to access or evacuate from multiple directions during an emergency.

At the proposed project entrance on Woodward Avenue, there are no safety, capacity, or sight distance issues identified with providing either an eastbound left-turn or westbound right-turn movement entering the project site. Therefore, impacts associated with design features and emergency access would be considered ***less than significant***.

XVIII. TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Would the project 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)?		X		
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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resources to a California Native American tribe.		X		

Responses to Checklist Questions

Responses a), b): A record search was conducted for the project site and surrounding area through the CCIC of the California Historical Resources Information System on May 30, 2019 (CCIC file No.: 11090L). The record search indicates that: the project site does not contain any recorded prehistoric or historic archaeological resources or historic buildings. Based on the above information, the project site has a low to moderate potential for the discovery of prehistoric, ethnohistoric, or historic archaeological sites that may meet the definition of TCRs. Although no TCRs have been documented in the project site, the project is located in a region where significant cultural resources have been recorded and there remains a potential that undocumented archaeological resources that may meet the TCR definition could be unearthed or otherwise discovered during ground-disturbing and construction activities. Examples of significant archaeological discoveries that may meet the TCR definition would include villages and cemeteries. Due to the possible presence of undocumented TCRs within the project site, construction-related impacts on tribal cultural resources would be potentially significant. With implementation of the following mitigation measure, the proposed project would have a ***less than significant*** impact related to tribal cultural resources.

Mitigation Measure(s)

Mitigation Measure TRIBAL-1: *If cultural resources are discovered during project-related construction activities, all ground disturbances within a minimum of 50 feet of the find shall be halted until a qualified professional archaeologist can evaluate the discovery. The archaeologist shall examine the resources, assess their significance, and recommend appropriate procedures to the lead agency to either further investigate or mitigate adverse impacts. If the find is determined by the lead agency in consultation with the Native American tribe traditionally and culturally affiliated with the geographic area of the project site to be a tribal cultural resource and the discovered archaeological resource cannot be avoided, then applicable mitigation measures for the resource shall be discussed with the geographically affiliated tribe. Applicable mitigation measures that also take into account the cultural values and meaning of the discovered tribal cultural resource, including confidentiality if requested by the tribe, shall be completed (e.g., preservation in*

place, data recovery program pursuant to PRC §21083.2[i]). During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project site.

XIX. UTILITIES AND SERVICE SYSTEMS

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Require or result in the relocation or construction of new or expanded water, wastewater or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the projects projected demand in addition to the providers existing commitments?			X	
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?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			X	

Responses to Checklist Questions

Responses a)-c):

Water

It is anticipated that water supply for the proposed project would be local groundwater and treated surface water from SSJID's SCWSP. Water distribution will be by an underground distribution system to be installed as per the City of Manteca standards and specifications. The applicant for the proposed project will provide their proportionate share of required funding to the City for the acquisition and delivery of treated potable water supplies to the proposed project site through connection fees.

The City has adequate water supplies to support existing demand in the City in addition to the proposed project under average daily and maximum daily demand conditions. According to the City's 2015 Urban Water Management Plan (UWMP), water demand for current and proposed uses in the City of Manteca is 21,894 acre-feet per year (AFY). The City has a projected total supply of 26,428 AFY in the year 2020, leaving 4,534 AFY available. The City's 2015 UWMP Planning Area corresponds with the City SOI established in the City's 2023 General Plan. The City's 2015 UWMP included existing and projected water demands for existing and projected future land uses to be developed within the City's Sphere of Influence through 2030. The water demand projections in the City's 2015 UWMP included existing City water demands, future water demands for developments within the existing City limit, and future water demands for future service areas outside the existing City limit.

The City's 2023 General Plan designates the project area as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 105 units and an associated population of 334 persons within the project area. The analysis included in the City's UWMP assumed that the site would be developed with LDR uses. The project would not increase demand beyond the levels assumed for the site in the City's UWMP.

The proposed project would not result in insufficient water supplies available to serve the project from existing entitlements and resources. Therefore, a ***less than significant*** impact would occur related to water supply and water infrastructure.

Wastewater

The City of Manteca owns and operates a wastewater collection, treatment, and disposal system, and provides sanitary sewerage service to the City of Manteca and a portion of the City of Lathrop. On April 17, 2015, the RWQCB adopted Waste Discharge Requirements Order No. R5-2015-0026 NPDES NO. CA0081558, prescribing waste discharge requirements for the City of Manteca Wastewater Quality Control Facility (WQCF) and allowing expansion of the plant up to 17.5 mgd.

The City's Wastewater Quality Control Facility Master Plan Update includes projected wastewater generation factors for various land uses. Based on these calculations it was determined that the City will have flows totaling 19.5 mgd as of the General Plan horizon of 2023 with a buildout capacity of 23.0 mgd. The study includes a reduction of industrial and general commercial wastewater generation factors to reflect historical water use data from local businesses.

According to the City's 2012 Wastewater Collection System Master Plan Update, Low Density Residential uses (2.1 to 8 units per acre) are estimated to generated 1,338 gallons per acre per day. The project site includes approximately 13.08 acres of Low Density Residential. Using this rate, the proposed Low Density Residential uses would generate approximately 17,501 gallons per day (gpd) of wastewater. The proposed project would increase the amount of wastewater requiring treatment. The wastewater would be treated at the WQCF. Occupancy of the proposed project would be prohibited without sewer allocation.

The City's available capacity would ensure that there would not be a determination by the wastewater treatment and/or collection provider that there is inadequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments. Additionally, any planned expansion to the WQCF with a subsequent allocation of capacity to the proposed project would ensure that there would not be a determination by the wastewater treatment and/or collection provider that there is inadequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments.

As noted above, the City's 2023 General Plan designates the project area as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 105 units and an associated population of 334 persons within the project area.

Because the project applicant would pay City PFIP fees to develop the site, and adequate long-term wastewater treatment capacity is available to serve full build-out of the project, a ***less than significant*** impact would occur related to requiring or resulting in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Responses d), e): The City of Manteca Solid Waste Division (SWD) provides solid waste hauling service for the City of Manteca and would serve the proposed project. Solid waste from Manteca is primarily landfilled at the Forward Sanitary Landfill, located northeast of Manteca. Other landfills used include Foothill Sanitary and North County.

The permitted maximum disposal at the Forward Landfill is 8,668 tons per day. The total permitted capacity of the landfill is 51.04 million cubic yards, which is expected to accommodate an operational life until January 1, 2020. The remaining capacity is 23,700,000 cubic yards. Solid waste generated by the proposed project was estimated based on CalRecycle generation rate estimates by use.

The residential uses are estimated to generate roughly 10 pounds per day per household. It is estimated that the proposed 60 residential units would generate 600 pounds (0.3 tons) of solid waste per day.

The Forward Landfill is projected to close in the year 2020. At that time the City can utilize the Foothill Landfill as a location for solid waste disposal. The City's solid waste per capita generation has decreased since 2007 due to the waste diversion efforts of the City. The permitted maximum disposal at the Forward Landfill is 8,668 tons per day. Currently, the average daily disposal is 620 tons per day. The total permitted capacity of the landfill is 51.04 million cubic yards. The addition of solid waste associated with the proposed project, approximately 0.3 tons per day at total buildout, to the Forward Landfill would not exceed the landfill's remaining capacity. The City will need to secure a new location of disposal of all solid waste generated in the City when the Forward landfill is ultimately closed. There are several options that the City will have to consider for solid waste disposal at that time which is estimated to be 2020. Because the project would increase the local waste stream, each single-family dwelling would be subject to the City's monthly rate or charge for the city's waste collection system as outlined in the City's Municipal Code.

Development of the site for LDR uses, which allows for up to 8 units per acre of residential, was assumed in the City's General Plan EIR. The project would not interfere with regulations related to solid waste, or generate waste in excess of the capacity of local infrastructure. Therefore, the proposed project would have a ***less than significant*** impact relative to this topic.

XX. WILDFIRE

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
d) 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?			X	
c) 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?			X	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			X	

Existing Setting

There are no State Responsibility Areas (SRAs) within the vicinity of the Manteca Planning Area. The City of Manteca is not categorized as a "Very High" Fire Hazard Severity Zone (FHSZ) by CalFire. No cities or communities within San Joaquin County are categorized as a "Very High" FHSZ by CalFire. Although this CEQA topic only applies to areas within a SRA or Very High FHSZ, out of an abundance of caution, these checklist questions are analyzed below.

Responses to Checklist Questions

Response a) The project site will connect to an existing network of City streets. The proposed circulation improvements would allow for greater emergency access relative to existing conditions. The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response b) The risk of wildfire is related to a variety of parameters, including fuel loading (vegetation), fire weather (winds, temperatures, humidity levels and fuel moisture contents) and topography (degree of slope). Steep slopes contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. Fuels such as grass are highly flammable because they have a high surface area to mass ratio and require less heat to reach the ignition point. The project site is located in an area that is predominately agricultural and urban, which is not considered at a significant risk of wildlife. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response c) The project includes development of infrastructure (water, sewer, and storm drainage) required to support the proposed multi-family use. The project site is surrounded by existing and future urban development. The project would not impair implementation of or

physically interfere with an adopted emergency response plan or emergency evacuation plan. The project would not require the installation or maintenance of infrastructure that may exacerbate fire risk. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response d) The proposed project would require the installation of storm drainage infrastructure to ensure that storm waters properly drain from the project site and does not result in downstream flooding or major drainage changes. Storm drainage would be conveyed to an on-site storm drain basin and storm drainage metering station which will discharge to the City's storm drainage system. The project proposes to include a drainage basin in the southwestern corner of the site. The basin will have 0.96 ac-ft of storage potential. Various storm drainage supporting structures, inlets, outlets, and drainage swales will be located throughout the project site directing the direction of flow into the drainage basin.

Runoff from the project site currently flows to the existing City storm drains located in Woodward Avenue. Upon development of the site, stormwater would flow to the on-site retention basin and/or the existing storm drains in the adjacent roadways. Additionally, the project site is located within FEMA Zone X (Levee), indicating that the site is located in an area protected by levees from the 100-year flood hazard zone. Further, because the site is essentially flat and located in an existing urbanized and agricultural area of the City, downstream landslides would not occur.

Landslides include rockfalls, deep slope failure, and shallow slope failure. Factors such as the geological conditions, drainage, slope, vegetation, and others directly affect the potential for landslides. One of the most common causes of landslides is construction activity that is associated with road building (i.e. cut and fill). The project site is relatively flat; therefore, the potential for a landslide in the project site is essentially non-existent.

Overall, impacts from project implementation would be considered ***less than significant*** relative to this topic.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

Responses to Checklist Questions

Response a): This Initial Study includes an analysis of the project impacts associated with aesthetics, agricultural and forest resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation and traffic, and utilities and service systems. The analysis covers a broad spectrum of topics relative to the potential for the proposed project to have environmental impacts. This includes the potential for the proposed project to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. It was found that the proposed project would have either no impact, a less than significant impact, or a less than significant impact with the implementation of mitigation measures. For the reasons presented throughout this Initial Study, the proposed project would not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. With the implementation of mitigation measures presented in this Initial Study, the proposed project would have a ***less than significant*** impact relative to this topic.

Response b): This Initial Study includes an analysis of the project impacts associated with aesthetics, agricultural and forest resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and

water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation/traffic, and utilities and service systems. The analysis covers a broad spectrum of topics relative to the potential for the proposed project to have environmental impacts. It was found that the proposed project would have either no impact, a less than significant impact, or a less than significant impact with the implementation of mitigation measures. These mitigation measures would also function to reduce the project's contribution to cumulative impacts.

The project would increase the population and use of public services and systems; however, it was found that there is adequate capacity to accommodate the project.

There are no significant cumulative or cumulatively considerable effects that are identified associated with the proposed project after the implementation of all mitigation measures presented in this Initial Study. With the implementation of all mitigation measures presented in this Initial Study, the proposed project would have a ***less than significant*** impact relative to this topic.

Response c): The construction phase could affect surrounding neighbors through increased air emissions, noise, and traffic; however, the construction effects are temporary and are not substantial. The operational phase could also affect surrounding neighbors through increased air emissions, noise, and traffic; however, mitigation measures have been incorporated into the proposed project that would reduce the impacts to a less than significant level. The proposed project would not cause substantial adverse effects on human beings. Implementation of the proposed project would have a ***less than significant*** impact relative to this topic.

REFERENCES

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Appendix A

Greenhouse Gas and Energy Modeling Outputs

Wackerly Annexation IS/MND

San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	60.00	Dwelling Unit	13.08	569,764.80	191

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	51
Climate Zone	2			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See appendix A assumptions

Land Use - Lot size is 13.08 acres

Demolition -

Vehicle Trips - Trip rates are based on the Trip Generation Manual10th Edition (Institute off Transportation Engineers, 2017).
Source: Fehr & Peers, 2019

Woodstoves -

Energy Use -

Land Use Change -

Sequestration -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	108,000.00	569,764.80
tblLandUse	LotAcreage	19.48	13.08
tblLandUse	Population	190.00	191.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblVehicleTrips	WD_TR	9.52	9.44
tblWoodstoves	NumberCatalytic	13.08	0.00
tblWoodstoves	NumberNoncatalytic	13.08	0.00

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					
2020	0.2720	2.6368	2.0005	3.5900e-003	0.2400	0.1354	0.3754	0.1088	0.1263	0.2350	0.0000	312.9096	312.9096	0.0804	0.0000	314.9188
2021	5.5293	1.6498	1.6033	2.7800e-003	0.0194	0.0875	0.1069	5.2200e-003	0.0822	0.0874	0.0000	241.7914	241.7914	0.0542	0.0000	243.1456
Maximum	**5.5293**	**2.6368**	**2.0005**	**3.5900e-003**	**0.2400**	**0.1354**	**0.3754**	**0.1088**	**0.1263**	**0.2350**	**0.0000**	**312.9096**	**312.9096**	**0.0804**	**0.0000**	**314.9188**

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					
2020	0.2720	2.6368	2.0005	3.5900e-003	0.2400	0.1354	0.3754	0.1088	0.1263	0.2350	0.0000	312.9093	312.9093	0.0804	0.0000	314.9185
2021	5.5293	1.6498	1.6033	2.7800e-003	0.0194	0.0875	0.1069	5.2200e-003	0.0822	0.0874	0.0000	241.7911	241.7911	0.0542	0.0000	243.1453
Maximum	**5.5293**	**2.6368**	**2.0005**	**3.5900e-003**	**0.2400**	**0.1354**	**0.3754**	**0.1088**	**0.1263**	**0.2350**	**0.0000**	**312.9093**	**312.9093**	**0.0804**	**0.0000**	**314.9185**

	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**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-6-2020	7-5-2020	1.4672	1.4672
2	7-6-2020	10-5-2020	0.7289	0.7289
3	10-6-2020	1-5-2021	0.7259	0.7259
4	1-6-2021	4-5-2021	0.6474	0.6474
5	4-6-2021	7-5-2021	0.6542	0.6542
6	7-6-2021	9-30-2021	2.9645	2.9645
		Highest	2.9645	2.9645

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	2.7761	0.0276	0.4560	1.7000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923
Energy	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	149.3608	149.3608	8.2500e-003	2.9000e-003	150.4299
Mobile	0.1893	1.3342	2.1521	8.2700e-003	0.6137	7.3800e-003	0.6211	0.1645	6.9400e-003	0.1715	0.0000	762.3067	762.3067	0.0366	0.0000	763.2207
Waste						0.0000	0.0000		0.0000	0.0000	13.9577	0.0000	13.9577	0.8249	0.0000	34.5795
Water						0.0000	0.0000		0.0000	0.0000	1.2402	3.9172	5.1574	0.1278	3.0900e-003	9.2722
Total	**2.9738**	**1.4333**	**2.6385**	**8.9000e-003**	**0.6137**	**0.0174**	**0.6311**	**0.1645**	**0.0170**	**0.1815**	**15.1979**	**942.3049**	**957.5027**	**0.9987**	**6.4700e-003**	**984.3945**

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	2.7761	0.0276	0.4560	1.7000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923
Energy	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	149.3608	149.3608	8.2500e-003	2.9000e-003	150.4299
Mobile	0.1843	1.2867	2.0393	7.7600e-003	0.5713	6.9300e-003	0.5783	0.1532	6.5200e-003	0.1597	0.0000	715.1615	715.1615	0.0353	0.0000	716.0429
Waste						0.0000	0.0000		0.0000	0.0000	13.9577	0.0000	13.9577	0.8249	0.0000	34.5795
Water						0.0000	0.0000		0.0000	0.0000	0.9922	3.2914	4.2836	0.1022	2.4700e-003	7.5768
Total	**2.9688**	**1.3857**	**2.5257**	**8.3900e-003**	**0.5713**	**0.0170**	**0.5883**	**0.1532**	**0.0166**	**0.1698**	**14.9498**	**894.5340**	**909.4838**	**0.9718**	**5.8500e-003**	**935.5214**

	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	**0.17**	**3.32**	**4.28**	**5.73**	**6.90**	**2.58**	**6.78**	**6.90**	**2.47**	**6.49**	**1.63**	**5.07**	**5.02**	**2.69**	**9.58**	**4.96**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-81.0960
Total	**-81.0960**

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	4/6/2020	5/1/2020	5	20	
2	Site Preparation	Site Preparation	5/2/2020	5/15/2020	5	10	
3	Grading	Grading	5/16/2020	6/26/2020	5	30	
4	Building Construction	Building Construction	6/27/2020	8/20/2021	5	300	
5	Paving	Paving	8/21/2021	9/17/2021	5	20	
6	Architectural Coating	Architectural Coating	9/18/2021	10/15/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 1,153,774; Residential Outdoor: 384,591; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

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	6	15.00	0.00	7.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	22.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

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					8.2000e-004	0.0000	8.2000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0331	0.3320	0.2175	3.9000e-004		0.0166	0.0166		0.0154	0.0154	0.0000	33.9986	33.9986	9.6000e-003	0.0000	34.2386
Total	**0.0331**	**0.3320**	**0.2175**	**3.9000e-004**	**8.2000e-004**	**0.0166**	**0.0174**	**1.2000e-004**	**0.0154**	**0.0155**	**0.0000**	**33.9986**	**33.9986**	**9.6000e-003**	**0.0000**	**34.2386**

3.2 Demolition - 2020

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	3.0000e-005	9.8000e-004	1.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2661	0.2661	1.0000e-005	0.0000	0.2664
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.3000e-004	4.2400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0596	1.0596	3.0000e-005	0.0000	1.0603
Total	**6.3000e-004**	**1.4100e-003**	**4.3900e-003**	**1.0000e-005**	**1.2500e-003**	**1.0000e-005**	**1.2600e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.3257**	**1.3257**	**4.0000e-005**	**0.0000**	**1.3267**

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					8.2000e-004	0.0000	8.2000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0331	0.3320	0.2175	3.9000e-004		0.0166	0.0166		0.0154	0.0154	0.0000	33.9986	33.9986	9.6000e-003	0.0000	34.2385
Total	**0.0331**	**0.3320**	**0.2175**	**3.9000e-004**	**8.2000e-004**	**0.0166**	**0.0174**	**1.2000e-004**	**0.0154**	**0.0155**	**0.0000**	**33.9986**	**33.9986**	**9.6000e-003**	**0.0000**	**34.2385**

3.2 Demolition - 2020

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	3.0000e-005	9.8000e-004	1.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2661	0.2661	1.0000e-005	0.0000	0.2664
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.3000e-004	4.2400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0596	1.0596	3.0000e-005	0.0000	1.0603
Total	**6.3000e-004**	**1.4100e-003**	**4.3900e-003**	**1.0000e-005**	**1.2500e-003**	**1.0000e-005**	**1.2600e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.3257**	**1.3257**	**4.0000e-005**	**0.0000**	**1.3267**

3.3 Site Preparation - 2020

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					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0204	0.2121	0.1076	1.9000e-004		0.0110	0.0110		0.0101	0.0101	0.0000	16.7153	16.7153	5.4100e-003	0.0000	16.8505
Total	**0.0204**	**0.2121**	**0.1076**	**1.9000e-004**	**0.0903**	**0.0110**	**0.1013**	**0.0497**	**0.0101**	**0.0598**	**0.0000**	**16.7153**	**16.7153**	**5.4100e-003**	**0.0000**	**16.8505**

3.3 Site Preparation - 2020

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.6000e-004	2.5400e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6358	0.6358	2.0000e-005	0.0000	0.6362
Total	**3.6000e-004**	**2.6000e-004**	**2.5400e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6358**	**0.6358**	**2.0000e-005**	**0.0000**	**0.6362**

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					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0204	0.2121	0.1076	1.9000e-004		0.0110	0.0110		0.0101	0.0101	0.0000	16.7153	16.7153	5.4100e-003	0.0000	16.8505
Total	**0.0204**	**0.2121**	**0.1076**	**1.9000e-004**	**0.0903**	**0.0110**	**0.1013**	**0.0497**	**0.0101**	**0.0598**	**0.0000**	**16.7153**	**16.7153**	**5.4100e-003**	**0.0000**	**16.8505**

3.3 Site Preparation - 2020

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	2.6000e-004	2.5400e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.6358	0.6358	2.0000e-005	0.0000	0.6362
Total	**3.6000e-004**	**2.6000e-004**	**2.5400e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6358**	**0.6358**	**2.0000e-005**	**0.0000**	**0.6362**

3.4 Grading - 2020

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					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0668	0.7530	0.4794	9.3000e-004		0.0326	0.0326		0.0300	0.0300	0.0000	81.7264	81.7264	0.0264	0.0000	82.3872
Total	**0.0668**	**0.7530**	**0.4794**	**9.3000e-004**	**0.1301**	**0.0326**	**0.1627**	**0.0540**	**0.0300**	**0.0840**	**0.0000**	**81.7264**	**81.7264**	**0.0264**	**0.0000**	**82.3872**

3.4 Grading - 2020

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-003	8.6000e-004	8.4800e-003	2.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	2.1192	2.1192	6.0000e-005	0.0000	2.1206
Total	**1.2000e-003**	**8.6000e-004**	**8.4800e-003**	**2.0000e-005**	**2.3900e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**2.1192**	**2.1192**	**6.0000e-005**	**0.0000**	**2.1206**

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					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0668	0.7530	0.4794	9.3000e-004		0.0326	0.0326		0.0300	0.0300	0.0000	81.7263	81.7263	0.0264	0.0000	82.3871
Total	**0.0668**	**0.7530**	**0.4794**	**9.3000e-004**	**0.1301**	**0.0326**	**0.1627**	**0.0540**	**0.0300**	**0.0840**	**0.0000**	**81.7263**	**81.7263**	**0.0264**	**0.0000**	**82.3871**

3.4 Grading - 2020

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-003	8.6000e-004	8.4800e-003	2.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	2.1192	2.1192	6.0000e-005	0.0000	2.1206
Total	**1.2000e-003**	**8.6000e-004**	**8.4800e-003**	**2.0000e-005**	**2.3900e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**2.1192**	**2.1192**	**6.0000e-005**	**0.0000**	**2.1206**

3.5 Building Construction - 2020

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	0.1420	1.2855	1.1289	1.8000e-003		0.0748	0.0748		0.0704	0.0704	0.0000	155.1787	155.1787	0.0379	0.0000	156.1251
Total	**0.1420**	**1.2855**	**1.1289**	**1.8000e-003**		**0.0748**	**0.0748**		**0.0704**	**0.0704**	**0.0000**	**155.1787**	**155.1787**	**0.0379**	**0.0000**	**156.1251**

3.5 Building Construction - 2020

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6300e-003	0.0475	0.0101	1.1000e-004	2.6600e-003	2.6000e-004	2.9200e-003	7.7000e-004	2.5000e-004	1.0200e-003	0.0000	10.7977	10.7977	6.7000e-004	0.0000	10.8145
Worker	5.8800e-003	4.2200e-003	0.0417	1.2000e-004	0.0117	8.0000e-005	0.0118	3.1200e-003	7.0000e-005	3.2000e-003	0.0000	10.4122	10.4122	2.9000e-004	0.0000	10.4194
Total	**7.5100e-003**	**0.0518**	**0.0518**	**2.3000e-004**	**0.0144**	**3.4000e-004**	**0.0147**	**3.8900e-003**	**3.2000e-004**	**4.2200e-003**	**0.0000**	**21.2099**	**21.2099**	**9.6000e-004**	**0.0000**	**21.2339**

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	0.1420	1.2855	1.1289	1.8000e-003		0.0748	0.0748		0.0704	0.0704	0.0000	155.1785	155.1785	0.0379	0.0000	156.1250
Total	**0.1420**	**1.2855**	**1.1289**	**1.8000e-003**		**0.0748**	**0.0748**		**0.0704**	**0.0704**	**0.0000**	**155.1785**	**155.1785**	**0.0379**	**0.0000**	**156.1250**

3.5 Building Construction - 2020

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6300e-003	0.0475	0.0101	1.1000e-004	2.6600e-003	2.6000e-004	2.9200e-003	7.7000e-004	2.5000e-004	1.0200e-003	0.0000	10.7977	10.7977	6.7000e-004	0.0000	10.8145
Worker	5.8800e-003	4.2200e-003	0.0417	1.2000e-004	0.0117	8.0000e-005	0.0118	3.1200e-003	7.0000e-005	3.2000e-003	0.0000	10.4122	10.4122	2.9000e-004	0.0000	10.4194
Total	**7.5100e-003**	**0.0518**	**0.0518**	**2.3000e-004**	**0.0144**	**3.4000e-004**	**0.0147**	**3.8900e-003**	**3.2000e-004**	**4.2200e-003**	**0.0000**	**21.2099**	**21.2099**	**9.6000e-004**	**0.0000**	**21.2339**

3.5 Building Construction - 2021

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	0.1578	1.4469	1.3757	2.2300e-003		0.0796	0.0796		0.0748	0.0748	0.0000	192.2589	192.2589	0.0464	0.0000	193.4185
Total	**0.1578**	**1.4469**	**1.3757**	**2.2300e-003**		**0.0796**	**0.0796**		**0.0748**	**0.0748**	**0.0000**	**192.2589**	**192.2589**	**0.0464**	**0.0000**	**193.4185**

3.5 Building Construction - 2021

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6500e-003	0.0533	0.0110	1.4000e-004	3.2900e-003	1.5000e-004	3.4400e-003	9.5000e-004	1.5000e-004	1.1000e-003	0.0000	13.2519	13.2519	7.8000e-004	0.0000	13.2715
Worker	6.7300e-003	4.6600e-003	0.0470	1.4000e-004	0.0145	1.0000e-004	0.0146	3.8700e-003	9.0000e-005	3.9500e-003	0.0000	12.4123	12.4123	3.2000e-004	0.0000	12.4202
Total	**8.3800e-003**	**0.0580**	**0.0580**	**2.8000e-004**	**0.0178**	**2.5000e-004**	**0.0181**	**4.8200e-003**	**2.4000e-004**	**5.0500e-003**	**0.0000**	**25.6642**	**25.6642**	**1.1000e-003**	**0.0000**	**25.6917**

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	0.1578	1.4469	1.3757	2.2300e-003		0.0796	0.0796		0.0748	0.0748	0.0000	192.2587	192.2587	0.0464	0.0000	193.4183
Total	**0.1578**	**1.4469**	**1.3757**	**2.2300e-003**		**0.0796**	**0.0796**		**0.0748**	**0.0748**	**0.0000**	**192.2587**	**192.2587**	**0.0464**	**0.0000**	**193.4183**

3.5 Building Construction - 2021

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6500e-003	0.0533	0.0110	1.4000e-004	3.2900e-003	1.5000e-004	3.4400e-003	9.5000e-004	1.5000e-004	1.1000e-003	0.0000	13.2519	13.2519	7.8000e-004	0.0000	13.2715
Worker	6.7300e-003	4.6600e-003	0.0470	1.4000e-004	0.0145	1.0000e-004	0.0146	3.8700e-003	9.0000e-005	3.9500e-003	0.0000	12.4123	12.4123	3.2000e-004	0.0000	12.4202
Total	**8.3800e-003**	**0.0580**	**0.0580**	**2.8000e-004**	**0.0178**	**2.5000e-004**	**0.0181**	**4.8200e-003**	**2.4000e-004**	**5.0500e-003**	**0.0000**	**25.6642**	**25.6642**	**1.1000e-003**	**0.0000**	**25.6917**

3.6 Paving - 2021

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	0.0126	0.1292	0.1465	2.3000e-004		6.7800e-003	6.7800e-003		6.2400e-003	6.2400e-003	0.0000	20.0235	20.0235	6.4800e-003	0.0000	20.1854
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0126**	**0.1292**	**0.1465**	**2.3000e-004**		**6.7800e-003**	**6.7800e-003**		**6.2400e-003**	**6.2400e-003**	**0.0000**	**20.0235**	**20.0235**	**6.4800e-003**	**0.0000**	**20.1854**

3.6 Paving - 2021

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.8000e-004	3.8600e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0196	1.0196	3.0000e-005	0.0000	1.0203
Total	**5.5000e-004**	**3.8000e-004**	**3.8600e-003**	**1.0000e-005**	**1.1900e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0196**	**1.0196**	**3.0000e-005**	**0.0000**	**1.0203**

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	0.0126	0.1292	0.1465	2.3000e-004		6.7800e-003	6.7800e-003		6.2400e-003	6.2400e-003	0.0000	20.0235	20.0235	6.4800e-003	0.0000	20.1854
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0126**	**0.1292**	**0.1465**	**2.3000e-004**		**6.7800e-003**	**6.7800e-003**		**6.2400e-003**	**6.2400e-003**	**0.0000**	**20.0235**	**20.0235**	**6.4800e-003**	**0.0000**	**20.1854**

3.6 Paving - 2021

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.8000e-004	3.8600e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0196	1.0196	3.0000e-005	0.0000	1.0203
Total	**5.5000e-004**	**3.8000e-004**	**3.8600e-003**	**1.0000e-005**	**1.1900e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0196**	**1.0196**	**3.0000e-005**	**0.0000**	**1.0203**

3.7 Architectural Coating - 2021

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					
Archit. Coating	5.3477					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1900e-003	0.0153	0.0182	3.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	2.5533	2.5533	1.8000e-004	0.0000	2.5576
Total	**5.3499**	**0.0153**	**0.0182**	**3.0000e-005**		**9.4000e-004**	**9.4000e-004**		**9.4000e-004**	**9.4000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.8000e-004**	**0.0000**	**2.5576**

3.7 Architectural Coating - 2021

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	1.0000e-004	1.0300e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2719	0.2719	1.0000e-005	0.0000	0.2721
Total	**1.5000e-004**	**1.0000e-004**	**1.0300e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2719**	**0.2719**	**1.0000e-005**	**0.0000**	**0.2721**

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					
Archit. Coating	5.3477					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1900e-003	0.0153	0.0182	3.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	2.5533	2.5533	1.8000e-004	0.0000	2.5576
Total	**5.3499**	**0.0153**	**0.0182**	**3.0000e-005**		**9.4000e-004**	**9.4000e-004**		**9.4000e-004**	**9.4000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.8000e-004**	**0.0000**	**2.5576**

3.7 Architectural Coating - 2021

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	1.0000e-004	1.0300e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2719	0.2719	1.0000e-005	0.0000	0.2721
Total	**1.5000e-004**	**1.0000e-004**	**1.0300e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2719**	**0.2719**	**1.0000e-005**	**0.0000**	**0.2721**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	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	0.1843	1.2867	2.0393	7.7600e-003	0.5713	6.9300e-003	0.5783	0.1532	6.5200e-003	0.1597	0.0000	715.1615	715.1615	0.0353	0.0000	716.0429
Unmitigated	0.1893	1.3342	2.1521	8.2700e-003	0.6137	7.3800e-003	0.6211	0.1645	6.9400e-003	0.1715	0.0000	762.3067	762.3067	0.0366	0.0000	763.2207

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	566.40	594.60	517.20	1,632,630	1,519,978
Total	566.40	594.60	517.20	1,632,630	1,519,978

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
Single Family Housing	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871

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	0.0000	66.6426	66.6426	6.6600e-003	1.3800e-003	67.2201
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	66.6426	66.6426	6.6600e-003	1.3800e-003	67.2201
NaturalGas Mitigated	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	82.7183	82.7183	1.5900e-003	1.5200e-003	83.2098
NaturalGas Unmitigated	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	82.7183	82.7183	1.5900e-003	1.5200e-003	83.2098

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					
Single Family Housing	1.55008e+006	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	82.7183	82.7183	1.5900e-003	1.5200e-003	83.2098
Total		**8.3600e-003**	**0.0714**	**0.0304**	**4.6000e-004**		**5.7700e-003**	**5.7700e-003**		**5.7700e-003**	**5.7700e-003**	**0.0000**	**82.7183**	**82.7183**	**1.5900e-003**	**1.5200e-003**	**83.2098**

5.2 Energy by Land Use - NaturalGas

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					
Single Family Housing	1.55008e+006	8.3600e-003	0.0714	0.0304	4.6000e-004		5.7700e-003	5.7700e-003		5.7700e-003	5.7700e-003	0.0000	82.7183	82.7183	1.5900e-003	1.5200e-003	83.2098
Total		**8.3600e-003**	**0.0714**	**0.0304**	**4.6000e-004**		**5.7700e-003**	**5.7700e-003**		**5.7700e-003**	**5.7700e-003**	**0.0000**	**82.7183**	**82.7183**	**1.5900e-003**	**1.5200e-003**	**83.2098**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	506627	66.6426	6.6600e-003	1.3800e-003	67.2201
Total		**66.6426**	**6.6600e-003**	**1.3800e-003**	**67.2201**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	506627	66.6426	6.6600e-003	1.3800e-003	67.2201
Total		**66.6426**	**6.6600e-003**	**1.3800e-003**	**67.2201**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	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	2.7761	0.0276	0.4560	1.7000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923
Unmitigated	2.7761	0.0276	0.4560	1.7000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	26.7202	26.7202	1.2000e-003	4.8000e-004	26.8923

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	0.5348					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2252					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.6300e-003	0.0224	9.5500e-003	1.4000e-004		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	25.9924	25.9924	5.0000e-004	4.8000e-004	26.1469
Landscaping	0.0135	5.1500e-003	0.4465	2.0000e-005		2.4600e-003	2.4600e-003		2.4600e-003	2.4600e-003	0.0000	0.7277	0.7277	7.1000e-004	0.0000	0.7454
Total	**2.7762**	**0.0276**	**0.4560**	**1.6000e-004**		**4.2700e-003**	**4.2700e-003**		**4.2700e-003**	**4.2700e-003**	**0.0000**	**26.7202**	**26.7202**	**1.2100e-003**	**4.8000e-004**	**26.8923**

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	0.5348					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2252					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.6300e-003	0.0224	9.5500e-003	1.4000e-004		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	25.9924	25.9924	5.0000e-004	4.8000e-004	26.1469
Landscaping	0.0135	5.1500e-003	0.4465	2.0000e-005		2.4600e-003	2.4600e-003		2.4600e-003	2.4600e-003	0.0000	0.7277	0.7277	7.1000e-004	0.0000	0.7454
Total	**2.7762**	**0.0276**	**0.4560**	**1.6000e-004**		**4.2700e-003**	**4.2700e-003**		**4.2700e-003**	**4.2700e-003**	**0.0000**	**26.7202**	**26.7202**	**1.2100e-003**	**4.8000e-004**	**26.8923**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	4.2836	0.1022	2.4700e-003	7.5768
Unmitigated	5.1574	0.1278	3.0900e-003	9.2722

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	3.90924 / 2.46452	5.1574	0.1278	3.0900e-003	9.2722
Total		**5.1574**	**0.1278**	**3.0900e-003**	**9.2722**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	3.12739 / 2.31419	4.2836	0.1022	2.4700e-003	7.5768
Total		**4.2836**	**0.1022**	**2.4700e-003**	**7.5768**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	13.9577	0.8249	0.0000	34.5795
Unmitigated	13.9577	0.8249	0.0000	34.5795

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	68.76	13.9577	0.8249	0.0000	34.5795
Total		**13.9577**	**0.8249**	**0.0000**	**34.5795**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	68.76	13.9577	0.8249	0.0000	34.5795
Total		**13.9577**	**0.8249**	**0.0000**	**34.5795**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-81.0960	0.0000	0.0000	-81.0960

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Cropland	13.08 / 0	-81.0960	0.0000	0.0000	-81.0960
Total		**-81.0960**	**0.0000**	**0.0000**	**-81.0960**

Off-road Mobile (Construction) Energy Usage

Note: For the sake of simplicity, and as a conservative estimation, it was assumed that all off-road vehicles use diesel fuel as an energy source.
Demolition, site preparation, and grading energy were used as the basis of this calculation.

Given Factor:	133.48	**metric tons**	**CO2**	**(provided in CalEEMod Output File)**	
Conversion Factor:	2204.62	pounds	per metric ton		
Intermediate Result:	**294,265**	**pounds**	**CO2**		
Conversion Factor:	22.38	pounds	CO2 per 1 gallon of diesel fuel		(Source: U.S. EIA, 2016.
Final Result:	**13,148.55**	**gallons**	**diesel fuel**		Website: http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11)

On-road Mobile (Operational) Energy Usage

Note: For the sake of simplicity, it was assumed that passenger vehicles, light duty trucks, motorcycles, and mobile homes use gasoline, and all medium-duty trucks, heavy-duty trucks, and buses use diesel fuel.

Unmitigated:

Step 1: **Total Net Daily Trips (provided by Fehr & Peers)**

566

Res H-W	*Res H-S*	*Res H-O*
Trip Length (miles) (provided by CalEEMod)		
10.8	7.3	7.5
Trip %		
45.60%	19.00%	35.40%

Average Trip Length (weighted average)

9.0

Therefore:

Average Daily VMT:

5,075

Step 2: Given:

Fleet Mix (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
55.2%	3.6%	18.2%	12.5%	1.9%	0.5%	1.6%	5.5%	0.1%	0.1%	0.5%	0.1%	0.1%

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2	MDV	MCY	MH	OBUS
29.93009483	24.879991	22.223868	16.02637345	36.90467564	6.572330026	6.572733

Diesel MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LHD1	LHD2	MHD	HHD	UBUS	SBUS
17.32849472	15.764626	8.096859	5.528806	4.682830913	7.232482739

Therefore:

Weighted Average MPG Factors

Gasoline: **26.2** Diesel: **8.8**

Step 3: **Therefore:**

174 **daily gallons of gasoline** **57** **daily gallons of diesel**

or

63,624	**annual gallons of gasoline**	**20,863**	**annual gallons of diesel**

On-road Mobile (Construction) Energy Usage - Demolition

Step 1:

Total Daily Worker Trips (provided by CalEEMod)

15

Worker Trip Length (miles) (provided by CalEEMod)

10.8

Therefore:

Average Worker Daily VMT:

162

Total Hauling Trips (provided by CalEEMod)

7

Hauling Trip Length (miles) (provided by CalEEMod)

20

Total Hauler VMT:

140

Step 2:

Given:

Assumed Fleet Mix for Workers

LDA	LDT1	LDT2
0.3333333	0.333333	0.333333

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2
29.930095	24.87999	22.22387

Therefore:

Weighted Average Worker MPG Factor

25.7

Assumed Fleet Mix for Haulers (provided by CalEEMod v2016.3.2)

MHD	HHD
0.5	0.5

Diesel:

MHD	HHD
8.0968586	5.452029

Step 3:

Therefore:

6.3 Worker daily gallons of gasoline

Weighted Average Hauler (Diesel) MPG Factor

6.8

Step 4:

20 **# of Days (see CalEEMod)**

Result:

Therefore:

126 Total gallons of gasoline

Therefore:

21 Total gallons of diesel

On-road Mobile (Construction) Energy Usage - Site Preparation

Step 1: **Total Daily Worker Trips (provided by CalEEMod)**

18

Worker Trip Length (miles) (provided by CalEEMod)

10.8

Therefore:

Average Worker Daily VMT:

194

Step 2: Given:

Assumed Fleet Mix for Workers (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2
0.3333333	0.3333333	0.3333333

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2
29.930095	24.879991	22.223868

Therefore:

Weighted Average Worker MPG Factor

25.7

Step 3: Therefore:

7.6 **Worker daily gallons of gasoline**

Step 4: 10 **# of Days (see CalEEMod)**

Therefore:

Result: **76** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Grading

Step 1: **Total Daily Worker Trips (provided by CalEEMod)**

20

Worker Trip Length (miles) (provided by CalEEMod)

10.8

Therefore:

Average Worker Daily VMT:

216

Step 2: Given:

Assumed Fleet Mix for Workers (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2
0.3333333	0.3333333	0.3333333

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2
29.930095	24.879991	22.223868

Therefore:

Weighted Average Worker MPG Factor

25.7

Step 3: **Therefore:**

8.4 Worker daily gallons of gasoline

Step 4: 30 **# of Days (see CalEEMod)**

Therefore:

Result: **252** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Building Construction

Step 1:

Total Daily Worker Trips (provided by CalEEMod)	Total Daily Vendor Trips (provided by CalEEMod)	Total Daily Hauler Trips (provided by CalEEMod)
22	6	0

Worker Trip Length (miles) (provided by CalEEMod)	Vendor Trip Length (miles) (provided by CalEEMod)	Hauling Trip Length (miles) (provided by CalEEMod)
10.8	7.3	0

Therefore:

Average Worker Daily VMT:	Average Vendor Daily VMT:	Average Hauling Daily VMT:
237.60	44	-

Step 2:

Given:

Assumed Fleet Mix for Workers (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2
0.33333333	0.333333	0.333333

Assumed Fleet Mix for Vendors (provided by CalEEMod v2016.3.2)

MHD	HHD
0.5	0.5

And:

MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

Gasoline:			Diesel:	
LDA	LDT1	LDT2	MHD	HHD
29.9300948	24.87999	22.22387	8.096858558	5.452029

Therefore:

Weighted Average Worker (Gasoline) MPG Factor	Weighted Average Vendor (Diesel) MPG Factor	Weighted Average Hauling MPG Factor
25.7	6.8	0.0

Step 3:

Therefore:	Therefore:	Therefore:
9 Worker daily gallons of gasoline	6 Vendor daily gallons of diesel	0.0

Step 4:

300 # of Days (see CalEEMod)

Therefore:	Therefore:
2,776 Total gallons of gasoline	1,939.64 Total gallons of diesel

On-road Mobile (Construction) Energy Usage - Paving

Step 1: **Total Daily Worker Trips (provided by CalEEMod)**

15

Worker Trip Length (miles) (provided by CalEEMod)

10.8

Therefore:

Average Worker Daily VMT:

162

Step 2: Given:

Assumed Fleet Mix for Workers (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2
0.3333333	0.3333333	0.3333333

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2
29.930095	24.879991	22.223868

Therefore:

Weighted Average Worker MPG Factor

25.7

Step 3: **Therefore:**

6.3 Worker daily gallons of gasoline

Step 4: 20 **# of Days (see CalEEMod)**

Therefore:

Result: **126** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Architectural Coating

Step 1: **Total Daily Worker Trips (provided by CalEEMod)**

4

Worker Trip Length (miles) (provided by CalEEMod)

10.8

Therefore:

Average Worker Daily VMT:

43

Step 2: Given:

Assumed Fleet Mix for Workers (provided by CalEEMod v2016.3.2)

LDA	LDT1	LDT2
0.3333333	0.3333333	0.3333333

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2014) - Year 2020

LDA	LDT1	LDT2
29.930095	24.879991	22.223868

Therefore:

Weighted Average Worker MPG Factor

25.7

Step 3: **Therefore:**

1.7 **Worker daily gallons of gasoline**

Step 4: 20 **# of Days (see CalEEMod)**

Therefore:

Result: **34** **Total gallons of gasoline**

Appendix B

Cultural Study (Confidential)

Appendix C

Environmental Noise Analysis

Environmental Noise Assessment

Wackerly Subdivision

City of Manteca, California

June 8, 2019

Project # 190501

Prepared for:

De Novo Planning Group
1020 Suncast Lane, Suite 106
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Roseville, CA 95678

This section provides a general description of the existing noise sources in the project vicinity, a discussion of the regulatory setting, and identifies potential noise impacts associated with the proposed project. Project impacts are evaluated relative to applicable noise level criteria and to the existing ambient noise environment. Mitigation measures have been identified for significant noise-related impacts.

3.10.1 ENVIRONMENTAL SETTING

KEY TERMS

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given area consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response. A-weighted dB values are expressed as dBA.
Decibel or dB	Fundamental unit of sound, defined as ten times the logarithm of the ratio of the sound pressure squared over the reference pressure squared.
CNEL	Community noise equivalent level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic acoustic signal, expressed in cycles per second or Hertz.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50 percent of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
SEL	Sound exposure levels. A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.

FUNDAMENTALS OF ACOUSTICS

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dB) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dB is generally perceived as a doubling in loudness. For example, a 70-dB sound is half as loud as an 80-dB sound, and twice as loud as a 60-dB sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average,

it tends to disguise short-term variations in the noise environment. CNEL is similar to L_{dn}, but includes a +5-dB penalty for evening noise. T19able 3.10-1 lists several examples of the noise levels associated with common situations.

TABLE 3.10-1: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	*NOISE LEVEL (DB)*	*COMMON INDOOR ACTIVITIES*
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

SOURCE: CALTRANS, TECHNICAL NOISE SUPPLEMENT, TRAFFIC NOISE ANALYSIS PROTOCOL. SEPTEMBER 2013.

EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a 1 dB change cannot be perceived;
- 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 human response would be expected; and
- A 10-dB change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS

Existing and Surrounding Land Uses

North: An existing single-family residence is located across W. Woodward Avenue.

East: The Wildwood residential development borders the east side of the project site.

South: Farmland borders the southern boundary of the project site.

West: The Gurmat Parkash Sikh Gurdwara temple is located near the northwest corner of the project site. Farmland and a single-family residence are located southwest of the project site.

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the Project Vicinity, short-term and continuous (24-hour) noise level measurements were conducted on the Project site on May 7th – May 8th, 2019. The noise measurement locations are shown on Figure 3.10-1. The noise level measurement survey results are provided in Table 3.10-2. Appendix A of Appendix F shows the complete results of the noise monitoring survey.

The sound level meters were programmed to collect hourly noise level intervals at each site during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

TABLE 3.10-2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

SITE	LOCATION	DATE/TIME	L_{DN}	AVERAGE MEASURED HOURLY NOISE LEVELS, DB					
				DAYTIME (7AM-10PM)			NIGHTTIME (10PM-7AM)		
				L_{EQ}	L_{50}	L_{MAX}	L_{EQ}	L_{50}	L_{MAX}
Continuous (24-hour) Noise Level Measurements									
LT-1	North side of site, 45 ft to centerline of Woodward Ave.	5/7/19 – 5/8/19	62	60	52	79	54	47	73
Short-Term Noise Level Measurements									
ST-1	North side of site	5/7/19 – 9:23 a.m.	N/A	52	48	66	Primary noise source is traffic on E Woodward Ave. Lmax caused by SUV traveling eastbound on E Woodward Ave.		
ST-2	West side of site	5/7/19 – 9:40 a.m.	N/A	44	44	55	Primary noise source is traffic on E Woodward Ave. and Airport Way. Lmax caused by wind.		
ST-3	South side of site	5/7/19 – 9:53 a.m.	N/A	43	44	47	Primary noise source is traffic on Airport Way. Lmax caused by wind.		
ST-4	East side of site	5/7/19 – 10:07 a.m.	N/A	44	44	50	Primary noise source is traffic on E. Woodward Ave. Lmax caused by activity from existing residential community to the east.		

SOURCE: SAXELBY ACOUSTICS, 2019.

Larson Davis Laboratories (LDL) Model 820, Model 812, and Model 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Existing and Future Traffic Noise Environment at Off-Site Receptors

OFF-SITE TRAFFIC NOISE IMPACT ASSESSMENT METHODOLOGY

To predict existing noise levels due to traffic, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the project (KD Anderson, April 2019). Truck percentages and vehicle speeds on the local area roadways were estimated from field observations.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each project-area roadway segment. Where traffic noise barriers are predominately along a roadway segment, a -5 offset was added to the noise prediction model to account for various noise barrier heights. A -5 to dB offset was also applied where outdoor activity areas are shielded by intervening buildings. In some locations, sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the project-area roadway segments analyzed in this report.

Table 3.10-3 shows the existing traffic noise levels in terms of L_{dn} at closest sensitive receptors along each roadway segment. A complete listing of the FHWA Model input data is contained in Appendix B of Appendix F.

TABLE 3.10-3: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, dB L_{DN}*
Airport Way	North of Woodward	62.4
Airport Way	South of Woodward	58.6
Union Road	North of Woodward	56.3
Union Road	South of Woodward	60.5
Woodward Ave.	West of Airport	55.4
Woodward Ave.	Airport to Union	60.6
Woodward Ave.	East of Union	57.4

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KIMLEY HORN AND SAXELBY ACOUSTICS. 2019.

PREDICTED EXTERIOR TRAFFIC NOISE LEVELS

Implementation of the proposed project would result in an increase in ADT volumes on the local roadway network, and consequently, an increase in noise levels from traffic sources along affected segments. Tables 3.10-4 and 3.10-5 show the predicted traffic noise level increases on the local roadway network for Existing, Existing + Project, Cumulative No Project, and Cumulative + Project conditions. Appendix B of Appendix F provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE 3.10-4: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS				
		EXISTING	EXISTING + PROJECT	CHANGE	CRITERIA[1]	SIGNIFICANT?
Airport Way	North of Woodward	62.4	62.5	0.1	+5-10 dBA	No
Airport Way	South of Woodward	58.6	58.6	0.0	>60 dBA	No
Union Road	North of Woodward	56.3	56.4	0.1	>60 dBA	No
Union Road	South of Woodward	60.5	60.5	0.0	+5-10 dBA	No
Woodward Ave.	West of Airport	55.4	55.5	0.1	>60 dBA	No
Woodward Ave.	Airport to Union	60.6	60.9	0.3	+5-10 dBA	No
Woodward Ave.	East of Union	57.4	57.5	0.1	>60 dBA	No

[1] *IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS AND SAXELBY ACOUSTICS. 2019.

TABLE 3.10-5: CUMULATIVE AND CUMULATIVE + PROJECT TRAFFIC NOISE LEVELS

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS				
		CUMULATIVE	CUMULATIVE + PROJECT	CHANGE	CRITERIA[1]	SIGNIFICANT?
Airport Way	North of Woodward	67.5	67.5	0.0	+5-10 dBA	No
Airport Way	South of Woodward	63.1	63.1	0.0	+5-10 dBA	No
Union Road	North of Woodward	60.6	60.6	0.0	+5-10 dBA	No
Union Road	South of Woodward	64.2	64.2	0.0	+5-10 dBA	No
Woodward Ave.	West of Airport	61.1	61.2	0.0	+5-10 dBA	No
Woodward Ave.	Airport to Union	64.7	64.7	0.1	+5-10 dBA	No
Woodward Ave.	East of Union	61.5	61.5	0.1	+5-10 dBA	No

[1] *IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS AND SAXELBY ACOUSTICS. 2019.

Based upon data in Tables 3.10-4 and 3.10-5, the proposed project is predicted to result in a maximum traffic noise level increase of 0.3 dB.

EVALUATION OF TRANSPORTATION NOISE ON PROJECT SITE

Traffic Noise Levels

Woodward Avenue

Cumulative plus project traffic noise levels are predicted to be 65 dB L_{dn} at a distance of 50 feet from the centerline of Woodward Avenue, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 50 feet from the centerline Woodward Avenue. Therefore, maximum exterior noise levels of 65 dB L_{dn} are predicted for these uses.

Construction Noise Environment

During the construction of the proposed project, including roads, water, and sewer lines and related infrastructure, noise from construction activities would add to the noise environment in the project vicinity. As indicated in Table 3.10-6, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 3.10-6: CONSTRUCTION EQUIPMENT NOISE

TYPE OF EQUIPMENT	*MAXIMUM LEVEL, DB*	
	25 FEET	*50 FEET*
Backhoe	84	78
Compactor	89	83
Compressor (air)	84	78
Concrete Saw	96	90
Dozer	88	82
Dump Truck	82	76
Excavator	87	81
Generator	87	81
Jackhammer	94	89
Pneumatic Tools	91	85

SOURCE: ROADWAY CONSTRUCTION NOISE MODEL USER'S GUIDE. FEDERAL HIGHWAY ADMINISTRATION. FHWA-HEP-05-054. JANUARY 2006.

Construction Vibration Environment

The primary vibration-generating activities associated with the proposed project would happen during construction when activities such as grading, utilities placement, and road construction occur. Table 3.10-7 shows the typical vibration levels produced by construction placement.

TABLE 3.10-7: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

TYPE OF EQUIPMENT	*PEAK PARTICLE VELOCITY @ 25 FEET (INCHES/SECOND)*	*PEAK PARTICLE VELOCITY @ 100 FEET (INCHES/SECOND)*
Large Bulldozer	0.089	0.011
Loaded Trucks	0.076	0.010
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.011
Jackhammer	0.035	0.004
Vibratory Hammer	0.070	0.009
Vibratory Compactor/roller	0.210	0.026

SOURCE: FEDERAL TRANSIT ADMINISTRATION, TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT GUIDELINES, MAY 2006

3.10.2 REGULATORY SETTING

FEDERAL

There are no federal regulations related to noise that apply to the proposed project.

STATE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a project exposes persons to noise or vibration levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels. CEQA standards are discussed more below under the Thresholds of Significance section.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and dwellings other than single-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room.

Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels

are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment

CITY OF MANTECA

The City of Manteca General Plan

The City of Manteca General Plan Noise Element contains goals, policies, and implementation measures for assessing noise impacts within the City. Listed below are the noise goals, policies, and implementation measures that are applicable to the proposed Project (City of Manteca as amended through 2016):

GOALS: NOISE

- N-1. Protect the residents of Manteca from the harmful and annoying effects of exposure to excessive noise.
- N-3. Ensure that the downtown core noise levels remain acceptable and compatible with commercial and higher density residential land uses.
- N-4. Protect public health and welfare by eliminating existing noise problems where feasible, by establishing standards for acceptable indoor and outdoor noise, and by preventing significant increases in noise levels.
- N-5. Incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

POLICIES: NOISE

- N-P-2. New development of residential or other noise-sensitive land uses will not be permitted in noise-impacted areas unless effective mitigation measures are incorporated into the project design to satisfy the performance standards in Table 9-1 [Table 3.10-8].

TABLE 3.10-8: MAXIMUM ALLOWABLE NOISE EXPOSURE MOBILE NOISE SOURCES

LAND USE[4]	*OUTDOOR ACTIVITY AREAS*[1]	*INTERIOR SPACES*	
		L_{DN}/CNEL, dB	L_{EQ}/CNEL, dB[3]
Residential	60[2]	45	--
Transient Lodging	60[2]	45	--
Hospitals, Nursing Homes	60[2]	45	--
Theatres, Auditoriums, Music Halls	--	--	35
Churches, Music Halls	60[2]	--	40
Office Buildings	65	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

NOTES: [1] OUTDOOR ACTIVITY AREAS FOR RESIDENTIAL DEVELOPMENT ARE CONSIDERED TO BE BACKYARD PATIOS OR DECKS OF SINGLE FAMILY DWELLINGS, AND THE COMMON AREAS WHERE PEOPLE GENERALLY CONGREGATE FOR MULTI-FAMILY DEVELOPMENTS. OUTDOOR ACTIVITY AREAS FOR NON-RESIDENTIAL DEVELOPMENTS ARE CONSIDERED TO BE THOSE COMMON AREAS WHERE PEOPLE

GENERALLY CONGREGATE, INCLUDING PEDESTRIAN PLAZAS, SEATING AREAS, AND OUTSIDE LUNCH FACILITIES. WHERE THE LOCATION OF OUTDOOR ACTIVITY AREAS IS UNKNOWN, THE EXTERIOR NOISE LEVEL STANDARD SHALL BE APPLIED TO THE PROPERTY LINE OF THE RECEIVING LAND USE.

[2] IN AREAS WHERE IT IS NOT POSSIBLE TO REDUCE EXTERIOR NOISE LEVELS TO 60 DB L_{DN} OR BELOW USING A PRACTICAL APPLICATION OF THE BEST NOISE-REDUCTION TECHNOLOGY, AN EXTERIOR NOISE LEVEL OF UP TO 65 L_{DN} WILL BE ALLOWED.

[3] DETERMINED FOR A TYPICAL WORST-CASE HOUR DURING PERIODS OF USE.

[4] WHERE A PROPOSED USE IS NOT SPECIFICALLY LISTED ON THE TABLE, THE USE SHALL COMPLY WITH THE NOISE EXPOSURE STANDARDS FOR THE NEAREST SIMILAR USE AS DETERMINED BY THE CITY.

SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-1.

- N-P-3. The City may permit the development of new noise-sensitive uses only where the noise level due to fixed (non-transportation) noise sources satisfies the noise level standards of Table 9-2 [Table 3.10-9]. Noise mitigation may be required to meet Table 9-2 [Table 3.10-9] performance standards.

TABLE 3.10-9: PERFORMANCE STANDARDS FOR STATIONARY NOISE SOURCES OR PROJECTS AFFECTED BY STATIONARY NOISE SOURCES [1,2]

NOISE LEVEL DESCRIPTOR	*DAYTIME (7 AM – 10 PM)*	*NIGHTTIME (10 PM – 7 AM)*
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65

NOTES: [1] EACH OF THE NOISE LEVELS SPECIFIED ABOVE SHOULD BE LOWERED BY FIVE (5) DB FOR SIMPLE NOISE TONES, NOISES CONSISTING PRIMARILY OF SPEECH OR MUSIC, OR RECURRING IMPULSIVE NOISES. SUCH NOISES ARE GENERALLY CONSIDERED BY RESIDENTS TO BE PARTICULARLY ANNOYING AND ARE A PRIMARY SOURCE OF NOISE COMPLAINTS.

[2] NO STANDARDS HAVE BEEN INCLUDED FOR INTERIOR NOISE LEVELS. STANDARD CONSTRUCTION PRACTICES SHOULD, WITH THE EXTERIOR NOISE LEVELS IDENTIFIED, RESULT IN ACCEPTABLE INTERIOR NOISE LEVELS.

SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-2.

- N-P-5. In accord with the Table 9-2 [Table 3.10-9] standards, the City shall regulate construction-related noise impacts on adjacent uses.

IMPLEMENTATION MEASURES: NOISE

- N-I-1. New development in residential areas with an actual or projected exterior noise level of greater than 60 dB L_{dn} will be conditioned to use mitigation measures to reduce exterior noise levels to less than or equal to 60 dB L_{dn}.
- N-I-3. In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:
    - the resulting noise levels
    - the duration and frequency of the noise
    - the number of people affected
    - the land use designation of the affected receptor sites
    - public reactions or controversy as demonstrated at workshops or hearings, or by correspondence
    - prior CEQA determinations by other agencies specific to the project

- N-I-4. Control noise at the source through use of insulation, berms, building design and orientation, buffer space, staggered operating hours and other techniques. Use noise barriers to attenuate noise to acceptable levels.

City of Manteca Municipal Code Noise Ordinance

Section 9.52.030 of the City of Manteca Municipal Code prohibits excessive or annoying noise or vibration to residential and commercial properties in the City. The following general rules are outline in the ordinance:

9.52.030 PROHIBITED NOISES—GENERAL STANDARD

No person shall make, or cause to suffer, or permit to be made upon any public property, public right-of-way or private property, any unnecessary and unreasonable noises, sounds or vibrations which are physically annoying to reasonable persons of ordinary sensitivity or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to cause or contribute to the unnecessary and unreasonable discomfort of any persons within the neighborhood from which said noises emanate or which interfere with the peace and comfort of residents or their guests, or the operators or customers in places of business in the vicinity, or which may detrimentally or adversely affect such residences or places of business. (Ord. 1374 § 1(part), 2007)

17.58.050 D. EXEMPT ACTIVITIES

8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.

17.58.050 E. Prohibited Activities

1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

VIBRATION STANDARDS

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 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. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City does not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities are addressed as potential noise impacts associated with project implementation.

Human and structural response to different vibration levels is influenced by several factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 3.10-10 indicates that the threshold for damage to structures ranges from 0.2 to 0.6 peak particle velocity in inches per second (in/sec p.p.v). A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 3.10-10: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

PEAK PARTICLE VELOCITY		*HUMAN REACTION*	*EFFECT ON BUILDINGS*
MM/SEC.	*IN./SEC.*		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

SOURCE: CALTRANS. TRANSPORTATION RELATED EARTHBORN VIBRATIONS. TAV-02-01-R9601 FEBRUARY 20, 2002.

3.10.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the project will have a significant impact related to noise if it will result in:

Would the project:

a. Expose persons to or generate 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 generate, excessive groundborne vibration or groundborne noise levels;
c. Cause a substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the project;
d. Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project;
e. Expose persons residing or working in the project area to excessive noise levels if located within an airport land use plan or where such a plan has not been adopted within 2 miles of a public airport or public use airport; or
f. Expose persons residing or working in the project area to excessive noise levels if located within the vicinity of a private airstrip.

Determination of a Significant Increase in Noise Levels

The CEQA guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas". Implementation Measure N-I-3 of the City of Manteca General Plan Noise Element provides specific guidance for assessing increases in ambient noise, as follows:

> *In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:*
>
> - *the resulting noise levels*
> - *the duration and frequency of the noise*
> - *the number of people affected*
> - *the land use designation of the affected receptor sites*
> - *public reactions/controversy as demonstrated at workshops/hearings, or by correspondence*
> - *prior CEQA determinations by other agencies specific to the project*

IMPACTS AND MITIGATION MEASURES

Impact 3.10-1: Would the project result in 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? (Less than Significant with Mitigation)

EXTERIOR NOISE IMPACTS

Table 3.10-11 shows the predicted traffic noise levels at the proposed residential uses adjacent to Woodward Avenue. Table 3.10-11 also indicates the property line noise barrier heights required to achieve compliance with an exterior noise level standard of 60 dB L_{dn}.

TABLE 3.10-11: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES

SEGMENT	*APPROXIMATE RESIDENTIAL SETBACK, FEET[1]*	*PREDICTED NOISE LEVELS, DB L_{DN}[2]*			
		NO WALL	*6' WALL*	*7' WALL*	*8' WALL*
Woodward Avenue	50	65 dB	59	57	55

NOTES:
[1] SETBACK DISTANCES ARE MEASURED IN FEET FROM THE CENTERLINES OF THE ROADWAYS TO THE CENTER OF RESIDENTIAL BACKYARDS.
[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND WALL HEIGHT MAY BE ACHIEVE D THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 8-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 10-FOOT TALL WALL).
SOURCE: SAXELBY ACOUSTICS. 2019.

The complete inputs and results of the barrier calculations are contained in the Noise Study Appendix C (see Appendix F of this MND). The modeled noise barriers assume flat site conditions where roadway elevations, base of wall elevations, and building pad elevations are approximately equivalent.

The Table 3.10-11 data indicate that a noise barrier 6-feet in height would be required to achieve compliance with the City of Manteca 60 dB L_{dn} exterior noise level standard for the proposed residential uses.

INTERIOR NOISE IMPACTS

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, will typically comply with the City of Manteca 45 dB L_{dn} interior noise level standard. Additional noise reduction measures, such as acoustically-rated windows, are generally required for exterior noise levels exceeding 70 dB L_{dn}.

It should be noted that exterior noise levels are typically 2 to 3 dB higher at second floor locations. Additionally, noise barriers do not reduce exterior noise levels at second floor locations. The proposed residential uses are predicted to be exposed to unmitigated first floor exterior transportation noise levels up to 65 dB L_{dn}. Therefore, second floor facades are predicted to be exposed to exterior noise levels of up to 69 dB L_{dn}.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 44 dB L_{dn}. Accordingly, predicted interior noise levels along the first row of residential uses along Woodward are predicted to comply with the City's 45 dB L_{dn} interior noise level standard.

This analysis assumes that mechanical ventilation will be provided to allow residents to keep doors and windows closed, as desired for acoustical isolation.

CONCLUSION

Table 3.10-11 data indicate that a noise barrier 6-feet in height would be sufficient to achieve compliance with the City of Manteca 60 dB L_{dn} exterior noise level standard for the proposed residential uses along Woodward Avenue.

Interior noise levels at the residential uses along Santa Fe Avenue are predicted to comply with the City's 45 dB L_{dn} interior noise level standards.

Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a ***less-than-significant*** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.10-1: *A 6-foot tall sound wall shall be constructed along the Woodward Avenue frontage, adjacent to proposed residential uses, in order to achieve the City's exterior noise standards. Final wall height selection would be at the discretion of the City. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-2 shows the recommended sound wall locations.*

Mitigation Measure 3.10-2: *Mechanical ventilation shall be provided to allow occupants to keep doors and windows closed for acoustic isolation.*

Impact 3.10-2: Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? (Less than Significant with Mitigation)

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural damage.

With the exception of vibratory compactors, the Table 3.10-7 data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at a distance of 25 feet. Use of vibratory compactors within 26 feet of the adjacent buildings could cause vibrations in excess of 0.2 in/sec. Sensitive receptors which could be impacted by construction-related vibrations, especially vibratory compactors/rollers, are located approximately 10-15 feet, or further, from the project site.

Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a ***less-than-significant*** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.10-3: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

Impact 3.10-3: Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? (Less than Significant)

TRAFFIC NOISE INCREASES

As shown in Tables 3.10-4 and 3.10-5, some noise-sensitive receptors located along the project-area roadways are currently exposed to exterior traffic noise levels exceeding the City of Manteca 60 dB L_{dn} exterior noise level standard for residential uses. These receptors would continue to experience elevated exterior noise levels with implementation of the proposed project. For example, sensitive receptors under Existing conditions located adjacent to Airport Way, north of Woodward Avenue experience an exterior noise level of approximately 62.4 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 62.5 dB L_{dn}. Exterior noise levels in both scenarios exceed the City's exterior noise level standard of 60 dB L_{dn}. However, the project's contribution of 0.1 dB would not exceed the City's increase criteria of 5-10 dB.

OPERATIONAL NOISE INCREASES

The proposed project would include typical residential noise which would be compatible with the adjacent existing single-family residential uses.

This is a ***less-than-significant*** impact and no mitigation is required.

Impact 3.10-4: 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? (Less than Significant with Mitigation)

During the construction of the project, including roads, water, sewer lines, and related infrastructure, noise from construction activities would add to the noise environment in the project vicinity. Existing receptors adjacent to the proposed construction activities are located north, south and east of the site.

As indicated in Table 3.10-6, activities involved in construction would generate maximum noise levels ranging from 82 to 96 dB L_{max} at a distance of 50 feet. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Construction activities would be temporary in nature and are exempt from noise regulation during the hours of 7:00 AM to 7:00 PM, as outlined in the City's Municipal Code:

> **17.58.050 D. Exempt Activities**
>
> 8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.
>
> **17.58.050 E. Prohibited Activities**
>
> 1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

Implementation of the following mitigation measures will ensure that these potential impacts are reduced to a **less-than-significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.10-4: *Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

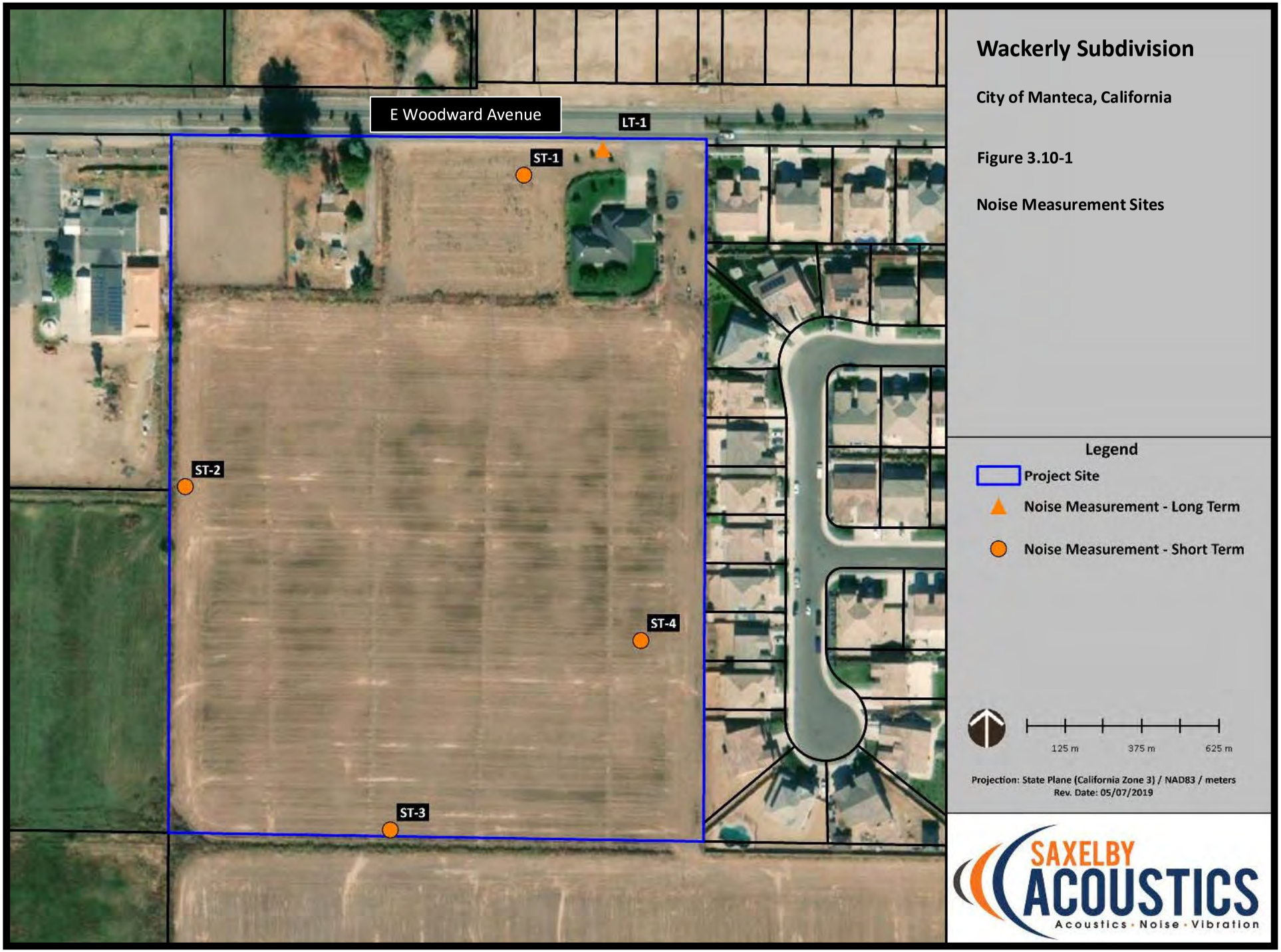
Mitigation Measure 3.10-5: *All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Impact 3.10-5: 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, would the project expose people residing or working in the project area to excessive noise levels?

There are no airports in the project vicinity. Therefore, this impact is not applicable to the proposed project.

Impact 3.10-6: 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?

There are no private airstrips in the project vicinity. Therefore, this impact is not applicable to the proposed project.



Wackerly Subdivision

City of Manteca, California

Figure 3.10-1

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement - Long Term
- Noise Measurement - Short Term

125 m 375 m 625 m

Projection: State Plane (California Zone 3) / NAD83 / meters
Rev. Date: 05/07/2019

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Wackerly Subdivision

City of Manteca, California

Figure 3.10-2

Recommended Sound Walls





NorthStar Engineering Group, Inc.
• CIVIL ENGINEERING • SURVEYING • PLANNING •
620 12th Street Modesto, CA 95354
(209) 524-3525 Phone (209) 524-3526 Fax

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Appendix A1: Continuous Noise Monitoring Results

Site: LT-1

Project: Wackerly Subdivision

Meter: LDL 820-1

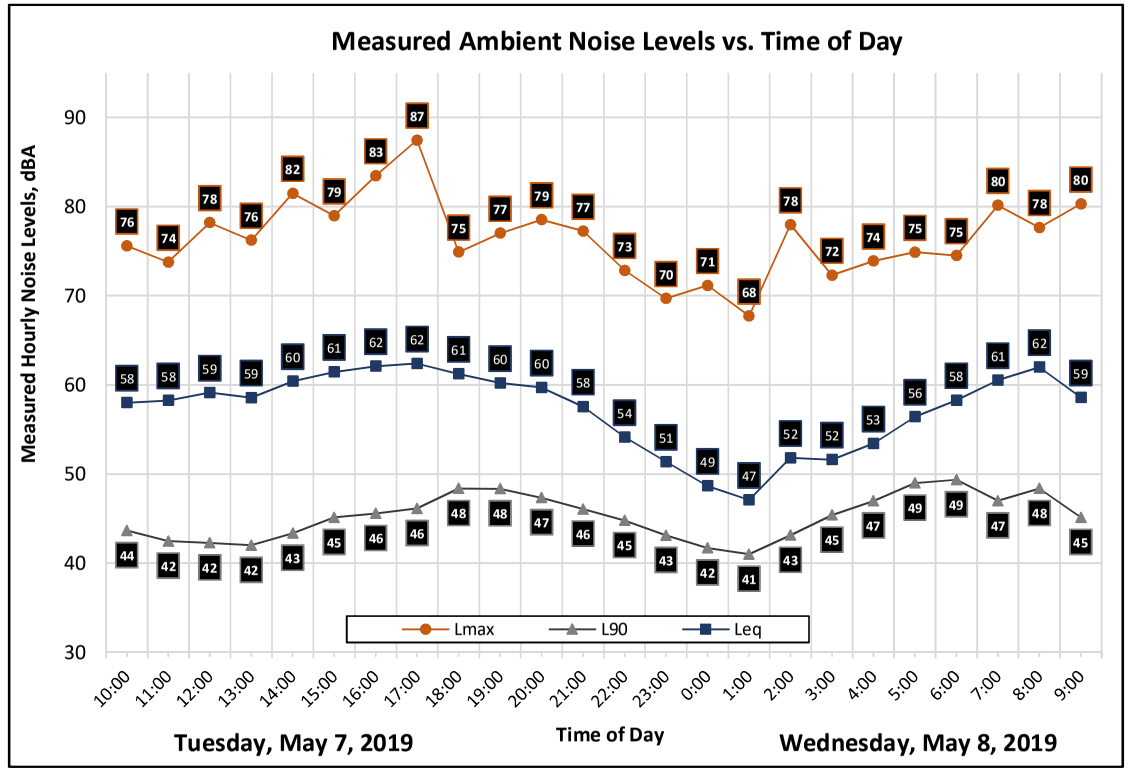
Location: 4950 Woodward Avenue

Calibrator: B&K 4230

Coordinates: 37.7755115°, -121.2481474°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Tuesday, May 7, 2019	10:00	58	76	47	44
Tuesday, May 7, 2019	11:00	58	74	47	42
Tuesday, May 7, 2019	12:00	59	78	48	42
Tuesday, May 7, 2019	13:00	59	76	47	42
Tuesday, May 7, 2019	14:00	60	82	52	43
Tuesday, May 7, 2019	15:00	61	79	56	45
Tuesday, May 7, 2019	16:00	62	83	56	46
Tuesday, May 7, 2019	17:00	62	87	56	46
Tuesday, May 7, 2019	18:00	61	75	56	48
Tuesday, May 7, 2019	19:00	60	77	53	48
Tuesday, May 7, 2019	20:00	60	79	52	47
Tuesday, May 7, 2019	21:00	58	77	49	46
Tuesday, May 7, 2019	22:00	54	73	47	45
Tuesday, May 7, 2019	23:00	51	70	45	43
Wednesday, May 8, 2019	0:00	49	71	44	42
Wednesday, May 8, 2019	1:00	47	68	43	41
Wednesday, May 8, 2019	2:00	52	78	45	43
Wednesday, May 8, 2019	3:00	52	72	47	45
Wednesday, May 8, 2019	4:00	53	74	49	47
Wednesday, May 8, 2019	5:00	56	75	51	49
Wednesday, May 8, 2019	6:00	58	75	52	49
Wednesday, May 8, 2019	7:00	61	80	52	47
Wednesday, May 8, 2019	8:00	62	78	57	48
Wednesday, May 8, 2019	9:00	59	80	49	45

Statistics	Leq	Lmax	L50	L90
Day Average	60	79	52	45
Night Average	54	73	47	45
Day Low	58	74	47	42
Day High	62	87	57	48
Night Low	47	68	43	41
Night High	58	78	52	49
Ldn	62	Day %		88
CNEL	63	Night %		12





Appendix A2 : Short Term Noise Monitoring Results

Site: ST-1
Project: Wackerly Subdivision
Location: Nothern Boundary of Project Site
Coordinates: 37.7754214' -121.2484827°

Meter: LDL 831-1
Calibrator: B&K 4230

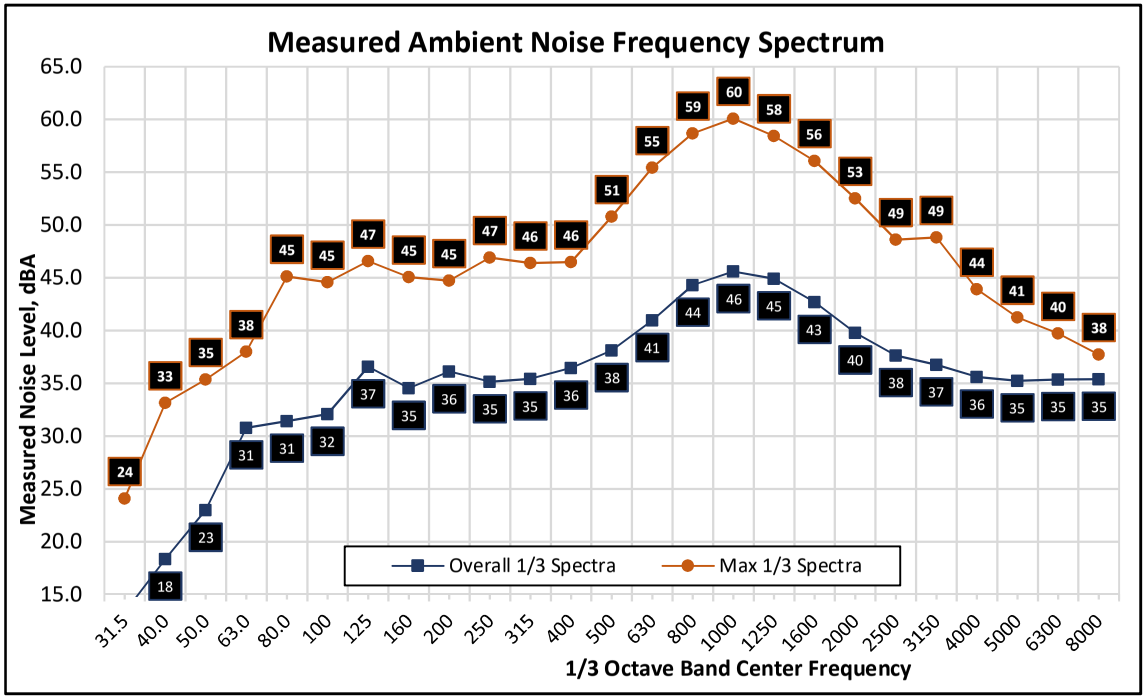
Start: 2019-05-07 09:23:53
Stop: 2019-05-07 09:33:53
SLM: Model 831
Serial: 1800

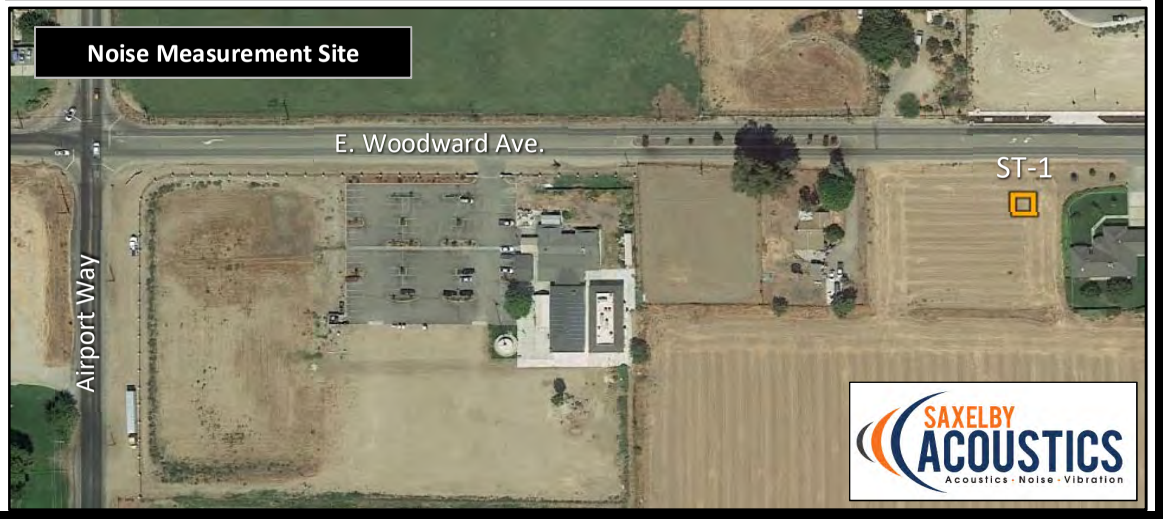
Measurement Results, dBA

Duration:	0:10
L_{eq}:	52
L_{max}:	66
L_{min}:	42
L_{50}:	48
L_{90}:	46

Notes

Primary noise source is traffic on E Woodward Ave. Lmax caused by SUV traveling eastbound on E Woodward Ave.





Appendix A3 : Short Term Noise Monitoring Results

Site: ST-2
Project: Wackerly Subdivision
Location: Western Boundary of Project Site
Coordinates: 37.7743558' -121.2499153°

Meter: LDL 831-1
Calibrator: B&K 4230

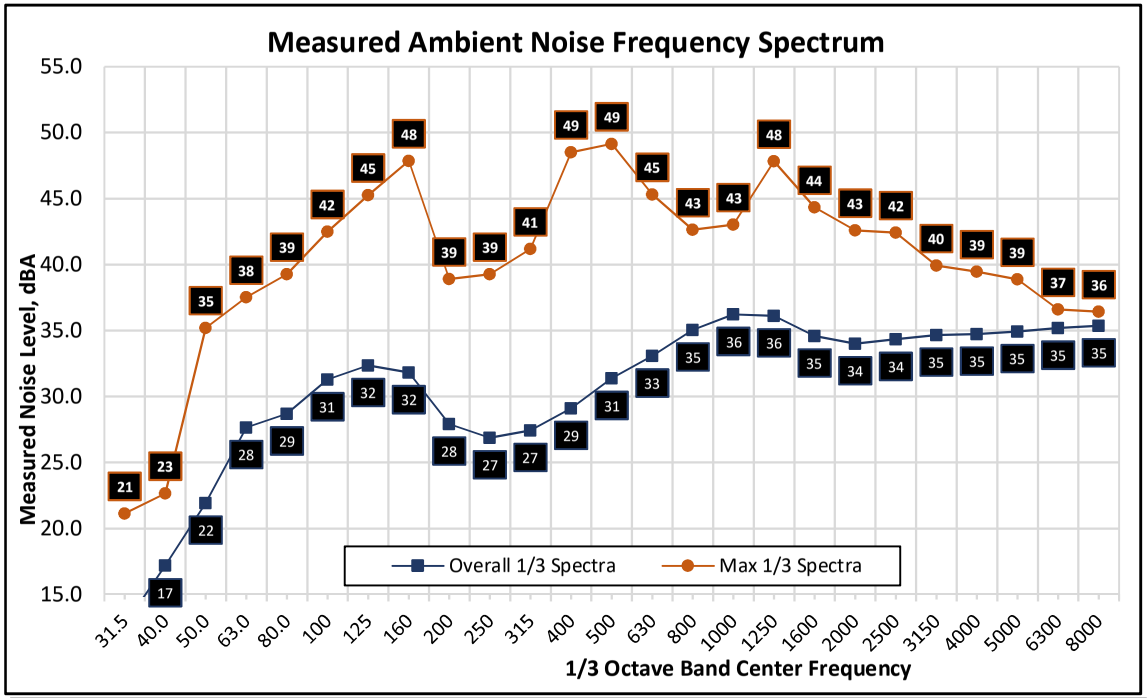
Start: 2019-05-07 09:40:25
Stop: 2019-05-07 09:50:25
SLM: Model 831
Serial: 1800

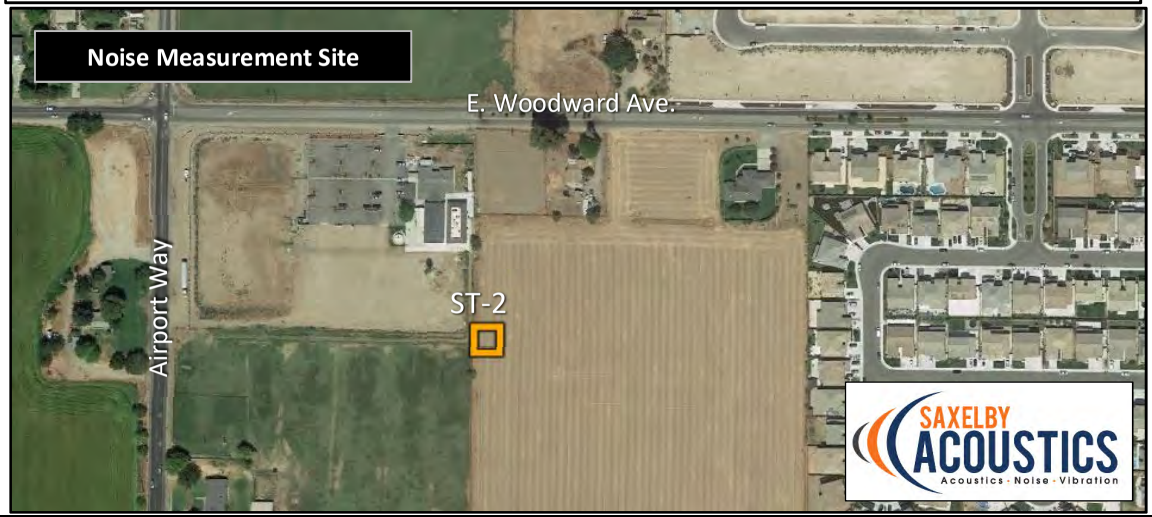
Measurement Results, dBA

Duration:	0:10
L_{eq}:	44
L_{max}:	55
L_{min}:	40
L_{50}:	44
L_{90}:	43

Notes

Primary noise source is traffic on E Woodward Ave. and Airport Way. Lmax caused by wind.





Appendix A4 : Short Term Noise Monitoring Results

Site: ST-3
Project: Wackerly Subdivision
Location: Southern Boundary of Project Site
Coordinates: 37.773202°, -121.2490299°
Meter: LDL 831-1
Calibrator: B&K 4230

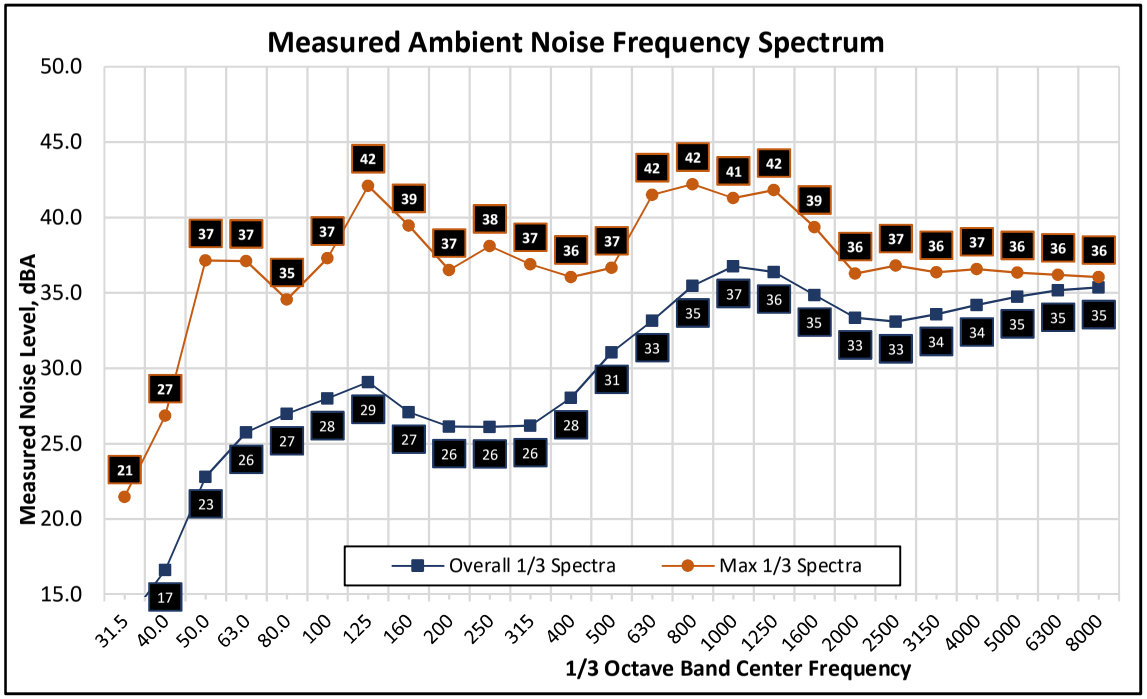
Start: 2019-05-07 09:53:48
Stop: 2019-05-07 10:03:48
SLM: Model 831
Serial: 1800

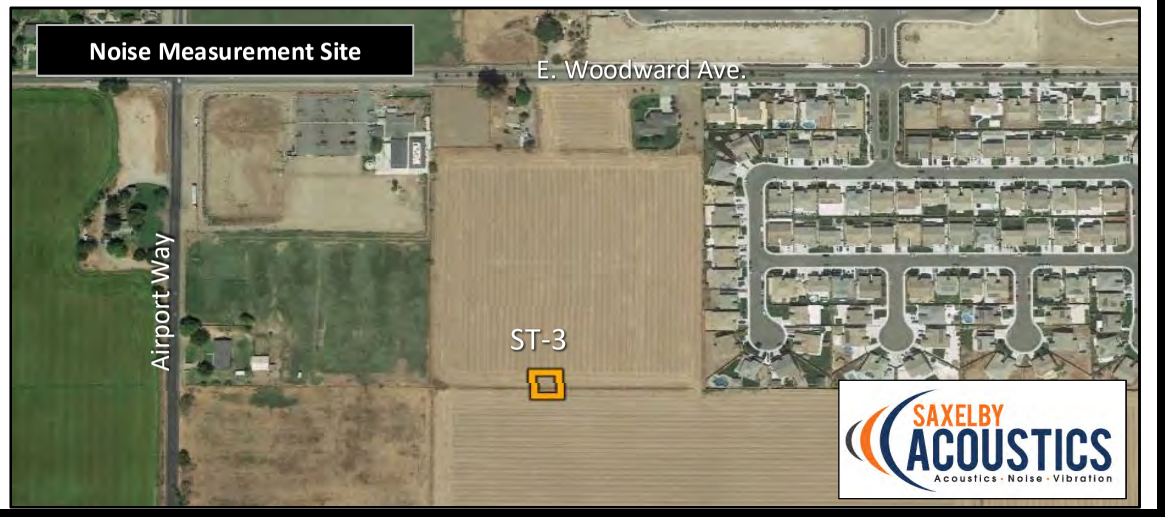
Measurement Results, dBA

Duration:	0:10
L_{eq}:	43
L_{max}:	47
L_{min}:	41
L_{50}:	44
L_{90}:	43

Notes

Primary noise source is traffic on Airport Way. Lmax caused by wind.





Appendix A5 : Short Term Noise Monitoring Results

Site: ST-4
Project: Wackerly Subdivision
Location: Eastern Boundary of Project Site
Coordinates: 37.7738483‘ -121.247968°

Meter: LDL 831-1
Calibrator: B&K 4230

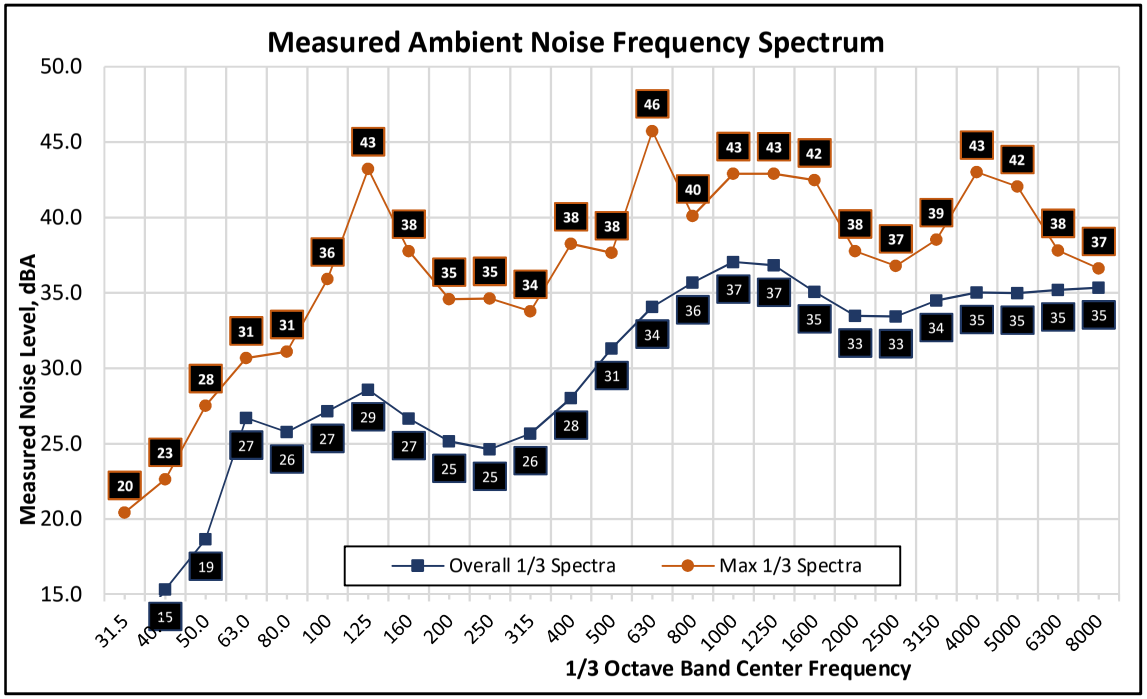
Start: 2019-05-07 10:07:27
Stop: 2019-05-07 10:17:27
SLM: Model 831
Serial: 1800

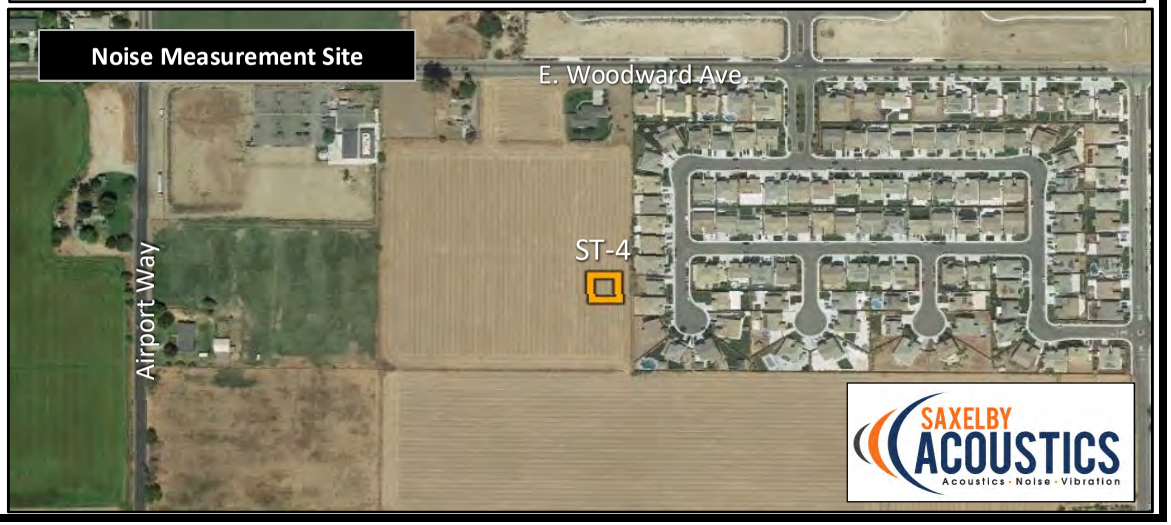
Measurement Results, dBA

Duration:	0:10
L_{eq}:	44
L_{max}:	50
L_{min}:	40
L_{50}:	44
L_{90}:	43

Notes

Primary noise source is traffic on E. Woodward Ave. Lmax caused by activity from existing residential community to the east.





Appendix B-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 190306
Description: Wackerly Subdivision - Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	7,050	88	0	12	1.0%	1.0%	45	75	0	108	50	23	62.4
2	Airport Way	3,920	88	0	12	1.0%	1.0%	45	90	0	73	34	16	58.6
3	Union Road	7,340	88	0	12	1.0%	1.0%	45	90	-5	111	51	24	56.3
4	Union Road	3,500	88	0	12	1.0%	1.0%	50	75	0	81	37	17	60.5
5	Woodward Ave.	3,260	88	0	12	1.0%	1.0%	40	50	-5	53	25	11	55.4
6	Woodward Ave.	3,410	88	0	12	1.0%	1.0%	40	50	0	55	25	12	60.6
7	Woodward Ave.	5,150	88	0	12	1.0%	1.0%	40	50	-5	72	33	15	57.4

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Appendix B-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 190306
Description: Wackerly Subdivision - Existing Plus Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	7,220	88	0	12	1.0%	1.0%	45	75	0	109	51	24	62.5
2	Airport Way	3,930	88	0	12	1.0%	1.0%	45	90	0	73	34	16	58.6
3	Union Road	7,470	88	0	12	1.0%	1.0%	45	90	-5	112	52	24	56.4
4	Union Road	3,520	88	0	12	1.0%	1.0%	50	75	0	81	38	17	60.5
5	Woodward Ave.	3,350	88	0	12	1.0%	1.0%	40	50	-5	54	25	12	55.5
6	Woodward Ave.	3,680	88	0	12	1.0%	1.0%	40	50	0	57	27	12	60.9
7	Woodward Ave.	5,320	88	0	12	1.0%	1.0%	40	50	-5	73	34	16	57.5

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Appendix B-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 190306
Description: Wackerly Subdivision - Cumulative Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	23,100	88	0	12	1.0%	1.0%	45	75	0	238	110	51	67.5
2	Airport Way	10,900	88	0	12	1.0%	1.0%	45	90	0	144	67	31	63.1
3	Union Road	19,500	88	0	12	1.0%	1.0%	45	90	-5	212	98	46	60.6
4	Union Road	8,200	88	0	12	1.0%	1.0%	50	75	0	142	66	31	64.2
5	Woodward Ave.	12,300	88	0	12	1.0%	1.0%	40	50	-5	128	60	28	61.1
6	Woodward Ave.	8,900	88	0	12	1.0%	1.0%	40	50	0	104	48	22	64.7
7	Woodward Ave.	13,200	88	0	12	1.0%	1.0%	40	50	-5	135	62	29	61.5

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Appendix B-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 190306
Description: Wackerly Subdivision - Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	23,270	88	0	12	1.0%	1.0%	45	75	0	239	111	51	67.5
2	Airport Way	10,910	88	0	12	1.0%	1.0%	45	90	0	144	67	31	63.1
3	Union Road	19,630	88	0	12	1.0%	1.0%	45	90	-5	213	99	46	60.6
4	Union Road	8,220	88	0	12	1.0%	1.0%	50	75	0	143	66	31	64.2
5	Woodward Ave.	12,390	88	0	12	1.0%	1.0%	40	50	-5	129	60	28	61.2
6	Woodward Ave.	9,170	88	0	12	1.0%	1.0%	40	50	0	106	49	23	64.9
7	Woodward Ave.	13,370	88	0	12	1.0%	1.0%	40	50	-5	136	63	29	61.5

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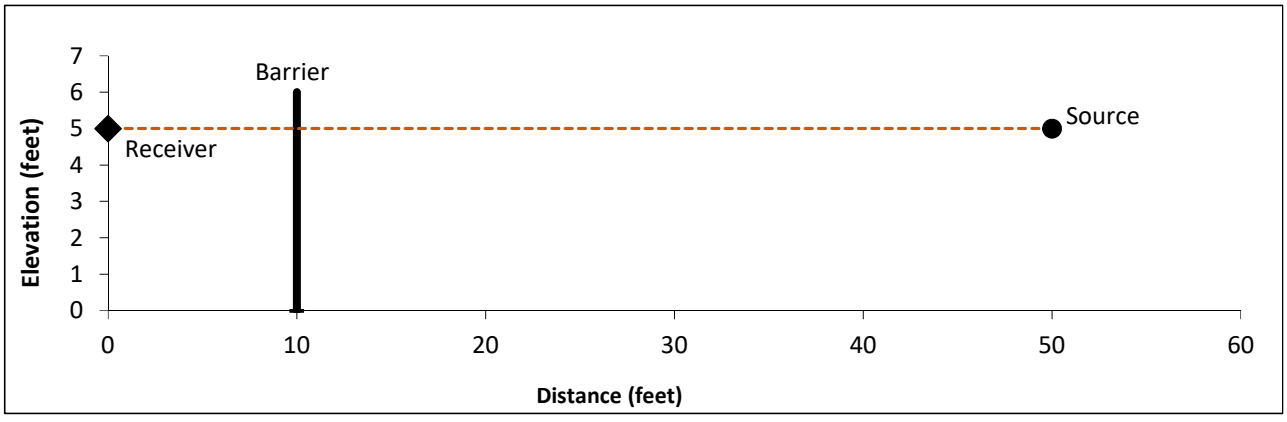
Appendix C : Barrier Insertion Loss Calculation

Project Information:	Project Name: Parkwood Residential Location(s): Proposed SF Residential
Noise Level Data:	Source Description: Traffic Source Noise Level, dBA: 65 Source Frequency (Hz): 800 Source Height (ft): 5
Site Geometry:	Receiver Description: Nearest Backyard Source to Barrier Distance (C_1): 40 Barrier to Receiver Distance (C_2): 10 Pad/Ground Elevation at Receiver: 0 Receiver Elevation[1]: 5 Base of Barrier Elevation: 0 Starting Barrier Height 6

Barrier Effectiveness

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
6	6	-6	59	Yes
7	7	-8	57	Yes
8	8	-10	55	Yes
9	9	-11	54	Yes
10	10	-13	52	Yes
11	11	-14	51	Yes
12	12	-15	50	Yes
13	13	-15	50	Yes
14	14	-16	49	Yes
15	15	-16	49	Yes
16	16	-17	48	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)



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Appendix D

Transportation Impact Analysis Report

1. INTRODUCTION

This report documents the results of the Transportation Impact Analysis conducted for the proposed Wackerly Annexation Project in Manteca, California. This *Transportation Impact Analysis* (June 2019) was prepared by Fehr & Peers for the proposed project under contract to the City of Manteca Community Development Department and DeNovo Planning Group.

PROJECT DESCRIPTION

The Wackerly Annexation project would construct sixty (60) single-family residential units on an approximately 13-acre parcel located on the south side of Woodward Avenue between Airport Way and Union Road. The project site is currently located in unincorporated San Joaquin County; however, it is located within the City of Manteca's 10-Year Planning Horizon per the City's Sphere of Influence Map. Access to the project is proposed via two public streets on Woodward Avenue (see Appendix A - Tentative Subdivision Map).

STUDY INTERSECTIONS

The following four (4) study intersections were included in the analysis:

1. Airport Way / Woodward Avenue;
2. Union Road / Woodward Avenue;
3. Woodward Avenue / Street A
4. Woodward Avenue / Street B

TRAFFIC ANALYSIS SCENARIOS

The study intersections were evaluated for the following four scenarios:

- **Scenario 1: Existing Conditions** – Analyzes operations as they exist today.

- **Scenario 2: Existing Plus Project Conditions** – Analyzes existing operations with the addition of trips generated from the proposed project.

- **Scenario 3: Cumulative No Project Conditions** – Analyzes cumulative year (2042) volumes based on the City of Manteca / San Joaquin Council of Governments Travel Demand Forecasting (TDF) Model, assuming the project site remains in its current state

- **Scenario 4: Cumulative Plus Project Conditions** – Analyzes cumulative year volumes with the addition of trips generated from the proposed project.

2. ANALYSIS METHODOLOGY

This chapter describes the methods used to analyze the four (4) study intersections described above, and to develop traffic forecasts for the study intersections.

DATA COLLECTION

Intersection turning movements and roadway segment traffic counts were collected on Thursday, May 16, 2019. Local schools were in session, however, weather conditions were cloudy with rain. Total rain on this day was about 0.6 inches (source: https://www.localconditions.com/weather-manteca-california/95336/past.php), with much occurring during overnight hours and no precipitation during the AM and PM peak periods. Given the lack of any rain during peak hours and majority of trips in the area being made by vehicle, weather conditions were determined not to have a meaningful effect on vehicle travel during the data collection period.

We collected weekday AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak period intersection turning movements at the following study intersections.

1) Airport Way/Woodward Avenue
2) Union Road/Woodward Avenue

We collected daily roadway segment traffic counts on the following segments:

1) Airport Way north of Woodward Avenue
2) Union Road north of Woodward Avenue
3) Woodward Avenue between Airport Way and Union Road.

TRAVEL DEMAND FORECASTS

Using the City of Manteca / SJCOG sub-area Travel Demand Forecasting (TDF) Model, Cumulative Year 2042 traffic volume forecasts were developed for the following two (2) existing study intersections:

1. Airport Way/Woodward Avenue;
2. Union Road/Woodward Avenue

The travel demand model incorporates the current RTP / Air Quality Model, Build-out of the current City of Manteca General Plan, and General Plans for the surrounding communities of Lathrop, Ripon, San Joaquin County, and Stockton. The Manteca General Plan Model also includes projects identified in the City's Public Facilities Improvement Plan (PFIP) and the Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) Project List for:

- Mainline Highway Improvements (Table 6-1 from SJCOG RTP);
- Interchange Improvements (Table 6-1 from SJCOG RTP); and
- Regional Roadway Improvements (Table 6-3 from SJCOG RTP).

The traffic forecasting adjustment procedure known as the "difference method" was used to develop Cumulative Year (2042) AM and PM Peak Hour traffic forecasts. For a given intersection, this forecasting procedure is calculated as follows for every movement at the study intersections:

Year 2042 Forecast = Existing Volume + (Year 2042 TDF Model – Base Year (2018) TDF Model)

INTERSECTION ANALYSIS

The study intersections were analyzed using procedures and methodologies contained in the *Highway Capacity Manual – 6th Edition* (Transportation Research Board, 2016). These methodologies were applied using Synchro 10 software which considers traffic volumes, lane configurations, signal timings, signal coordination, and other pertinent parameters of intersection operations.

The following describes the specific inputs, model parameters, and other aspects of the Synchro modeling, based on data collected in May 2019:

- Existing roadway geometrics and intersection lane configurations.
- The peak hour factor (PHF) observed at each intersection during each peak hour was used. The PHF, which is a measure of peaking (lower values represent more peaking) during the busiest 15-minutes of the hour, ranges from 0.79 to 0.94 depending on the intersection and the peak hour.
- The heavy vehicle percentage observed at each intersection during each peak hour was used. The heavy vehicle percentage ranges from one percent (1%) to six percent (6%) depending on the intersection and the peak hour.
- A minimum volume of five pedestrians and five bicyclists were entered at each intersection approach/crosswalk (if observed volumes were lower than five).

LEVEL OF SERVICE DEFINITION

Each study intersection was analyzed using the concept of Level of Service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. For signalized intersections and all-way stop controlled intersections, LOS is based on the average delay experienced by all vehicles passing through the intersection. For side-street stop-controlled intersections, the delay and LOS for the overall intersection is reported along with the delay for the worst-case movement. Table 1 displays the delay range associated with each LOS category for signalized and unsignalized intersections.

Table 1: Intersections Level of Service (LOS) Criteria			
LOS	Description (for Signalized Intersections)	Average Delay (Seconds/Vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	< 10.0	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, and long cycle lengths. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

Note: LOS = level of service; V/C ratio = volume-to-capacity ratio
LOS at signalized intersections and unsignalized all-way stop controlled intersections is based on average delay for all vehicles. LOS at unsignalized side-street stop-controlled intersections is reported for the entire intersection and for the minor street movement with the greatest delay.
Source: Transportation Research Board, 2016

STANDARDS OF SIGNIFICANCE

The City of Manteca 2023 General Plan Policy C-P-2 establishes the following level of service standard:

To the extent feasible, the City shall strive for a vehicular LOS of D or better at all streets and intersections, except in the Downtown area where right-of-way is limited, pedestrian, bicycle, and transit mobility are most important and vehicular LOS is not a consideration.

3. PROJECT IMPACTS UNDER EXISTING CONDITIONS

This chapter presents the transportation impact analysis results for Existing and Existing Plus Project Conditions. The following is a detailed description of the roadways that could be affected by the project:

- **Airport Way** is a north-south arterial in the City of Manteca extending from State Route 120 (SR 120) and W. Ripon Road to the south and French Camp Road and the City of Stockton to the north. Near the project site, Airport Way provides one travel lane in each direction. Between SR 120 and Woodward Avenue, Airport Way has an Average Daily Traffic (ADT) volume of approximately 8,600 vehicles.

- **Union Road** is a north-south arterial road that runs parallel to Airport Way extending from SR 120 and W. Ripon Road to the south and French Camp Road to the north. Near the project site, Union Road provides two travel lanes in each direction north of the Union Road/Woodward Avenue intersection and one travel lane in each direction south of the intersection. Between SR 120 and Woodward Avenue, Union Road has an ADT volume of approximately 8,600 vehicles.

- **Woodward Avenue** is an east-west minor collector extending from west of Airport Way to Moffat Boulevard. Near the project site, Woodward Avenue consists of one travel lane in each direction. Between Airport Way and Union Road, Woodward Avenue has an ADT volume of approximately 4,600 vehicles.

EXISTING LEVEL OF SERVICE

Table 2 presents the LOS results for the study intersections under existing conditions. As shown, the intersections operate acceptably during both peak hours. Technical calculations are provided in Appendix B.

Table 2: Level of Service Analysis – Existing Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS
1) Airport Way/Woodward Avenue	AWSC	12	B	15	B
2) Union Road/Woodward Avenue	AWSC	16	C	18	C

Notes: LOS = Level of Service, AWSC = All-Way Stop Control
[1] For all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.
Source: Fehr & Peers, 2019

TRANSIT SERVICE

Transit service in the City of Manteca is provided by Manteca Transit. Transit Route 2 (northbound / westbound) and Transit Route 3 (southbound / eastbound) provide fixed route service near the study area. The closest transit stop for Routes 2 and 3 are located on Atherton Street, east of Union Road, which is approximately one-mile northeast of the project site.

BICYCLE AND PEDESTRIAN FACILITIES

Bicycle infrastructure near the project site consists of a Class II bike lane on Oleander Avenue east of the project site. A Class II bike lane is defined in the Manteca Bicycle Master Plan (City of Manteca, 2003) as a bike lane that provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Woodward Avenue consists of shoulders in each direction, which are suitable for bicycle travel, though pavement markings and signage is not provided to designate them as such.

The pedestrian network in the study area includes sidewalks present along the developed frontages of Airport Way, Union Road and Woodward Avenue. Sidewalks in the area are being constructed as development occurs; therefore, significant gaps in the pedestrian network currently exist. However, these gaps will be reduced, if not eliminated, as the area continues to build out.

PROJECT TRIP GENERATION

Table 3 presents the estimated trips generated by the proposed project for weekday daily, AM and PM peak hour conditions. As shown below, the project would generate approximately 566 daily vehicle trips, 44 AM peak hour trips, and 59 PM peak hour trips. The trips generated by the residential land uses are based on trip rates from the *Trip Generation Manual 10th Edition* (Institute of Transportation Engineers, 2017).

Table 3: Wackerly Annexation Trip Generation Analysis

ITE Land Use (Code)	Quantity (dwelling units)	Vehicle Trip Rate[1]							Vehicle Trips						
		Daily	AM			PM			Daily	AM			PM		
		Total	In	Out	Total	In	Out	Total	Total	In	Out	Total	In	Out	Total
Single Family Detached (210)	60	9.44	0.19	0.55	0.74	0.62	0.37	0.99	566	11	33	44	37	22	59

Notes:
[1] Trip rates are based on the *Trip Generation Manual 10th Edition* (Institute of Transportation Engineers 2017).
Source: Fehr & Peers, 2019

TRIP DISTRIBUTION/ASSIGNMENT

Project trips were distributed throughout the study area and assigned to project driveways based on proposed permitted turning movements and existing directional travel patterns on Airport Way, Union Road, and Woodward Avenue during morning and evening commute time periods. The westerly Street A access would be restricted to right-turns only via the existing raised median on Woodward Avenue, while the easterly Street B access would permit all turning movements via a two-way left-turn lane that is present.

Based on existing travel patterns, approximately 33 percent of project trips during the AM peak hour and 31 percent of project trips during the PM peak hour will head west on Woodward Avenue while 67 percent of project trips during the AM peak hour and 69 percent of project trips during the PM peak hour will head east.

EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Table 4 displays intersection LOS and delay under existing plus project conditions. As shown, all intersections would operate acceptably with the proposed project. Technical calculations are provided in Appendix B.

Table 4: Level of Service Analysis – Existing Plus Project Conditions

Intersection	Control	Existing Conditions				Existing Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1) Airport Way/Woodward Avenue	AWSC	12	B	15	B	12	B	15	C
2) Union Road/Woodward Avenue	AWSC	16	C	18	C	16	C	19	C
3) Woodward Avenue/Street A (west project driveway)	SSSC	N/A	N/A	N/A	N/A	0 (9)	A (A)	0 (10)	A (A)
4) Woodward Avenue/Street B (east project driveway)	SSSC	N/A	N/A	N/A	N/A	1 (10)	A (B)	1 (11)	A (B)

Notes:
LOS = Level of Service, AWSC = All-Way Stop Control; SSSC = Side-Street Stop-Control
In some cases, reported intersection delay is the same; however, LOS varies. This is due to rounding and occurs when intersection delay is at the delay threshold between two different levels of service.
[1] For all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop-controlled intersections, average intersection and (worst-case movement) delay in seconds per vehicle is reported.

Source: Fehr & Peers, 2019

QUEUING ANALYSIS

Because Intersection 4 proposes full access, we completed a queuing analysis for the westbound left-turn ingress turning movement from Woodward Avenue. The estimated maximum queue is approximately 50 feet (two vehicles). Approximately 185 feet of deceleration and storage would be provided between Street B and the beginning of the raised median located to the east of the project. Thus, no queuing problems are expected at this location. See Appendix B for technical calculations.

4. CUMULATIVE CONDITIONS ANALYSIS

This chapter presents the results for Cumulative No Project and Cumulative Plus Project Conditions.

CUMULATIVE NO PROJECT INTERSECTION LEVELS OF SERVICE

The City of Manteca Public Facilities Impact Fee Program includes traffic signals at both existing study intersections under cumulative conditions; therefore, traffic signals were assumed at Intersections 1 and 2 in the Cumulative No Project scenario. Table 5 displays the results of the Cumulative No Project operations analysis.

Table 5: Level of Service Analysis – Cumulative No Project Conditions

Intersection	Control[1]	Existing Conditions				Cumulative No Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1) Airport Way/Woodward Avenue	AWSC/Signal	12	B	15	B	34	C	38	D
2) Union Road/Woodward Avenue	AWSC/Signal	16	C	18	C	29	C	22	C

Notes:
LOS = Level of Service, AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control
[1] Under existing conditions, intersection control for both study intersections is AWSC. Under cumulative conditions, intersection control for both study intersections is a traffic signal.
[2] For signalized intersections and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.

Source: Fehr & Peers, 2019

CUMULATIVE PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Project trips were added to Cumulative No Project volumes. The same trip generation estimates and trip distribution patterns for project-generated traffic used for Existing Plus Project conditions was also applied for Cumulative Plus Project Conditions. Table 6 displays the results of the Cumulative Plus Project Conditions operations analysis. As shown, all intersection operate acceptably at LOS D or better during both peak hours.

Table 6: Level of Service Analysis – Cumulative Plus Project Conditions									
Intersection	Control[1]	Cumulative No Project Conditions				Cumulative Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1) Airport Way/Woodward Avenue	Signal	34	C	38	D	34	C	40	D
2) Union Road/Woodward Avenue	Signal	29	C	22	C	29	C	23	C
3) Woodward Avenue/Street A (west project driveway)	SSSC	N/A	N/A	N/A	N/A	0 (10)	A (A)	0 (13)	A (B)
4) Woodward Avenue/Street B (east project driveway)	SSSC	N/A	N/A	N/A	N/A	1 (13)	A (B)	0 (17)	A (C)

Notes:
LOS = Level of Service, AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control
[1] Under cumulative conditions, intersection control for Intersections 1 and 2 is a traffic signal.
[2] For signalized intersections and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, average intersection and (worst-case movement) delay in seconds per vehicle is reported.

Source: Fehr & Peers, 2019

SIGNAL WARRANT AND QUEUING ANALYSIS

A signal warrant analysis (for peak hour conditions), consistent with the methodologies in the *California MUTCD 2014 Edition*, and queuing analysis were performed for the Woodward Avenue/Street B intersection under Cumulative Plus Project conditions. The intersection does not satisfy the warrant for installation of a traffic signal. See Appendix B for technical calculations.

A queuing analysis was completed to determine the maximum queue for the westbound left-turn ingress turning movement. Results of the analysis estimate a maximum queue of approximately 75 feet (3 vehicles). Approximately 185 feet of deceleration and storage would be provided between Street B and the beginning of the raised median located to the east of project. Thus, no queuing problems are expected at this location. See Appendix B for technical calculations.

5. TRANSPORTATION IMPACT ANALYSIS CONCLUSIONS

This chapter presents the conclusions of the transportation impact analysis for the proposed Wackerly Annexation Project in Manteca, California. The Wackerly Annexation would construct sixty (60) single-family residential units on an approximately 13-acre parcel located on the south side of Woodward Avenue between Airport Way and Union Road.

RESULTS OF THE INTERSECTION LEVEL OF SERVICE ANALYSIS

All intersections would operate acceptably at LOS D or better under Existing Plus Project and Cumulative Plus Project conditions. Therefore, impacts of the proposed project would be considered *less than significant*.

Although not a level of service impact, some motorists heading westbound on Woodward Avenue may opt to exit the development from Street A and make a u-turn after the median break. To discourage this behavior, installation of a "No-U-Turn" sign is recommended at the median break.

RESULTS OF THE SIGNAL WARRANT ANALYSIS AND QUEUING ANALYSIS

Results of the signal warrant analysis indicate the Woodward Avenue/Street B intersection does not satisfy the warrant for a traffic signal. Due to low volumes and low delay experienced under both Existing Plus Project and Cumulative Plus Project conditions, side-street stop-control is recommended.

The existing two-way left-turn lane located east of Street B is adequate to provide left-turn storage and deceleration into Street B.

ADJACENT PROPERTY CONSIDERATIONS

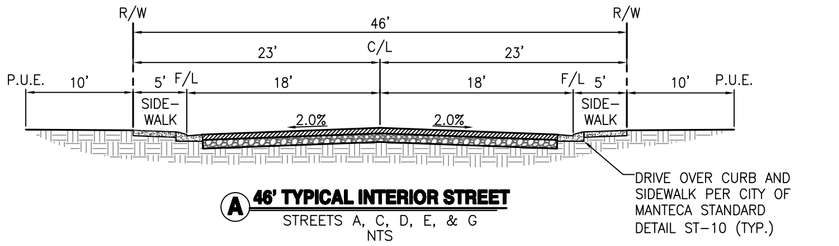
The project site plan shows street connections to vacant properties located to the south and west of the site. This analysis did not consider the potential for development of those properties to affect both the distribution of project trips and volume of traffic on Street A and Street B at Woodward Avenue. When development applications for those properties are submitted to the City, additional analyses should be performed to confirm that their access provisions and resulting traffic flows do not adversely affect the proposed project and its access points along Woodward Avenue.

Two vacant parcels are situated opposite the project site along the north side of Woodward Avenue. The westerly parcel has Commercial Mixed-Use (CMU) zoning, while the easterly parcel has single-family residential zoning. The Sundance Unit 2 project (situated directly east of the easterly residential parcel) has a street stub (Merrimac Street) that could provide a connection to that approximately 4.3-acre property. Detailed site plans for these undeveloped properties were not available to review. Thus, it is not possible to determine how their access points onto Woodward Avenue could function with those of the proposed project. However, it is noted that the location of the Street B intersection (east of the north side residential parcel eastern property line) would preclude the ability to construct

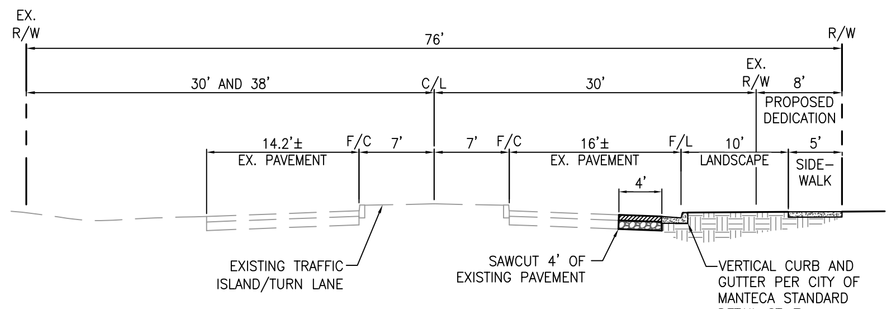
a single four-way full-access intersection on Woodward Avenue that serves both the proposed project and that property.

Appendix A – Tentative Subdivision Map

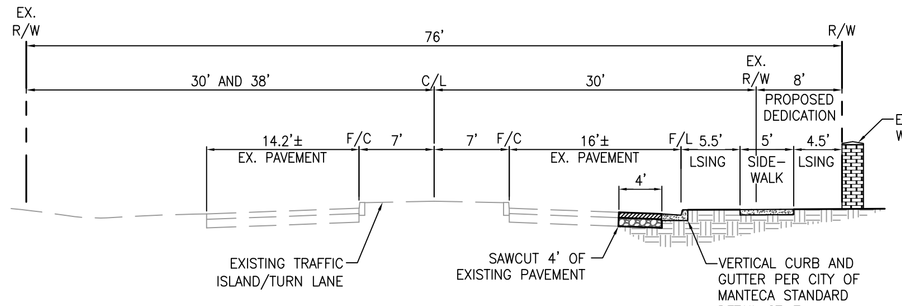
WACKERLY PROPERTY
TENTATIVE SUBDIVISION MAP
MANTECA, CALIFORNIA



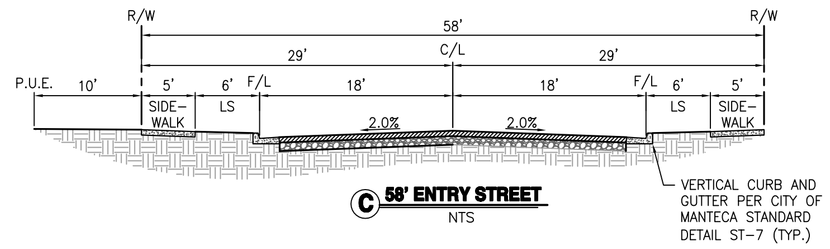
A 46' TYPICAL INTERIOR STREET
STREETS A, C, D, E, & G
NTS



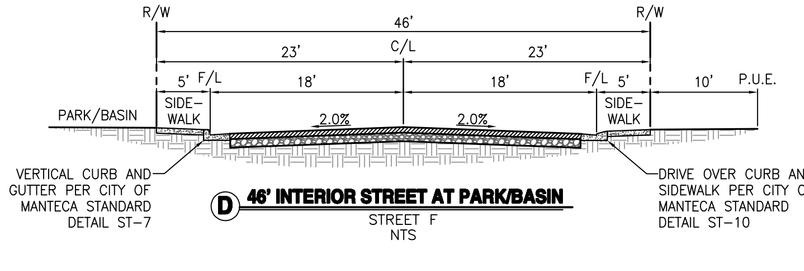
B1 EXISTING WOODWARD AVENUE
NTS



B2 EXISTING WOODWARD AVENUE
NTS



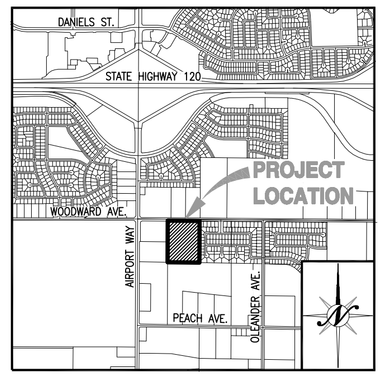
C 58' ENTRY STREET
NTS



D 46' INTERIOR STREET AT PARK/BASIN
STREET F
NTS



60 30 0 60
1" = 60'



VICINITY MAP
NTS

SHEET INDEX

1. TM1.1 COVER AND CROSS SECTIONS SHEET
2. TM2.1 DIMENSION AND TOPOGRAPHIC PLAN
3. TM2.2 UTILITY PLAN

PROJECT INFORMATION

A. REGULATORY AGENCY:	CITY OF MANTECA 1001 W CENTER STREET MANTECA, CA 95337 T: (209) 456-8000 CONTACT: TENDAI MTUNGA
B. APPLICANT:	KDH GROUP, LLC 3200 DANVILLE BOULEVARD, SUITE 200 ALAMO CA. 94507 T: (925) 683-7052 CONTACT: DOUG LEDEBOER
C. ENGINEER:	NORTHSTAR ENGINEERING GROUP, INC 620 12th STREET MODESTO CA, 95354 T: (209) 524-3525 CONTACT: TONY DE MELO, P.E.
D. ASSESSOR'S PARCEL NUMBERS:	226-17-003
E. EXISTING LAND USE:	HOME SITE AND OPEN FIELD
F. PROPOSED LAND USE:	SINGLE FAMILY HOMES
G. EXISTING ZONING/GP:	AU-20/ R/L
H. PROPOSED ZONING/GP:	R-1/ R/L
I. TOTAL PROJECT SIZE:	13.5± ACRES
J. NET ACREAGE:	12.9± ACRES
K. TOTAL NUMBER OF R-1 LOTS:	60
L. DENSITY:	4.6 UNITS/DU
M. TYPICAL LOT SIZE:	50'x100'
N. PARKING:	MINIMUM TWO CAR GARAGE, AND TWO DRIVEWAY SPACES PER LOT
O. CONTOURS:	1.0-FOOT INTERVALS
P. RETURNS:	PER CITY OF MANTECA STANDARDS
Q. UTILITIES:	WATER SYSTEM – CITY OF MANTECA SANITARY SEWER – CITY OF MANTECA STORM DRAINAGE – CITY OF MANTECA GAS – PG&E ELECTRIC – PG&E TELEPHONE – AT&T SCHOOL DISTRICT – MANTECA UNIFIED SCHOOL DISTRICT

GENERAL NOTES

1. ALL IMPROVEMENTS SHALL BE CONSTRUCTED AS PER THE CITY OF MANTECA STANDARD PLANS AND SPECIFICATIONS EXCEPT AS NOTED.
2. STORM DRAINAGE TO BE CONVEYED TO AN ON-SITE STORM DRAIN BASIN AND STORM DRAINAGE METERING STATION WHICH WILL DISCHARGE TO CITY OF MANTECA STORM DRAINAGE SYSTEM. ALL IMPROVEMENTS TO BE CONSTRUCTED TO THE CITY OF MANTECA STANDARDS.
3. ALL STORM DRAINAGE IMPROVEMENTS AS PART OF FUTURE IMPROVEMENTS PLANS AND STUDIES SHALL CONFORM TO THE REQUIREMENTS SET FORTH IN NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT 2013-0001-DWQ AND THE MULTI-AGENCY POST-CONSTRUCTION STORMWATER STANDARDS MANUAL APPROVED OR ADOPTED PRIOR TO THE TIME OF THIS TENTATIVE MAP APPLICATION BEING DEEMED COMPLETE.
4. SANITARY SEWER TO BE CONSTRUCTED TO THE CITY OF MANTECA STANDARDS AND SPECIFICATIONS.
5. WATER SYSTEM TO BE CONSTRUCTED TO THE CITY OF MANTECA STANDARDS AND SPECIFICATIONS.
6. STREET LIGHTING SHALL BE INSTALLED PER CITY OF MANTECA STANDARD SPECIFICATIONS.
7. PUBLIC UTILITIES ARE TO BE INSTALLED UNDER GROUND IN EASEMENTS.
8. THE SUBDIVIDER HEREBY RESERVES THE RIGHT TO FILE "MULTIPLE SUBDIVISION MAPS" AS SET FORTH BY THE SUBDIVISION MAP ACT, ARTICLE 4, SECTION 66456.1., AND FILE PARCEL MAPS FOR REASON OF SALE. ALL PARCEL LINES SHALL CONFORM TO THIS TENTATIVE MAP.
9. PUBLIC UTILITY EASEMENTS WILL BE PROVIDED ALONG ALL STREET IN-TRACT FRONTAGES.
10. ALL EXISTING STRUCTURES AND TREES ARE TO BE REMOVED UNLESS OTHERWISE NOTED. SEPTIC TANKS, LEACH FIELDS, AND WELLS ON SITE WILL BE REMOVED OR ABANDONED AS PER CITY OF MANTECA REQUIREMENTS.
11. APPLICANT SHALL PROVIDE ACCESS AGREEMENT IN PERPETUITY FOR CITY TO INSPECT ALL POST-CONSTUCTION BMP'S.
12. ALL LOT SETBACK REQUIREMENTS AND LOT SIZES ARE TO BE IN ACCORDANCE WITH CITY OF MANTECA MUNICIPAL CODE 17.26.020, TABLE 17.26.020-1.

CITY ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THIS MAP HAS BEEN REVIEWED FOR COMPLIANCE WITH THE REQUIREMENTS OF THE CITY OF MANTECA MUNICIPAL CODE AND THE SUBDIVISION MAP ACT AS TO FORM AND CONTENT

CITY ENGINEER _____ DATE _____

LEGAL DESCRIPTION

THE LAND DESCRIBED HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SAN JOAQUIN, CITY OF MANTECA, AND IS DESCRIBED AS FOLLOWS: LOT SEVEN (7) AS SHOWN UPON MAP ENTITLED, CALIFORNIA NILE GARDEN FARMS, MAP NO. 5, FILED FOR RECORD MAY 6, 1913, IN VOL. 7 OF MAPS AND PLATS, PAGE 12, SAN JOAQUIN COUNTY RECORDS.

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REGISTERED PROFESSIONAL ENGINEER ANTHONY M. DE MELO 13 PRELIMINARY NOT FOR CONSTRUCTION STATE OF CALIFORNIA

REVISIONS			
NO.	DESCRIPTIONS	DATE	APPROVED

COVER AND CROSS SECTIONS SHEET
TENTATIVE SUBDIVISION MAP
WACKERLY PROPERTY
MANTECA, CALIFORNIA

North Star Engineering Group, Inc.
• CIVIL ENGINEERING • SURVEYING • PLANNING •
620 12th Street Modesto, CA 95354
(209) 524-3525 Phone (209) 524-3526 Fax

JOB #:	18-2195
DATE:	01/22/2019
SCALE:	1" = 60'
DRAWN:	PMH
DESIGN:	PMH
CHK'D:	TPD

SHEET NUMBER

TM 1.1

PLOTTED: 01/17/2019 14:14 PLOTTED BY: Phuntion
DWGNAME: F:\18-2195 Wackerly Property\Planning\TM\TM 1.1.dwg

Appendix B – Technical Calculations

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	45	78	6	46	80	44	124	6	72	101	42
Future Vol, veh/h	102	45	78	6	46	80	44	124	6	72	101	42
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	126	56	96	7	57	99	54	153	7	89	125	52
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.7	11	13.5	12.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	25%	69%	0%	100%	0%	42%	0%
Vol Thru, %	71%	31%	0%	0%	37%	58%	0%
Vol Right, %	3%	0%	100%	0%	63%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	174	147	78	6	126	173	42
LT Vol	44	102	0	6	0	72	0
Through Vol	124	45	0	0	46	101	0
RT Vol	6	0	78	0	80	0	42
Lane Flow Rate	215	181	96	7	156	214	52
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.384	0.339	0.152	0.015	0.265	0.386	0.08
Departure Headway (Hd)	6.435	6.732	5.667	7.1	6.137	6.505	5.585
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	534	631	503	583	551	639
Service Time	4.492	4.491	3.425	4.864	3.901	4.261	3.34
HCM Lane V/C Ratio	0.385	0.339	0.152	0.014	0.268	0.388	0.081
HCM Control Delay	13.5	12.9	9.4	10	11.1	13.3	8.8
HCM Lane LOS	B	B	A	A	B	B	A
HCM 95th-tile Q	1.8	1.5	0.5	0	1.1	1.8	0.3

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	101	6	38	65	115	10	181	30	78	158	46
Future Vol, veh/h	65	101	6	38	65	115	10	181	30	78	158	46
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	82	128	8	48	82	146	13	229	38	99	200	58
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	12.6	14	17.8	17.5
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	5%	100%	0%	100%	0%	33%	0%
Vol Thru, %	82%	0%	94%	0%	36%	67%	0%
Vol Right, %	14%	0%	6%	0%	64%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	65	107	38	180	236	46
LT Vol	10	65	0	38	0	78	0
Through Vol	181	0	101	0	65	158	0
RT Vol	30	0	6	0	115	0	46
Lane Flow Rate	280	82	135	48	228	299	58
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.539	0.179	0.274	0.103	0.427	0.58	0.099
Departure Headway (Hd)	6.93	7.827	7.273	7.713	6.741	6.985	6.103
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	520	458	493	465	533	517	586
Service Time	4.976	5.579	5.025	5.462	4.489	4.729	3.846
HCM Lane V/C Ratio	0.538	0.179	0.274	0.103	0.428	0.578	0.099
HCM Control Delay	17.8	12.3	12.8	11.4	14.5	19	9.5
HCM Lane LOS	C	B	B	B	B	C	A
HCM 95th-tile Q	3.2	0.6	1.1	0.3	2.1	3.6	0.3

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	65	37	3	54	54	13	120	5	160	214	83
Future Vol, veh/h	74	65	37	3	54	54	13	120	5	160	214	83
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	69	39	3	57	57	14	128	5	170	228	88
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.5	10.7	11.5	17.4
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	53%	0%	100%	0%	43%	0%
Vol Thru, %	87%	47%	0%	0%	50%	57%	0%
Vol Right, %	4%	0%	100%	0%	50%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	138	139	37	3	108	374	83
LT Vol	13	74	0	3	0	160	0
Through Vol	120	65	0	0	54	214	0
RT Vol	5	0	37	0	54	0	83
Lane Flow Rate	147	148	39	3	115	398	88
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.255	0.28	0.064	0.006	0.202	0.658	0.123
Departure Headway (Hd)	6.265	6.817	5.833	7.208	6.34	5.95	5.028
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	573	526	612	496	564	609	713
Service Time	4.314	4.567	3.583	4.963	4.095	3.684	2.762
HCM Lane V/C Ratio	0.257	0.281	0.064	0.006	0.204	0.654	0.123
HCM Control Delay	11.5	12.2	9	10	10.7	19.4	8.5
HCM Lane LOS	B	B	A	A	B	C	A
HCM 95th-tile Q	1	1.1	0.2	0	0.7	4.9	0.4

Intersection	
Intersection Delay, s/veh	18.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	84	138	11	20	92	82	5	109	14	169	191	99
Future Vol, veh/h	84	138	11	20	92	82	5	109	14	169	191	99
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	97	159	13	23	106	94	6	125	16	194	220	114
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	13	13.6	13.2	24.7
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	4%	100%	0%	100%	0%	47%	0%
Vol Thru, %	85%	0%	93%	0%	53%	53%	0%
Vol Right, %	11%	0%	7%	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	128	84	149	20	174	360	99
LT Vol	5	84	0	20	0	169	0
Through Vol	109	0	138	0	92	191	0
RT Vol	14	0	11	0	82	0	99
Lane Flow Rate	147	97	171	23	200	414	114
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.293	0.205	0.337	0.049	0.383	0.774	0.183
Departure Headway (Hd)	7.162	7.65	7.085	7.75	6.898	6.738	5.789
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	502	469	507	462	522	542	624
Service Time	5.206	5.393	4.827	5.494	4.642	4.438	3.489
HCM Lane V/C Ratio	0.293	0.207	0.337	0.05	0.383	0.764	0.183
HCM Control Delay	13.2	12.4	13.4	10.9	13.9	28.8	9.8
HCM Lane LOS	B	B	B	B	B	D	A
HCM 95th-tile Q	1.2	0.8	1.5	0.2	1.8	7	0.7

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	102	45	78	6	46	80	44	124	6	72	101	42
Future Vol, veh/h	102	45	78	6	46	80	44	124	6	72	101	42
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	126	56	96	7	57	99	54	153	7	89	125	52
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.7	11	13.5	12.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	25%	69%	0%	100%	0%	42%	0%
Vol Thru, %	71%	31%	0%	0%	37%	58%	0%
Vol Right, %	3%	0%	100%	0%	63%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	174	147	78	6	126	173	42
LT Vol	44	102	0	6	0	72	0
Through Vol	124	45	0	0	46	101	0
RT Vol	6	0	78	0	80	0	42
Lane Flow Rate	215	181	96	7	156	214	52
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.384	0.339	0.152	0.015	0.265	0.386	0.08
Departure Headway (Hd)	6.435	6.732	5.667	7.1	6.137	6.505	5.585
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	534	631	503	583	551	639
Service Time	4.492	4.491	3.425	4.864	3.901	4.261	3.34
HCM Lane V/C Ratio	0.385	0.339	0.152	0.014	0.268	0.388	0.081
HCM Control Delay	13.5	12.9	9.4	10	11.1	13.3	8.8
HCM Lane LOS	B	B	A	A	B	B	A
HCM 95th-tile Q	1.8	1.5	0.5	0	1.1	1.8	0.3

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	101	6	38	65	115	10	181	30	78	158	46
Future Vol, veh/h	65	101	6	38	65	115	10	181	30	78	158	46
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	82	128	8	48	82	146	13	229	38	99	200	58
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	12.6	14	17.8	17.5
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	5%	100%	0%	100%	0%	33%	0%
Vol Thru, %	82%	0%	94%	0%	36%	67%	0%
Vol Right, %	14%	0%	6%	0%	64%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	65	107	38	180	236	46
LT Vol	10	65	0	38	0	78	0
Through Vol	181	0	101	0	65	158	0
RT Vol	30	0	6	0	115	0	46
Lane Flow Rate	280	82	135	48	228	299	58
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.539	0.179	0.274	0.103	0.427	0.58	0.099
Departure Headway (Hd)	6.93	7.827	7.273	7.713	6.741	6.985	6.103
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	520	458	493	465	533	517	586
Service Time	4.976	5.579	5.025	5.462	4.489	4.729	3.846
HCM Lane V/C Ratio	0.538	0.179	0.274	0.103	0.428	0.578	0.099
HCM Control Delay	17.8	12.3	12.8	11.4	14.5	19	9.5
HCM Lane LOS	C	B	B	B	B	C	A
HCM 95th-tile Q	3.2	0.6	1.1	0.3	2.1	3.6	0.3

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	121	2	0	132	0	11
Future Vol, veh/h	121	2	0	132	0	11
Conflicting Peds, #/hr	0	5	5	0	0	5
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	80	80	80	80	80	80
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	151	3	0	165	0	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	163
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.345
Pot Cap-1 Maneuver	-	-	0	-	0	874
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	866
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	866	-	-	-
HCM Lane V/C Ratio	0.016	-	-	-
HCM Control Delay (s)	9.2	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	2	7	121	11	11
Future Vol, veh/h	130	2	7	121	11	11
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	163	3	9	151	14	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	171	0	344	175
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1388	-	646	861
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	849	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1381	-	635	853
Mov Cap-2 Maneuver	-	-	-	-	635	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	845	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	728	-	-	1381	-
HCM Lane V/C Ratio	0.038	-	-	0.006	-
HCM Control Delay (s)	10.1	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	71	37	3	57	58	13	120	6	173	214	83
Future Vol, veh/h	74	71	37	3	57	58	13	120	6	173	214	83
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	76	39	3	61	62	14	128	6	184	228	88
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.8	11	11.7	18.9
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	9%	51%	0%	100%	0%	45%	0%
Vol Thru, %	86%	49%	0%	0%	50%	55%	0%
Vol Right, %	4%	0%	100%	0%	50%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	145	37	3	115	387	83
LT Vol	13	74	0	3	0	173	0
Through Vol	120	71	0	0	57	214	0
RT Vol	6	0	37	0	58	0	83
Lane Flow Rate	148	154	39	3	122	412	88
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.261	0.295	0.065	0.006	0.218	0.689	0.125
Departure Headway (Hd)	6.355	6.885	5.912	7.289	6.418	6.021	5.089
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	563	521	604	490	558	601	704
Service Time	4.411	4.644	3.669	5.053	4.181	3.76	2.828
HCM Lane V/C Ratio	0.263	0.296	0.065	0.006	0.219	0.686	0.125
HCM Control Delay	11.7	12.5	9.1	10.1	11	21.1	8.6
HCM Lane LOS	B	B	A	B	B	C	A
HCM 95th-tile Q	1	1.2	0.2	0	0.8	5.4	0.4

Intersection	
Intersection Delay, s/veh	19.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	89	147	12	20	100	82	6	109	14	169	191	107
Future Vol, veh/h	89	147	12	20	100	82	6	109	14	169	191	107
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	102	169	14	23	115	94	7	125	16	194	220	123
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	13.5	14.2	13.5	25.8
HCM LOS	B	B	B	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	5%	100%	0%	100%	0%	47%	0%
Vol Thru, %	84%	0%	92%	0%	55%	53%	0%
Vol Right, %	11%	0%	8%	0%	45%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	129	89	159	20	182	360	107
LT Vol	6	89	0	20	0	169	0
Through Vol	109	0	147	0	100	191	0
RT Vol	14	0	12	0	82	0	107
Lane Flow Rate	148	102	183	23	209	414	123
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.301	0.22	0.364	0.05	0.407	0.788	0.202
Departure Headway (Hd)	7.307	7.73	7.163	7.845	7.007	6.855	5.905
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	491	464	503	456	513	530	611
Service Time	5.36	5.48	4.912	5.595	4.757	4.555	3.605
HCM Lane V/C Ratio	0.301	0.22	0.364	0.05	0.407	0.781	0.201
HCM Control Delay	13.5	12.7	14	11	14.5	30.5	10.1
HCM Lane LOS	B	B	B	B	B	D	B
HCM 95th-tile Q	1.3	0.8	1.6	0.2	2	7.3	0.8

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	240	10	0	118	0	7
Future Vol, veh/h	240	10	0	118	0	7
Conflicting Peds, #/hr	0	5	5	0	0	5
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	264	11	0	130	0	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	280
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	759
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	752
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	752	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-
HCM Control Delay (s)	9.8	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

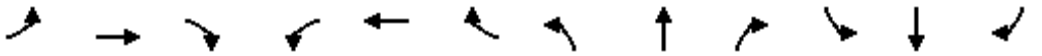
Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	237	10	17	111	7	8
Future Vol, veh/h	237	10	17	111	7	8
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	260	11	19	122	8	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	276	0	436	276
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1287	-	578	763
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	864	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1281	-	564	756
Mov Cap-2 Maneuver	-	-	-	-	564	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.7
HCM LOS			B

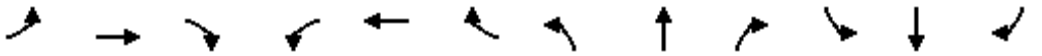
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	652	-	-	1281	-
HCM Lane V/C Ratio	0.025	-	-	0.015	-
HCM Control Delay (s)	10.7	-	-	7.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	460	80	90	20	130	240	60	440	20	80	180	300
Future Volume (veh/h)	460	80	90	20	130	240	60	440	20	80	180	300
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	568	99	37	25	160	70	74	543	0	99	222	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	613	824	686	47	230	189	94	687	306	126	750	321
Arrive On Green	0.36	0.46	0.46	0.03	0.13	0.13	0.05	0.20	0.00	0.07	0.22	0.22
Sat Flow, veh/h	1725	1811	1508	1725	1811	1485	1725	3441	1535	1725	3441	1474
Grp Volume(v), veh/h	568	99	37	25	160	70	74	543	0	99	222	18
Grp Sat Flow(s),veh/h/ln	1725	1811	1508	1725	1811	1485	1725	1721	1535	1725	1721	1474
Q Serve(g_s), s	23.2	2.3	1.0	1.1	6.2	3.2	3.1	11.0	0.0	4.1	4.0	0.7
Cycle Q Clear(g_c), s	23.2	2.3	1.0	1.1	6.2	3.2	3.1	11.0	0.0	4.1	4.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	613	824	686	47	230	189	94	687	306	126	750	321
V/C Ratio(X)	0.93	0.12	0.05	0.53	0.70	0.37	0.79	0.79	0.00	0.79	0.30	0.06
Avail Cap(c_a), veh/h	693	1030	858	176	444	364	176	867	387	176	913	391
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	11.5	11.2	35.3	30.7	29.4	34.3	27.9	0.0	33.5	24.0	22.7
Incr Delay (d2), s/veh	17.4	0.1	0.0	9.1	3.8	1.2	13.4	3.9	0.0	14.5	0.2	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	11.5	0.9	0.3	0.5	2.9	1.2	1.5	4.3	0.0	2.1	1.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	11.6	11.2	44.3	34.5	30.6	47.7	31.9	0.0	48.0	24.2	22.8
LnGrp LOS	D	B	B	D	C	C	D	C	A	D	C	C
Approach Vol, veh/h		704			255			617			339	
Approach Delay, s/veh		34.6			34.4			33.8			31.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.9	19.2	6.5	37.9	8.5	20.5	30.6	13.8
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	7.5	18.5	7.5	41.8	7.5	19.5	29.5	18.0
Max Q Clear Time (g_c+I1), s	6.1	13.0	3.1	4.3	5.1	6.0	25.2	8.2
Green Ext Time (p_c), s	0.0	1.5	0.0	0.7	0.0	1.0	0.9	0.7

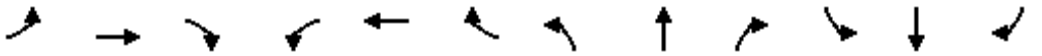
Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	130	30	50	160	500	40	400	60	120	170	100
Future Volume (veh/h)	170	130	30	50	160	500	40	400	60	120	170	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	215	165	18	63	203	414	51	506	0	152	215	7
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	259	959	799	0	581	483	75	693	309	190	922	396
Arrive On Green	0.15	0.52	0.52	0.00	0.32	0.32	0.04	0.20	0.00	0.11	0.26	0.26
Sat Flow, veh/h	1753	1841	1534	0	1841	1529	1753	3497	1560	1753	3497	1503
Grp Volume(v), veh/h	215	165	18	0	203	414	51	506	0	152	215	7
Grp Sat Flow(s),veh/h/ln	1753	1841	1534	0	1841	1529	1753	1749	1560	1753	1749	1503
Q Serve(g_s), s	9.3	3.7	0.4	0.0	6.6	19.9	2.2	10.6	0.0	6.6	3.8	0.3
Cycle Q Clear(g_c), s	9.3	3.7	0.4	0.0	6.6	19.9	2.2	10.6	0.0	6.6	3.8	0.3
Prop In Lane	1.00		1.00	0.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	259	959	799	0	581	483	75	693	309	190	922	396
V/C Ratio(X)	0.83	0.17	0.02	0.00	0.35	0.86	0.68	0.73	0.00	0.80	0.23	0.02
Avail Cap(c_a), veh/h	437	1375	1146	0	1093	908	190	1184	528	325	1452	624
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	9.9	9.1	0.0	20.6	25.1	36.9	29.4	0.0	34.1	22.6	21.3
Incr Delay (d2), s/veh	6.7	0.1	0.0	0.0	0.4	4.5	10.3	1.5	0.0	7.6	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.4	0.1	0.0	2.8	7.4	1.1	4.4	0.0	3.1	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	9.9	9.1	0.0	21.0	29.7	47.2	30.9	0.0	41.6	22.8	21.3
LnGrp LOS	D	A	A	A	C	C	D	C	A	D	C	C
Approach Vol, veh/h		398			617			557			374	
Approach Delay, s/veh		25.6			26.8			32.4			30.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	20.0	0.0	45.3	7.9	25.1	16.1	29.2
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	14.5	26.5	7.5	58.5	8.5	32.5	19.5	46.5
Max Q Clear Time (g_c+I1), s	8.6	12.6	0.0	5.7	4.2	5.8	11.3	21.9
Green Ext Time (p_c), s	0.2	2.7	0.0	1.1	0.0	1.3	0.4	2.8

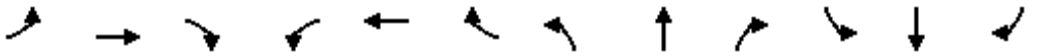
Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	150	90	30	140	120	20	340	20	430	590	390
Future Volume (veh/h)	440	150	90	30	140	120	20	340	20	430	590	390
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	468	160	31	32	149	11	21	362	3	457	628	151
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	502	673	559	54	203	166	40	486	206	492	1388	600
Arrive On Green	0.28	0.36	0.36	0.03	0.11	0.11	0.02	0.14	0.14	0.28	0.39	0.39
Sat Flow, veh/h	1781	1870	1555	1781	1870	1529	1781	3554	1504	1781	3554	1536
Grp Volume(v), veh/h	468	160	31	32	149	11	21	362	3	457	628	151
Grp Sat Flow(s),veh/h/ln	1781	1870	1555	1781	1870	1529	1781	1777	1504	1781	1777	1536
Q Serve(g_s), s	23.4	5.5	1.2	1.6	7.1	0.6	1.1	9.0	0.2	22.9	12.0	6.1
Cycle Q Clear(g_c), s	23.4	5.5	1.2	1.6	7.1	0.6	1.1	9.0	0.2	22.9	12.0	6.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	502	673	559	54	203	166	40	486	206	492	1388	600
V/C Ratio(X)	0.93	0.24	0.06	0.59	0.74	0.07	0.52	0.74	0.01	0.93	0.45	0.25
Avail Cap(c_a), veh/h	535	803	668	146	368	301	146	738	312	535	1592	688
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	1.00	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	32.0	20.5	19.1	43.8	39.5	36.7	44.2	38.0	34.2	32.2	20.6	18.8
Incr Delay (d2), s/veh	22.7	0.2	0.0	9.8	5.1	0.2	10.1	2.3	0.0	21.8	0.2	0.2
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	12.8	2.3	0.4	0.9	3.5	0.2	0.6	3.8	0.1	12.2	4.7	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.7	20.7	19.2	53.6	44.7	36.8	54.3	40.2	34.2	54.0	20.9	19.1
LnGrp LOS	D	C	B	D	D	D	D	D	C	D	C	B
Approach Vol, veh/h		659			192			386			1236	
Approach Delay, s/veh		44.8			45.7			41.0			32.9	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.8	17.0	7.3	37.4	6.6	40.3	30.3	14.4
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	27.5	19.0	7.5	39.3	7.5	41.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	24.9	11.0	3.6	7.5	3.1	14.0	25.4	9.1
Green Ext Time (p_c), s	0.4	1.2	0.0	1.0	0.0	4.8	0.4	0.5

Intersection Summary	
HCM 6th Ctrl Delay	38.3
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	240	50	40	170	280	20	140	30	560	540	290
Future Volume (veh/h)	140	240	50	40	170	280	20	140	30	560	540	290
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	161	276	16	46	195	25	23	161	0	644	621	133
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	206	608	505	0	271	223	46	310	138	715	1643	712
Arrive On Green	0.11	0.32	0.32	0.00	0.14	0.14	0.03	0.09	0.00	0.40	0.46	0.46
Sat Flow, veh/h	1795	1885	1566	0	1885	1550	1795	3582	1598	1795	3582	1551
Grp Volume(v), veh/h	161	276	16	0	195	25	23	161	0	644	621	133
Grp Sat Flow(s),veh/h/ln	1795	1885	1566	0	1885	1550	1795	1791	1598	1795	1791	1551
Q Serve(g_s), s	6.1	8.1	0.5	0.0	6.9	1.0	0.9	3.0	0.0	23.6	8.0	3.6
Cycle Q Clear(g_c), s	6.1	8.1	0.5	0.0	6.9	1.0	0.9	3.0	0.0	23.6	8.0	3.6
Prop In Lane	1.00		1.00	0.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	608	505	0	271	223	46	310	138	715	1643	712
V/C Ratio(X)	0.78	0.45	0.03	0.00	0.72	0.11	0.50	0.52	0.00	0.90	0.38	0.19
Avail Cap(c_a), veh/h	500	901	749	0	579	476	192	971	433	1627	3834	1660
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	18.8	16.2	0.0	28.7	26.1	33.7	30.6	0.0	19.8	12.4	11.2
Incr Delay (d2), s/veh	6.3	0.5	0.0	0.0	3.6	0.2	8.0	1.3	0.0	4.5	0.1	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	2.9	3.4	0.2	0.0	3.3	0.4	0.5	1.3	0.0	9.5	2.8	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.5	19.4	16.3	0.0	32.3	26.3	41.7	32.0	0.0	24.3	12.6	11.3
LnGrp LOS	D	B	B	A	C	C	D	C	A	C	B	B
Approach Vol, veh/h		453			220			184			1398	
Approach Delay, s/veh		25.3			31.6			33.2			17.8	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.4	10.6	0.0	27.1	6.3	36.6	12.5	14.6
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	63.5	19.0	7.5	33.5	7.5	75.0	19.5	21.5
Max Q Clear Time (g_c+I1), s	25.6	5.0	0.0	10.1	2.9	10.0	8.1	8.9
Green Ext Time (p_c), s	2.3	0.7	0.0	1.7	0.0	5.3	0.3	0.9

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	460	82	90	21	134	246	60	440	20	82	180	300
Future Volume (veh/h)	460	82	90	21	134	246	60	440	20	82	180	300
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	568	101	37	26	165	78	74	543	0	101	222	18
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	612	827	688	48	235	193	94	684	305	128	752	322
Arrive On Green	0.35	0.46	0.46	0.03	0.13	0.13	0.05	0.20	0.00	0.07	0.22	0.22
Sat Flow, veh/h	1725	1811	1508	1725	1811	1486	1725	3441	1535	1725	3441	1474
Grp Volume(v), veh/h	568	101	37	26	165	78	74	543	0	101	222	18
Grp Sat Flow(s),veh/h/ln	1725	1811	1508	1725	1811	1486	1725	1721	1535	1725	1721	1474
Q Serve(g_s), s	23.5	2.4	1.0	1.1	6.5	3.6	3.1	11.1	0.0	4.3	4.0	0.7
Cycle Q Clear(g_c), s	23.5	2.4	1.0	1.1	6.5	3.6	3.1	11.1	0.0	4.3	4.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	612	827	688	48	235	193	94	684	305	128	752	322
V/C Ratio(X)	0.93	0.12	0.05	0.54	0.70	0.40	0.79	0.79	0.00	0.79	0.30	0.06
Avail Cap(c_a), veh/h	685	1019	849	174	439	360	174	857	382	174	903	387
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	11.6	11.2	35.6	30.9	29.7	34.7	28.3	0.0	33.8	24.2	23.0
Incr Delay (d2), s/veh	17.9	0.1	0.0	9.1	3.8	1.4	13.4	4.1	0.0	15.4	0.2	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	11.7	0.9	0.3	0.6	3.0	1.3	1.5	4.4	0.0	2.2	1.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	11.7	11.3	44.7	34.7	31.1	48.1	32.4	0.0	49.2	24.5	23.0
LnGrp LOS	D	B	B	D	C	C	D	C	A	D	C	C
Approach Vol, veh/h		706			269			617			341	
Approach Delay, s/veh		35.2			34.6			34.3			31.7	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	19.3	6.6	38.4	8.5	20.7	30.9	14.1
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	7.5	18.5	7.5	41.8	7.5	19.5	29.5	18.0
Max Q Clear Time (g_c+I1), s	6.3	13.1	3.1	4.4	5.1	6.0	25.5	8.5
Green Ext Time (p_c), s	0.0	1.4	0.0	0.7	0.0	1.0	0.8	0.8

Intersection Summary	
HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	146	30	50	164	500	41	400	60	120	170	102
Future Volume (veh/h)	176	146	30	50	164	500	41	400	60	120	170	102
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	223	185	18	63	208	414	52	506	0	152	215	9
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	267	966	804	0	581	482	75	689	307	190	917	394
Arrive On Green	0.15	0.52	0.52	0.00	0.32	0.32	0.04	0.20	0.00	0.11	0.26	0.26
Sat Flow, veh/h	1753	1841	1534	0	1841	1528	1753	3497	1560	1753	3497	1503
Grp Volume(v), veh/h	223	185	18	0	208	414	52	506	0	152	215	9
Grp Sat Flow(s),veh/h/ln	1753	1841	1534	0	1841	1528	1753	1749	1560	1753	1749	1503
Q Serve(g_s), s	9.8	4.2	0.4	0.0	6.9	20.2	2.3	10.8	0.0	6.7	3.8	0.4
Cycle Q Clear(g_c), s	9.8	4.2	0.4	0.0	6.9	20.2	2.3	10.8	0.0	6.7	3.8	0.4
Prop In Lane	1.00		1.00	0.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	267	966	804	0	581	482	75	689	307	190	917	394
V/C Ratio(X)	0.83	0.19	0.02	0.00	0.36	0.86	0.69	0.73	0.00	0.80	0.23	0.02
Avail Cap(c_a), veh/h	431	1358	1131	0	1079	896	188	1168	521	320	1433	616
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	10.0	9.1	0.0	21.0	25.5	37.4	29.9	0.0	34.5	23.0	21.7
Incr Delay (d2), s/veh	7.5	0.1	0.0	0.0	0.4	4.6	10.7	1.5	0.0	7.6	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	1.6	0.1	0.0	2.9	7.5	1.2	4.5	0.0	3.2	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	10.1	9.1	0.0	21.3	30.1	48.1	31.4	0.0	42.2	23.1	21.7
LnGrp LOS	D	B	A	A	C	C	D	C	A	D	C	C
Approach Vol, veh/h		426			622			558			376	
Approach Delay, s/veh		25.8			27.1			33.0			30.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	20.1	0.0	46.1	7.9	25.3	16.6	29.5
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	14.5	26.5	7.5	58.5	8.5	32.5	19.5	46.5
Max Q Clear Time (g_c+I1), s	8.6	12.8	0.0	6.2	4.3	5.8	11.8	22.2
Green Ext Time (p_c), s	0.2	2.7	0.0	1.2	0.0	1.3	0.4	2.8

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	182	2	0	401	0	11
Future Vol, veh/h	182	2	0	401	0	11
Conflicting Peds, #/hr	0	5	5	0	0	5
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	80	80	80	80	80	80
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	228	3	0	501	0	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	240
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.345
Pot Cap-1 Maneuver	-	-	0	-	0	792
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	784
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	784	-	-	-
HCM Lane V/C Ratio	0.018	-	-	-
HCM Control Delay (s)	9.7	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

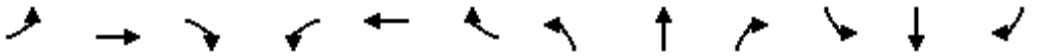
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	191	2	7	390	11	11
Future Vol, veh/h	191	2	7	390	11	11
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	239	3	9	488	14	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	247	0	757	251
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	511	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1302	-	371	780
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	596	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1296	-	365	773
Mov Cap-2 Maneuver	-	-	-	-	365	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	593	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	496	-	-	1296	-
HCM Lane V/C Ratio	0.055	-	-	0.007	-
HCM Control Delay (s)	12.7	-	-	7.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	156	90	30	143	124	20	340	21	443	590	390
Future Volume (veh/h)	440	156	90	30	143	124	20	340	21	443	590	390
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	468	166	31	32	152	15	21	362	4	471	628	151
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	500	673	560	54	205	167	40	483	204	502	1405	607
Arrive On Green	0.28	0.36	0.36	0.03	0.11	0.11	0.02	0.14	0.14	0.28	0.40	0.40
Sat Flow, veh/h	1781	1870	1555	1781	1870	1529	1781	3554	1504	1781	3554	1536
Grp Volume(v), veh/h	468	166	31	32	152	15	21	362	4	471	628	151
Grp Sat Flow(s),veh/h/ln	1781	1870	1555	1781	1870	1529	1781	1777	1504	1781	1777	1536
Q Serve(g_s), s	24.0	5.8	1.2	1.7	7.4	0.8	1.1	9.2	0.2	24.2	12.2	6.2
Cycle Q Clear(g_c), s	24.0	5.8	1.2	1.7	7.4	0.8	1.1	9.2	0.2	24.2	12.2	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	500	673	560	54	205	167	40	483	204	502	1405	607
V/C Ratio(X)	0.94	0.25	0.06	0.60	0.74	0.09	0.52	0.75	0.02	0.94	0.45	0.25
Avail Cap(c_a), veh/h	523	784	652	143	359	294	143	720	305	523	1554	672
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	1.00	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	32.9	21.1	19.6	44.9	40.5	37.5	45.3	39.0	35.1	32.8	20.8	19.0
Incr Delay (d2), s/veh	24.1	0.2	0.0	10.1	5.2	0.2	10.2	2.4	0.0	24.4	0.2	0.2
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	13.3	2.5	0.4	0.9	3.7	0.3	0.6	3.9	0.1	13.2	4.8	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.0	21.3	19.6	55.0	45.7	37.8	55.6	41.4	35.1	57.2	21.0	19.2
LnGrp LOS	E	C	B	E	D	D	E	D	D	E	C	B
Approach Vol, veh/h		665			199			387			1250	
Approach Delay, s/veh		46.3			46.6			42.1			34.4	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.9	17.2	7.3	38.2	6.6	41.6	30.8	14.8
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	27.5	19.0	7.5	39.3	7.5	41.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	26.2	11.2	3.7	7.8	3.1	14.2	26.0	9.4
Green Ext Time (p_c), s	0.2	1.2	0.0	1.0	0.0	4.8	0.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	39.7
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	249	51	40	178	280	21	140	30	560	540	298
Future Volume (veh/h)	145	249	51	40	178	280	21	140	30	560	540	298
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	167	286	18	46	205	25	24	161	0	644	621	143
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	212	620	515	0	279	230	48	307	137	713	1635	708
Arrive On Green	0.12	0.33	0.33	0.00	0.15	0.15	0.03	0.09	0.00	0.40	0.46	0.46
Sat Flow, veh/h	1795	1885	1566	0	1885	1551	1795	3582	1598	1795	3582	1551
Grp Volume(v), veh/h	167	286	18	0	205	25	24	161	0	644	621	143
Grp Sat Flow(s),veh/h/ln	1795	1885	1566	0	1885	1551	1795	1791	1598	1795	1791	1551
Q Serve(g_s), s	6.5	8.6	0.6	0.0	7.5	1.0	0.9	3.1	0.0	24.2	8.2	4.0
Cycle Q Clear(g_c), s	6.5	8.6	0.6	0.0	7.5	1.0	0.9	3.1	0.0	24.2	8.2	4.0
Prop In Lane	1.00		1.00	0.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	620	515	0	279	230	48	307	137	713	1635	708
V/C Ratio(X)	0.79	0.46	0.03	0.00	0.73	0.11	0.50	0.52	0.00	0.90	0.38	0.20
Avail Cap(c_a), veh/h	487	879	730	0	564	464	187	948	423	1587	3740	1619
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	19.1	16.4	0.0	29.2	26.5	34.5	31.4	0.0	20.4	12.8	11.7
Incr Delay (d2), s/veh	6.3	0.5	0.0	0.0	3.7	0.2	8.0	1.4	0.0	4.6	0.1	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	3.1	3.6	0.2	0.0	3.5	0.4	0.5	1.3	0.0	9.9	2.9	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	19.6	16.4	0.0	33.0	26.7	42.5	32.8	0.0	25.0	13.0	11.8
LnGrp LOS	D	B	B	A	C	C	D	C	A	C	B	B
Approach Vol, veh/h		471			230			185			1408	
Approach Delay, s/veh		25.7			32.3			34.1			18.3	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	10.7	0.0	28.1	6.4	37.3	13.0	15.1
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	8.5	19.0	7.5	33.5	7.5	75.0	19.5	21.5
Max Q Clear Time (g_c+I1), s	10.2	5.1	0.0	10.6	2.9	10.2	8.5	9.5
Green Ext Time (p_c), s	2.3	0.7	0.0	1.7	0.0	5.3	0.3	0.9

Intersection Summary		
HCM 6th Ctrl Delay		22.5
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	610	10	0	297	0	7
Future Vol, veh/h	610	10	0	297	0	7
Conflicting Peds, #/hr	0	5	5	0	0	5
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	670	11	0	326	0	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	686
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	447
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	443
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	443	-	-	-
HCM Lane V/C Ratio	0.017	-	-	-
HCM Control Delay (s)	13.3	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	607	10	17	290	7	8
Future Vol, veh/h	607	10	17	290	7	8
Conflicting Peds, #/hr	0	5	5	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	667	11	19	319	8	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	683	0	1040	683
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	362	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	910	-	255	449
Stage 1	-	-	-	-	504	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	906	-	247	445
Mov Cap-2 Maneuver	-	-	-	-	247	-
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	700	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	16.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	906	-
HCM Lane V/C Ratio	0.051	-	-	0.021	-
HCM Control Delay (s)	16.7	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Maximum Queue Estimation for: Major Street Left-Turn

Movement:	WBL from Woodward Ave
Scenario	Existing Plus Project

Input Data

Subject Approach	
Traffic Volume (vph) =	17
PHF=	0.91

Major Street	
Conflicting Traffic Volume (vph) =	237
PHF=	0.91
Conflicting Number of Through Lanes	1
Posted Speed Limit (mph)=	30

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	0

Output

Estimated Maximum Queue	2	vehicles

Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

Maximum Queue Estimation for: Major Street Left-Turn

Movement:	WBL from Woodward Ave
Scenario	Cumulative Year

Input Data

Subject Approach	
Traffic Volume (vph) =	17
PHF=	0.91

Major Street	
Conflicting Traffic Volume (vph) =	607
PHF=	0.91
Conflicting Number of Through Lanes	1
Posted Speed Limit (mph)=	30

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1

Output

Estimated Maximum Queue	3	vehicles

Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

FEHR PEERS

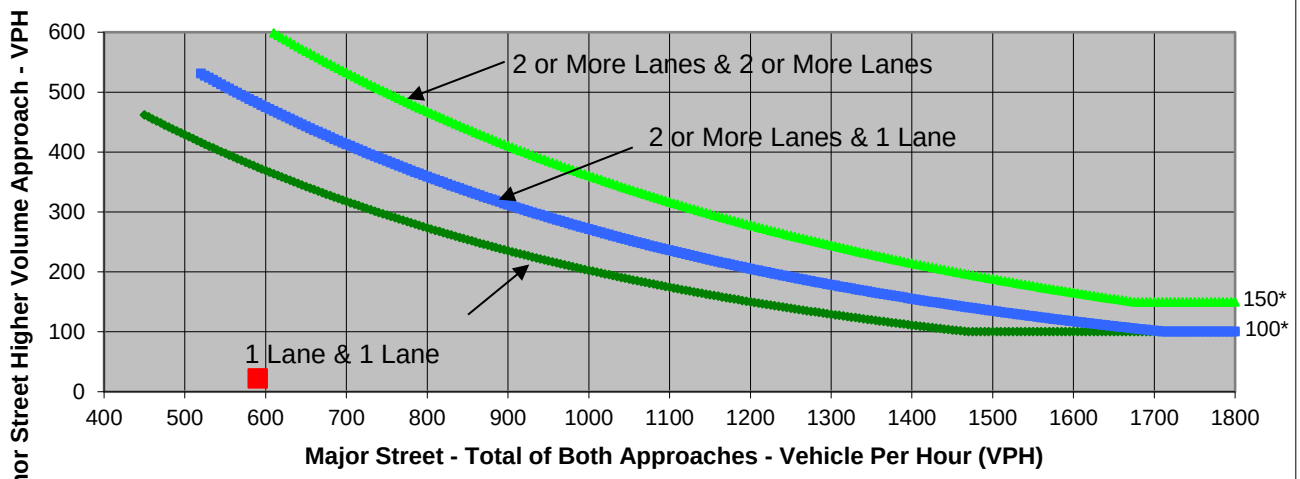
Major Street	Woodward Avenue	Project	Wackerly
Minor Street	Street B	Scenario	Cumulative Conditions
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	11	0	0	7
Through	0	0	191	390
Right	11	0	2	0
Total	22	0	193	397

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Woodward Avenue	Street B	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**590**	**22**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Woodward Avenue	Project	Wackerly
Minor Street	Street B	Scenario	Cumulative Conditions
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	11	0	0	7
Through	0	0	191	390
Right	11	0	2	0
Total	22	0	193	397

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	13
Approach with Worst Case Delay	NB
Total Vehicles on Approach	22

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Conditions	**0.1**	**22**	**612**
Limiting Value	**4**	**100**	**650**
Condition Satisfied?	**Not Met**	**Not Met**	**Not Met**
Warrant Met	**NO**		

FEHR PEERS

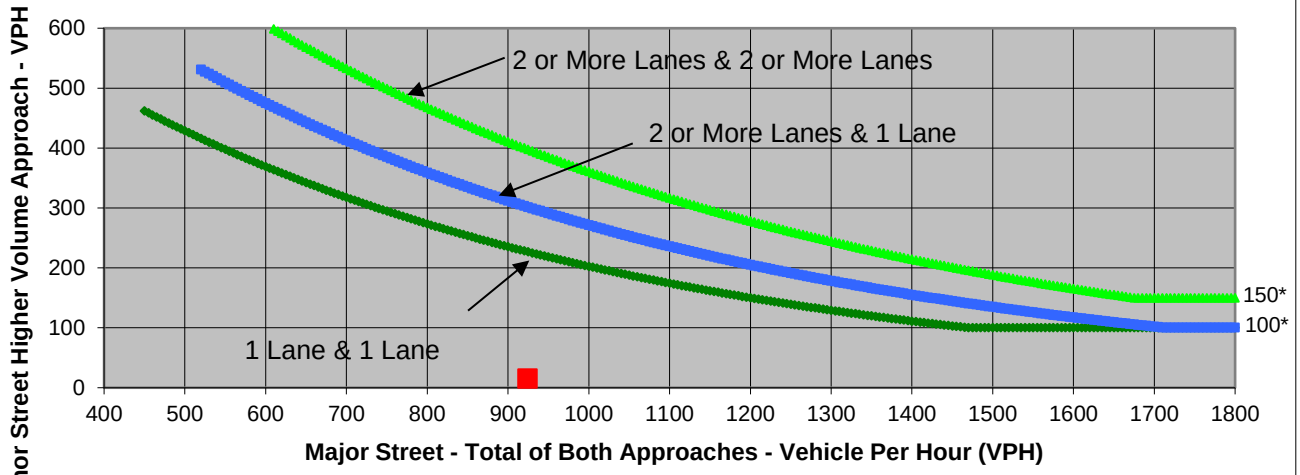
Major Street	Woodward Avenue	Project	Wackerly
Minor Street	Street B	Scenario	Cumulative Conditions
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	17
Through	0	0	607	290
Right	8	0	10	0
Total	15	0	617	307

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Woodward Avenue	Street B	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**924**	**15**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Woodward Avenue	Project	Wackerly
Minor Street	Street B	Scenario	Cumulative Conditions
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	17
Through	0	0	607	290
Right	8	0	10	0
Total	15	0	617	307

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	17
Approach with Worst Case Delay	NB
Total Vehicles on Approach	15

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Conditions	**0.1**	**15**	**939**
Limiting Value	**4**	**100**	**650**
Condition Satisfied?	**Not Met**	**Not Met**	**Met**
Warrant Met	**NO**		