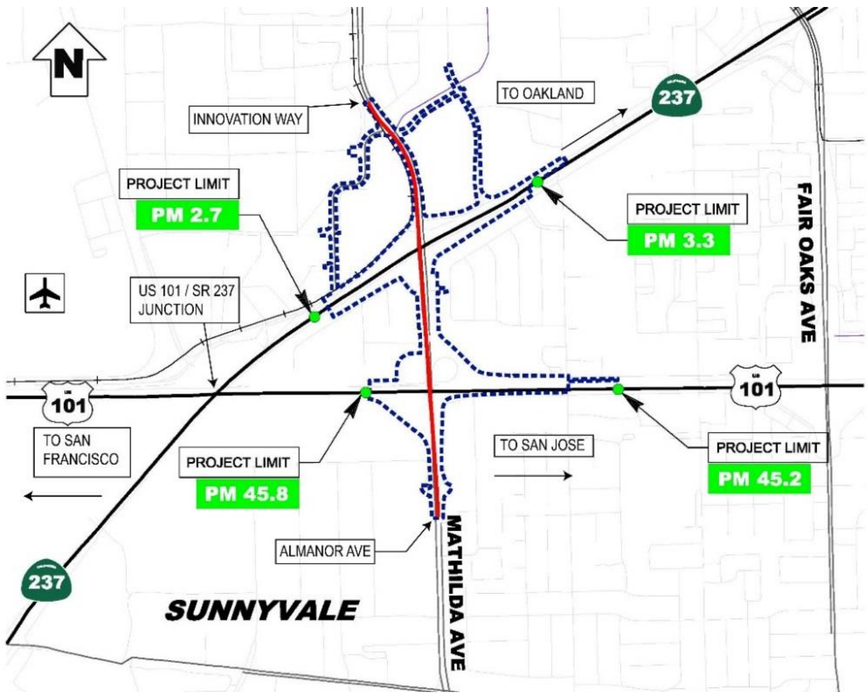
Mathilda Avenue Improvements at SR 237 and US 101 Project

SANTA CLARA COUNTY, CALIFORNIA
DISTRICT 4 – SCL- 237-PM 2.7/3.3; SCL-101-PM 45.2/45.8
EA 04-4H2900/Project ID 0413000204

Draft Environmental Impact Report



Prepared by the
State of California Department of Transportation
and
Santa Clara Valley Transportation Authority

Caltrans

August 2016

General Information about This Document

What's in this document:

The California Department of Transportation (Caltrans) has prepared this Draft Environmental Impact Report (EIR), which examines the potential environmental impacts of the alternatives being considered for the proposed project located in Santa Clara County, California. Caltrans is the lead agency under the California Environmental Quality Act (CEQA). The document tells you why the project is being proposed, what alternatives we have considered for the project, how the existing environment could be affected by the project, the potential impacts of each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What you should do:

- Please read this document.
- Additional copies of this document and related technical studies are available for review at:

Caltrans District 4
111 Grand Avenue
Oakland, CA 94612

Santa Clara Valley Transportation Authority
Environmental Programs and Resources Management
3331 North First Street, Building B
San Jose, CA 95134

Sunnyvale Public Library
655 West Olive Avenue
Sunnyvale, CA 94086

This document may be downloaded at the following website: http://www.vta.org/mathildaimprovements.

- Attend the public meeting at:

Date: **Tuesday, August 30th, 2016**
Location: **Columbia Middle School** **Time**: **6:00-8:00 PM**
Multipurpose Room
739 Morse Avenue
Sunnyvale, CA 94085

- We would like to hear what you think. If you have any comments about the proposed project, please attend the public meeting and/or send your written comments by the deadline.

Send comments via postal mail to:

Santa Clara Valley Transportation Authority
Environmental Programs and Resources
Management ATTN: Lani Lee Ho
3331 North First Street, Building B-2
San Jose, CA 95134

Send comments via email to: MathildaAve@vta.org.

- All comments must be received in writing by 5:00pm on Monday, September 26, 2016.

What happens next:

After comments are received from the public and reviewing agencies, Caltrans may: (1) give environmental approval to the proposed project, (2) do additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is obtained, Caltrans and/or Santa Clara Valley Transportation Authority could design and construct all or part of the project.

For individuals with sensory disabilities, this document can be available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternative formats, please write to Caltrans, Attn: Elizabeth White, Office of Environmental Planning, 111 Grand Avenue, Oakland, CA 94623-0660; or call (510) 286-6233 (voice); or use the California Relay Service TTY number, (800) 735-2929 or 711.

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SCH # 2015082030

SCL-237-PM 2.7/3.3;
SCL-101-PM 45.2/45.8
04-4H2900/Project ID 0413000204

Construct improvements on Mathilda Avenue from Almanor Avenue to Innovation Way; on SR 237 from 0.3 mile east of US 101/SR 237 Junction to 0.3 mile east of Mathilda Avenue Undercrossing; and on US 101 from 0.5 mile south of Mathilda Avenue Overcrossing to 0.3 mi south of SR 237/US 101 Junction in City of Sunnyvale, in Santa Clara County

Draft Environmental Impact Report

Submitted Pursuant to: (State) Division 13, California Public Resources Code

THE STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

and

Responsible Agencies: Santa Clara Valley Transportation Authority and the City of Sunnyvale

8-11-16
Date of Approval

Bijan Sartipi
District Director
California Department of Transportation
CEQA Lead Agency

The following persons may be contacted for more information about this document:

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(408) 321-5927

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Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
ADA	Americans with Disabilities Act
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
CAAQS	California ambient air quality standards
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
City	City of Sunnyvale
CNPS	California Native Plant Society
County	Santa Clara County
CRHR	California Register of Historical Resources
CRMP	construction risk management plan
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted decibel
DBH	diameter at breast height
DDI	Diverging Diamond Interchange
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
EO	Executive Order
ESA	federal Endangered Species Act
ESL	Environmental Screening Levels
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FSTIP	Federal Statewide Transportation Improvement Program
GHG	greenhouse gas
ICE	Intersection Control Evaluation
IPCC	Intergovernmental Panel on Climate Change
KOP	Key Observation Points
LRT	light rail transit
LUST	leaking underground storage tanks
MBTA	Migratory Bird Treaty Act
MLD	Most Likely Descendent
mph	miles per hour
MPSP	Moffett Park Specific Plan
MRZ	Mineral Resource Zone
MS4	municipal separate storm sewer systems
MSAT	mobile source air toxics
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards

NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NOA	naturally occurring asbestos
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OCPs	organochlorine pesticides
OPR	Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Act
PA/ED	Project Approval/Environmental Document
PAL	project area limit
PDT	Project Development Team
PG&E	Pacific Gas & Electric
PID	project initiation document
PM	post mile
ppm	parts per million
PPV	peak particle velocity
PRC	CA Public Resources Code
Project	Mathilda Avenue Improvements at SR 237 and US 101 Project
PSI	Preliminary Site Investigation
RCRA	Resource Conservation and Recovery Act of 1976
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	San Francisco Bay Regional Water Quality Control Board’s
SB	Senate Bill
SCS	Sustainable Communities Strategy
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SR	State Route
SWDR	Storm Water Data Report
SWMP	Statewide Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Loads
TMP	Traffic Management Plan
U.S. EPA	United States Environmental Protection Agency
US 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled
VTA	Santa Clara Valley Transportation Authority
WDR	Waste Discharge Requirements

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ES.1 Introduction

The California Department of Transportation (Caltrans), as Lead Agency under the California Environmental Quality Act (CEQA), in cooperation with the Santa Clara Valley Transportation Authority (VTA) and the City of Sunnyvale (City), has prepared this Draft Environmental Impact Report (EIR) for the Mathilda Avenue Improvements at State Route (SR) 237 and U.S. Highway 101 (US 101) Project (Project). The Project is also referred to as the Build Alternative. A No-Build Alternative is also considered.

During the early stages of the project development process, it was not yet determined if the proposed Project could have potentially significant impacts to the environment. As a result, the Project team decided to prepare an EIR due to the fair argument standard under CEQA. Preparing an EIR allowed for a more robust evaluation of the Project's potential impacts on the environment while the Project team continued to work to avoid and minimize potential environmental impacts.

ES.2 Overview of the Project Area

The Project is located in the southern region of the San Francisco Bay Area in the City. The Project extends from Almanor Avenue/Ahwanee Avenue to Innovation Way and includes on- and off-ramp improvements at the SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges. On SR- 237, the Project limits are from 0.3 mile east of the US 101/SR 237 interchange (post mile [PM] 2.7) to 0.3 mile east of the Mathilda Avenue undercrossing (PM 3.3). On US 101, the Project limits are from 0.5 mile south of the Mathilda Avenue overcrossing (PM 45.2) to 0.3 mile south of the SR 237/US 101 interchange (PM 45.8). The total length of the Project on Mathilda Avenue is approximately 1 mile.

In the general Project area, additional development projects include Moffett Place, Moffett Towers II, current development of the former Onizuka Air Force Station, and Perry Park development projects.

ES.3 Statement of Project Purpose and Need

The primary purpose of the Project is to improve traffic operations on Mathilda Avenue through the US 101 and SR 237 interchanges.

Specifically, the objectives of the Project are to:

- Reduce congestion and improve traffic operations along Mathilda Avenue and at the SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges.
- Improve mobility for all travel modes in the area including motor vehicles, transit, bicycles, and pedestrians.
- Provide standard crosswalks and sidewalks along Mathilda Avenue, improving access to local destinations such as Moffett Park, VTA light rail transit stations, and downtown Sunnyvale.

The Project is needed for the following reasons:

- Regional growth and new local development combined with inefficient roadway operations have resulted in substantial traffic congestion on Mathilda Avenue.
- Efficient access for all travel modes into and out of downtown Sunnyvale and development to the north of SR 237 is critical to a healthy and sustainable economy. Congestion on Mathilda Avenue adversely affects the economic vitality of the City.

ES.4 Project Description

The Project includes the Project Build Alternative (generally referred to as the "Project" in this EIR) and No-Build Alternative. Criteria used for evaluation included, but were not limited to, Project cost, potential for environmental impacts, and the ability of an alternative to meet the Project's objectives and purpose.

ES.4.1 Build Alternative

A summary of the main improvements proposed by the Project is provided in sections ES.4.1 and ES.4.2, below. A detailed description of the improvements proposed by the Project is provided in Chapter 1, Section 1.3, *Project Description*. The design features of the Project include reconfiguration of the US 101 and SR 237 interchanges with Mathilda Avenue. As shown in Figure ES-1, this includes modification to on- and off-ramps; removal, addition, and signalization of intersections; and provision of new left-turn lanes. In addition, the Project would require modification to bicycle and pedestrian facilities, utilities, storm water treatment facilities, street lighting, ramp metering, signage, retaining walls, and light rail crossing facilities as described.

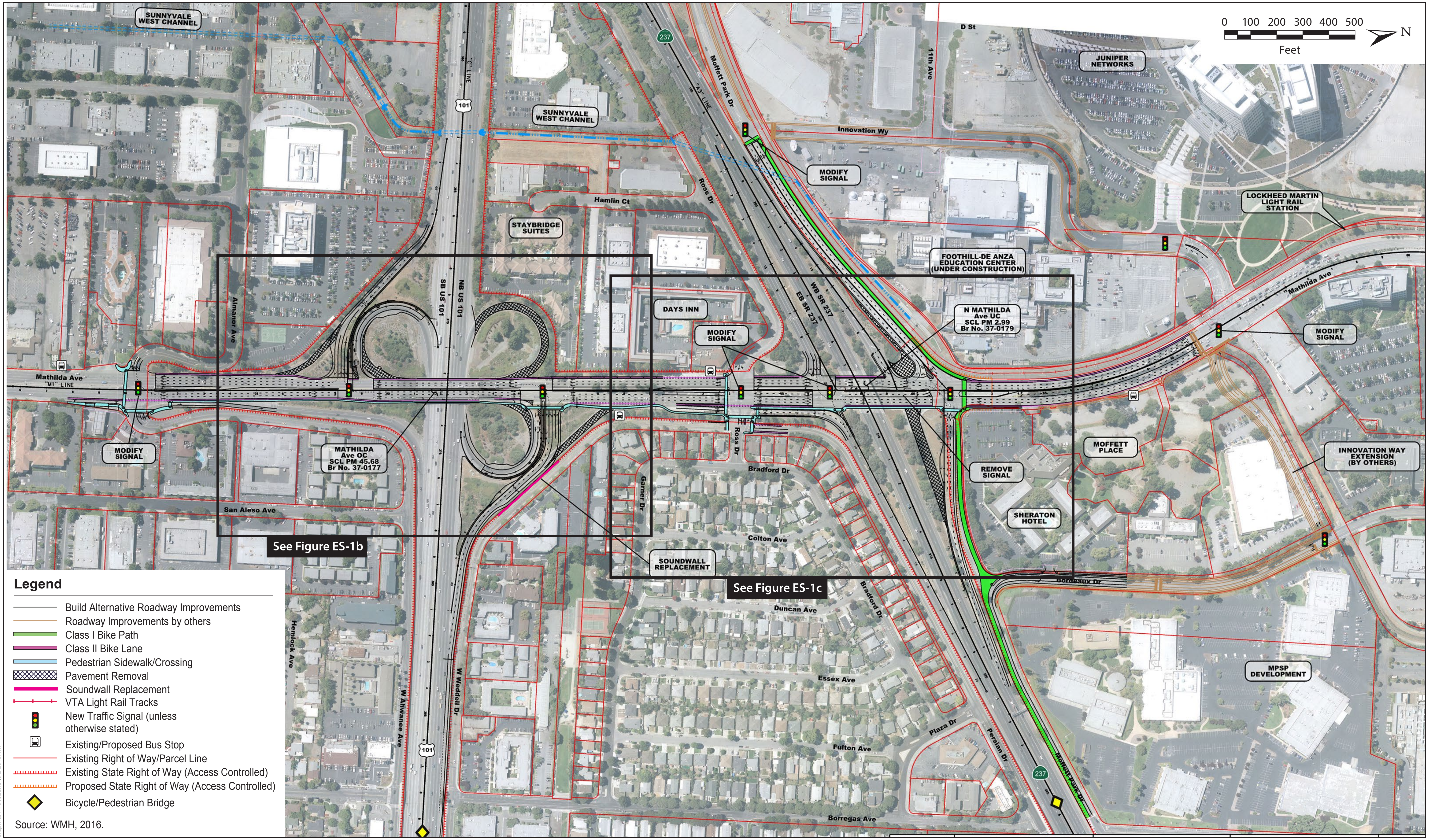

Figure ES-1a
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

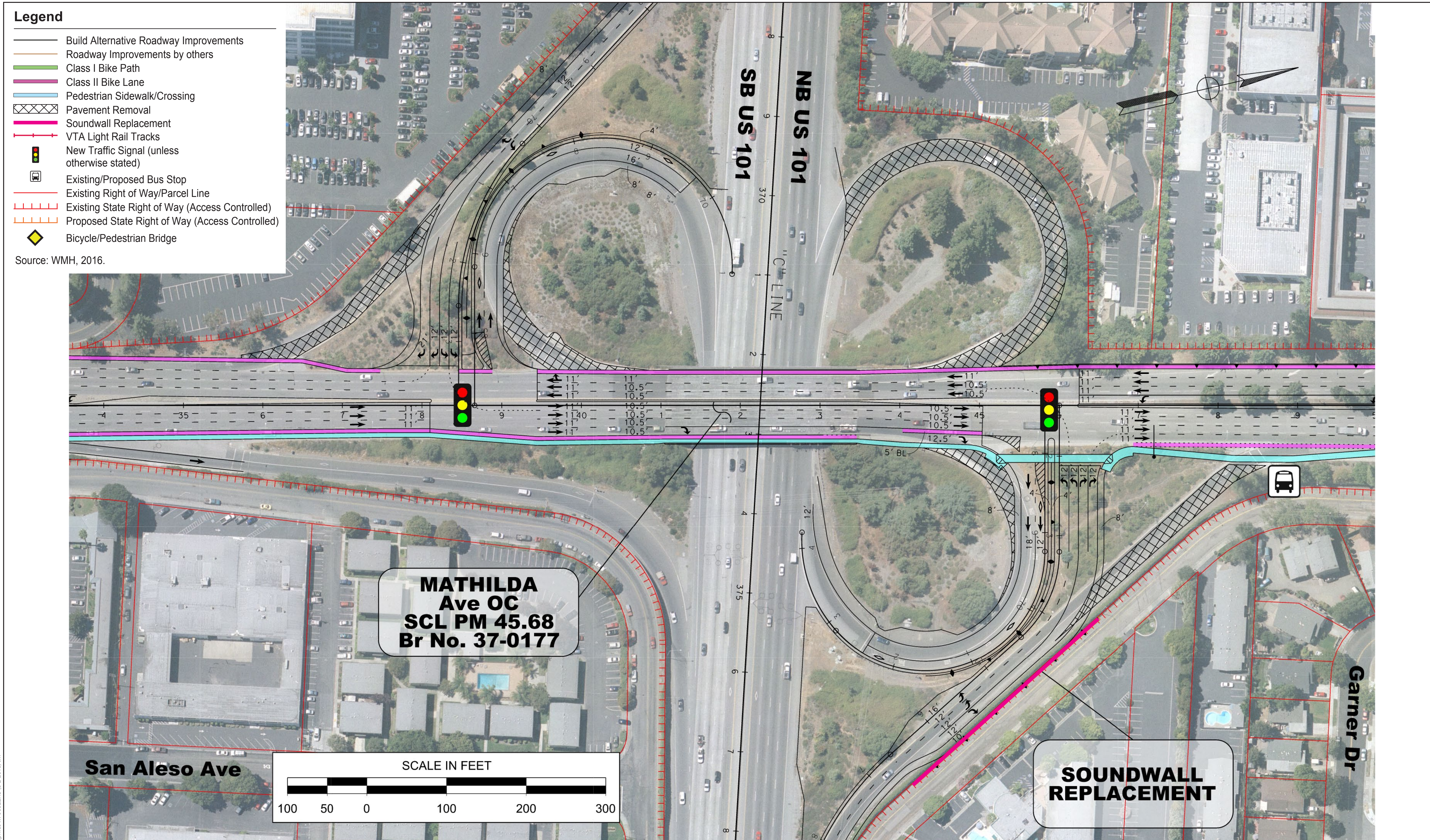

Figure ES-1b
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

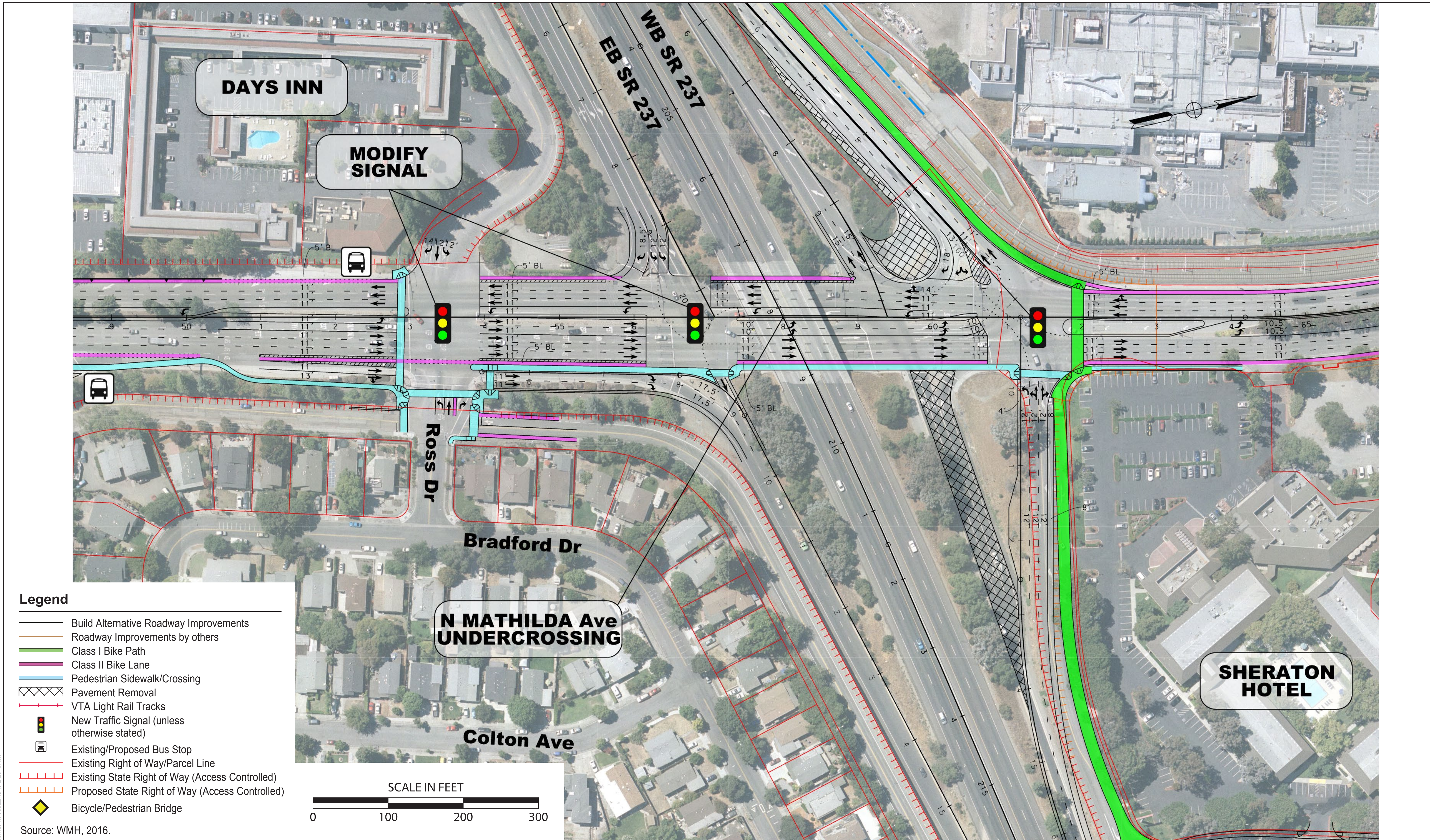

Figure ES-1c
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

Roadway Improvements

The Project would consist of the following roadway improvements:

- Provide three continuous through lanes in each direction on Mathilda Avenue.
- Remove the northbound US -101 loop off-ramp to Mathilda Avenue and shift traffic to the northbound US 101 diagonal off-ramp.
- Realign and widen the northbound US 101 ramps and signalize the ramp intersection with Mathilda Avenue, and construct a left-turn lane on southbound Mathilda Avenue to access the northbound US 101 loop on-ramp.
- Realign the southbound US 101 off-ramp and loop on-ramp and signalize the ramp intersection with Mathilda Avenue.
- Modify the Mathilda Avenue/Ross Drive signal intersection.[1]
- Close Moffett Park Drive between Bordeaux Drive and Mathilda Avenue, replace with a Class I bikeway,[2] and shift traffic to Bordeaux Drive and Innovation Way.[3] Innovation Way would be extended from Mathilda Avenue to Bordeaux Drive as part of the Moffett Place Campus Project. Moffett Park Drive eastbound north of Mathilda Avenue would remain. Moffett Park Drive would remain open to bicyclists and would become a Class I bikeway.
- Remove the westbound SR 237 ramp signal intersection. Realign the westbound SR 237 off-ramp opposite Moffett Park Drive and modify the signal intersection. The existing signalized intersections on Mathilda Avenue at the SR 237 westbound off-ramp and Moffett Park Drive would be removed.
- Signalize the reconfigured westbound SR 237 off-ramp/Moffett Park Drive intersection. The westbound SR 237 off-ramp would be modified to intersect with Mathilda Avenue just south of the new signalized intersection. Mathilda Avenue northbound traffic heading to westbound SR 237 would have to make a U-turn movement[4] at the new signalized intersection to access the on-ramp.
- Modify the westbound SR 237 ramps to provide a diamond configuration.

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[1] The bus stop on the east side of Mathilda Avenue, south of Ross Drive, would be relocated 300 feet south, closer to US 101.

[2] Per the Highway Design Manual Index 1002.1, a Class I bikeway is a *bicycle path* that is completely separate from the roadway.

[3] Innovation Way would be extended from Mathilda Avenue to Bordeaux Drive by the Moffett Place development project.

[4] U-turn movement is part of the intersection improvement.

Bicycle and Pedestrian Facilities

The proposed Project would be developed to provide improved mobility for all users, including bicyclists, pedestrians, transit riders, and motorists.

As shown in Figure ES-2, bicycle improvements on Mathilda Avenue would consist of Class II bike lanes[5] based on available pavement widths within the Project area, and would connect to the existing Class II bike lanes and Class III bike routes on Mathilda Avenue and the Class I bikeway on the Sunnyvale West Channel. Bicycle improvements on Moffett Park Drive would consist of a Class I bikeway between Bordeaux Drive and Mathilda Avenue. Between Mathilda Avenue and Innovation Way, a Class I multi-use path would be installed. Bicycle and pedestrian improvements in the Project area would be consistent with the *City of Sunnyvale 2006 Bicycle Plan* (City of Sunnyvale 2006) and the *Santa Clara Countywide Bicycle Plan* (Santa Clara County 2008), and would include:

- Upgrading existing pedestrian facilities to incorporate current Americans with Disabilities Act standards, including curb ramps at all crosswalks.
- Incorporating pavement delineation with new crosswalk markings.
- Installing pedestrian countdown signals at westbound SR 237 ramps, eastbound SR 237 ramps, Ross Drive, northbound US 101 ramps, and southbound US 101 ramps.
- Realigning (“teeing up”) and signalizing ramp termini to provide new pedestrian crossings, where feasible.

ES.4.2 No-Build Alternative

Under the No-Build Alternative, no changes would be made to the existing local roadways or freeway ramps within the Project limits. No construction activities would occur, and there would be no change in the operation of the existing facilities. Other planned and approved land use development and transportation improvements along local routes may be implemented by local agencies or under other projects.

ES.4.3 Cost

The Project is included in the 2015 Federal Statewide Transportation Improvement Program (ID No. SCL130001) (California Department of Transportation 2014) and the current Regional Transportation Plan/Sustainable Communities Strategy (Project No. 240554 in *Plan Bay Area*), which is updated by the Metropolitan Transportation Commission (Metropolitan Commission 2013). The Project is also identified in the Valley Transportation Plan 2040 (Santa Clara Valley Transportation Authority 2009) under ID H43 and in the City’s Capital

[5] Per the Highway Design Manual Index 1002.1, a Class II bikeway is a *bicycle lane* and a Class II bikeway is a *bicycle route*. A Class II bikeway lane has a separate striped bicycle-only lane adjacent to the roadway, and a Class III bikeway route is a shared roadway, often referred to as a *sharrow*.

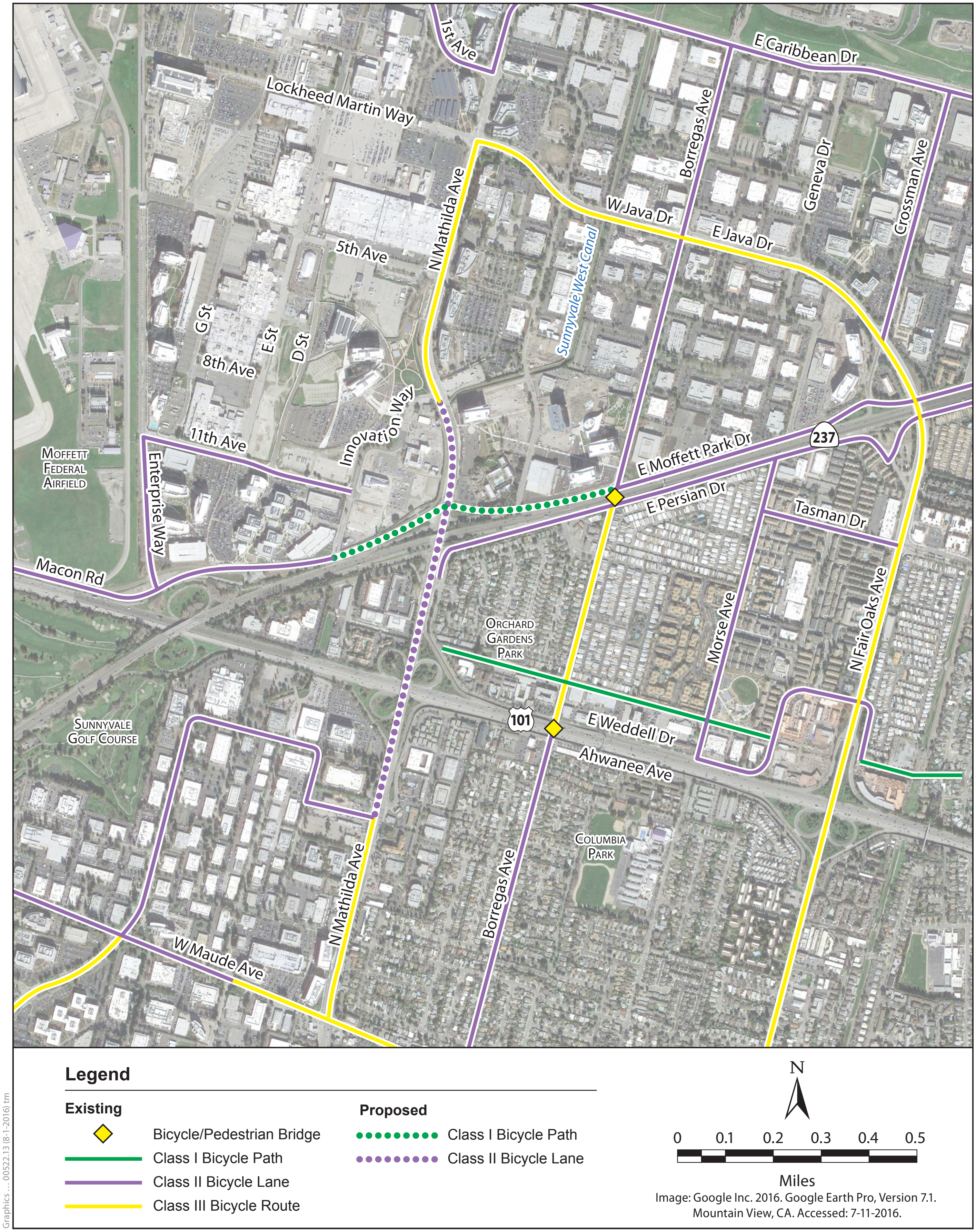

Figure ES-2
Existing and Proposed Bicycle Facilities
Mathilda Avenue Improvements at SR 237 and US 101 Project

Improvement Program for Fiscal Year 2013/2014 as Project No. 826890 (City of Sunnyvale 2013).

Under the No-Build Alternative, no improvements would be made to the existing local roadways or freeway ramps within the Project limits. There would be no construction activities and therefore no capital costs. In comparison, the Build Alternative is anticipated to cost $41.3 million dollars.[6] The City has committed local funding to the development of the Project. Other funding sources have yet to be determined, but may include a combination of state and local transportation funds.

ES.4.4 Schedule

Construction of these improvements would take approximately 250 working days, or 12 months, and is expected to start in early 2018. A combination of day and night work is anticipated. Weekend work is not anticipated. Short-term lane and ramp closures would be necessary to facilitate construction. A Traffic Management Plan (refer to Chapter 2, Section 2.14, *Traffic/Transportation*) would be implemented during construction to minimize and prevent delay and inconvenience to the traveling public.

ES.5 Summary of Environmental Impacts and Mitigation Measures

Table ES-1 provides a summary of the environmental impacts of the Project and associated avoidance, minimization, and/or mitigation measures. Refer to Chapter 2, *Environmental Setting, Impacts, and Avoidance, Minimization and/or Mitigation Measures*, for a detailed impact analysis of each resource area, including the regulatory setting and existing conditions.

[6] The escalated (2018) total Project cost is $41.3 million dollars. The current (2013) total Project cost is $39.8 million dollars.

Table ES-1. Summary of Environmental Impacts and Avoidance, Minimization, and/or Mitigation Measures

Environmental Impact Topic	Build Alternative	No-Build Alternative	Avoidance, Minimization, and/or Mitigation Measure
Aesthetics (EIR Section 2.2)			
Visual Character (Operation)	Less than Significant	No Impact	**AES-1:** Restore Highway Planting **AES-2:** Incorporate Bioretention Basins in Planting Design **AES-3:** Implement Aesthetic Treatment on Bridge Barriers, Sound Walls, and Retaining Walls
Visual Character (Construction)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required. Changes in visual character during construction would be temporary. For permanent changes in visual character, the Project will implement **AES-1** through **AES-3**.
Light and Glare (Operation)	Less than Significant	No Impact	**AES-4:** Apply Minimum Lighting Standards
Light and Glare (Construction)	Less than Significant	No Impact	**AES-5:** Minimize Fugitive Light from Portable Sources Used for Construction
Air Quality (EIR Section 2.3)			
Conformity with Applicable Air Quality Plan	Conforms	No Impact	Not applicable.
Violate air quality standard for Carbon Monoxide (Operation)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Criteria Pollutants (Operation)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Mobile Source Air Toxic Emissions (Operation)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Criteria Pollutants (Construction)	Less than Significant	No Impact	**AQ-1:** Implement California Department of Transportation Standard Specification Section 14 **AQ-2:** Implement Basic and Additional Control Measures for Construction Emissions of Fugitive Dust
Biological Resources (EIR Section 2.4)			
Nesting Birds and Raptors (Construction)	Less than Significant	No Impact	**BIO-1:** Implement Nesting Birds Avoidance Measures
Tree Removal (Construction)	Less than Significant	No Impact	**BIO-2:** Implement Tree Avoidance, Minimization, or Replacement

Environmental Impact Topic	Build Alternative	No-Build Alternative	Avoidance, Minimization, and/or Mitigation Measure
Invasive Species (Construction)	Less than Significant	No Impact	**BIO-3:** Minimize the Introduction and Spread of Invasive Plants
Cultural Resources (EIR Section 2.5)			
Historic Architectural Resources	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Archaeological Resources/Human Remains (Construction)	No Impact	No Impact	**CUL-1:** Stop Work if Cultural Resources are Encountered During Ground-Disturbing Activities **CUL-2:** Stop Work if Human Remains are Encountered During Ground-Disturbing Activities
Paleontological Resources (Construction)	No Impact	No Impact	**CUL-3:** Conduct Protocol and Procedures for Encountering Paleontological Resources
Geology, Soils, and Seismicity (EIR Section 2.6)			
Seismic activity, unstable geologic units, expansive and corrosive soils (Construction)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Greenhouse Gas Emissions (EIR Section 2.7)			
Greenhouse Gas Emissions	Not applicable	Not applicable	Refer to Section 2.7, *Greenhouse Gas Emissions* for a comprehensive discussion of greenhouse gas emissions. While Caltrans has provided the public and decision-makers as much information as possible about the Project, it is Caltrans determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a significance determination regarding the Project's direct and indirect impact with respect to climate change. Caltrans does remain firmly committed to implementing measures to help reduce the potential effects of the Project. These measures are outlined in the body of the environmental document.

Environmental Impact Topic	Build Alternative	No-Build Alternative	Avoidance, Minimization, and/or Mitigation Measure
Hazardous Wastes/Materials (EIR Section 2.8)			
Exposure to Hazardous Wastes/Materials (Aerially Deposited Lead, Hazardous Material Release Sites, Agricultural Pesticides, Naturally Occurring Asbestos, Lead-Based Paint, Asbestos-Containing Materials, Thermosplastic Paint, Asphalt Cement, Drainage Swales/Catch Basins) (Construction)	Less than Significant	No Impact	**HAZ-1:** Prepare Preliminary Site Investigation **HAZ-2:** Prepare Construction Risk Management Plan
Hydrology and Water Quality (EIR Section 2.9)			
Impacts to water quality standards/waste discharge requirements, alteration of drainage resulting in runoff or flooding (Operation)	Less than Significant	No Impact	**WQ-1:** Implement Best Management Practices
Impacts to depletion of groundwater supplies/interference with groundwater recharge (Operation)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Impacts to water quality standards/waste discharge requirements, depletion of groundwater supplies/interference with groundwater recharge (Construction)	Less than Significant	No Impact	**WQ-1:** Implement Best Management Practices
Impacts to depletion of groundwater supplies/interference with groundwater recharge, alteration of drainage resulting in runoff or flooding (Construction)	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Land Use and Recreation (EIR Section 2.10)			
Division of an Established Community (Operation)	Beneficial	No Impact	No avoidance, minimization, and/or mitigation measures required.
Division of an Established Community (Construction)	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Consistency with State, Regional, and Local Plans and Programs	Consistent	Not Consistent	Not applicable

Environmental Impact Topic	Build Alternative	No-Build Alternative	Avoidance, Minimization, and/or Mitigation Measure
Noise and Vibration (EIR Section 2.11)			
Permanent Noise (Operation)	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Temporary Noise (Construction)	Less than Significant	No Impact	**NV-1:** Implement Noise-Reducing Construction Practices
Temporary Vibration (Construction)	Less than Significant	No Impact	**NV-2:** Implement Vibration-Reducing Construction Measures to Limit Groundborne Vibration at Nearby Structures and Residences
Population and Housing (EIR Section 2.12)			
Growth (Construction)	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Public Services and Utilities (EIR Section 2.13)			
Public Services	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Public Utilities (Construction)	No Impact	No Impact	No avoidance, minimization, and/or mitigation measures required.
Transportation/Traffic (EIR Section 2.14)			
Local Roadways and Ramp and Termini Operations	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Impacts to Freeway Mainline Operations	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Freeway System Performance	Less than Significant	No Impact	No avoidance, minimization, and/or mitigation measures required.
Impacts to Bicycle and Pedestrians	Beneficial	No Impact	No avoidance, minimization, and/or mitigation measures required.
Construction Impacts	Less than Significant	No Impact	**TRF-1:** Prepare a Transportation Management Plan
Cumulative Impacts (EIR Section 2.15)			
Cumulative Impacts	No Impact	Cumulative impacts will not be substantial	No avoidance, minimization, and/or mitigation measures required.

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Chapter 1
Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans), as Lead Agency under the California Environmental Quality Act (CEQA), in cooperation with the Santa Clara Valley Transportation Authority (VTA), and the City of Sunnyvale (City), proposes the Mathilda Avenue Improvements at SR 237 and US 101 Project (Project) to improve Mathilda Avenue in the City from Almanor Avenue/Ahwanee Avenue to Innovation Way, including on- and off-ramp improvements at the State Route (SR) 237/Mathilda Avenue and U.S. Highway 101 (US 101)/Mathilda Avenue interchanges. On SR 237, the Project limits are from 0.3 mile east of the US 101/SR 237 interchange (post mile [PM] 2.7) to 0.3 mile east of the Mathilda Avenue undercrossing (PM 3.3). On US 101, the Project limits are from 0.5 mile south of the Mathilda Avenue overcrossing (PM 45.2) to 0.3 mile south of the SR 237/US 101 interchange (PM 45.8). The total length of the Project on Mathilda Avenue is approximately 1 mile. Figure 1-1 shows the location of the Project. The Project is subject to state environmental review requirements and is being prepared in compliance with CEQA.

During the early stages of the project development process, it was not yet determined if the proposed Project could have potentially significant impacts to the environment. As a result, the Project team decided to prepare an Environmental Impact Report (EIR) due to the fair argument standard under CEQA. Preparing an EIR allowed for a more robust evaluation of the Project's potential impacts on the environment while the project team continued to work to avoid and minimize potential environmental impacts.

The Project is included in the 2015 Federal Statewide Transportation Improvement Program (ID No. SCL130001) (California Department of Transportation 2014) and in the Metropolitan Transportation Commission (MTC) *Plan Bay Area*,[1] adopted July 18, 2013 (Project No. 240554) (Association of Bay Area Governments and Metropolitan Transportation Commission 2013). The Project is also identified in the VTA Valley Transportation Plan 2040 (Santa Clara Valley Transportation Authority 2009) under ID H43 and in the City's Capital Improvement Program for Fiscal Year 2013/2014 as Project No. 826890 (City of Sunnyvale 2013). The City has committed local funding to the development of the Project. Other funding sources have yet to be determined, but may include a combination of state and local transportation funds. The Project is included in the current Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in the

[1] *Plan Bay Area* is a long-range integrated transportation and land-use/housing strategy through 2040 for the San Francisco Bay Area.

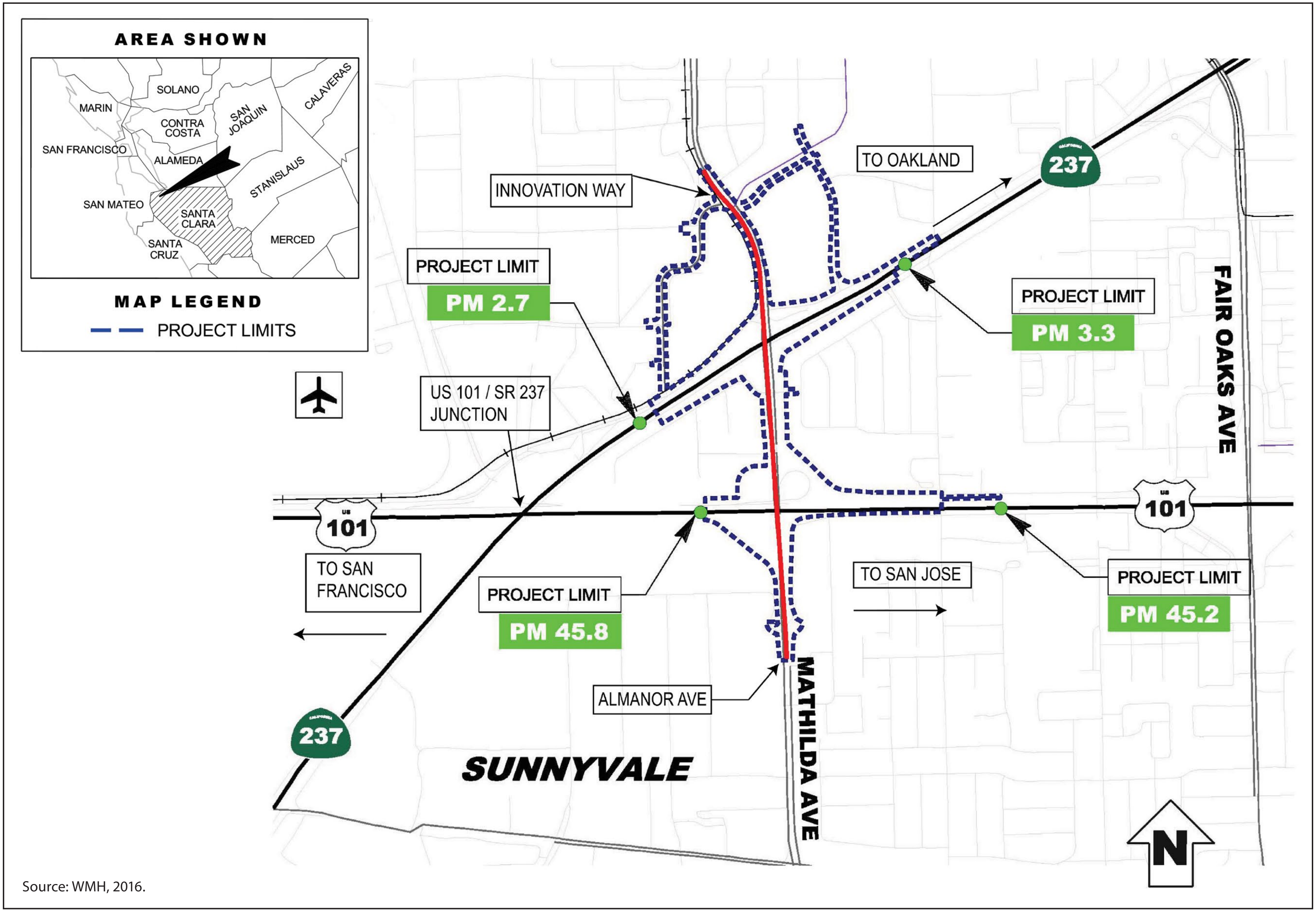


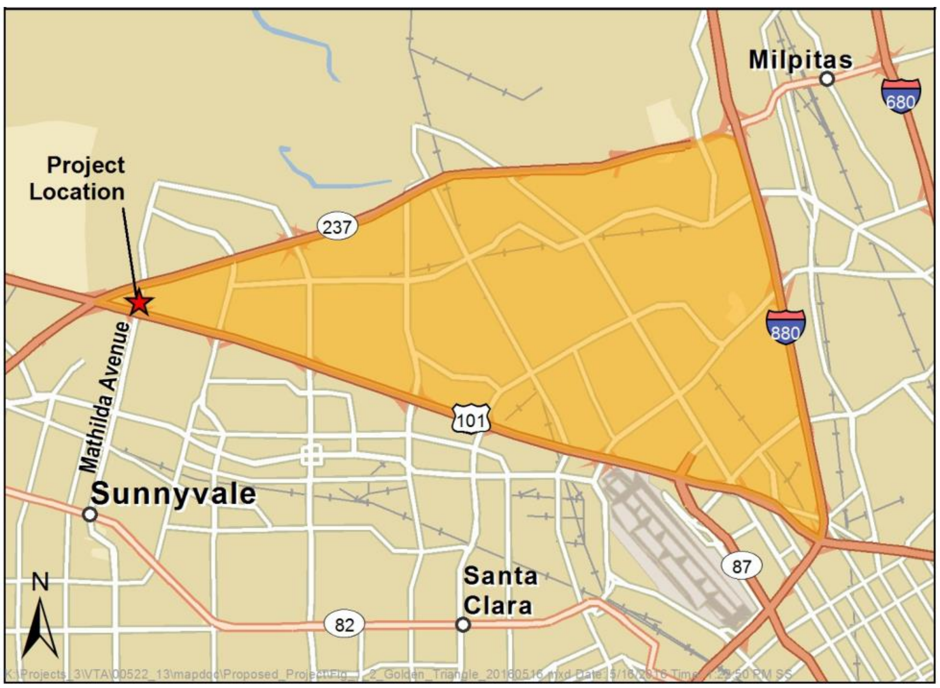
Figure 1-1
Project Location
Mathilda Avenue Improvements at SR 237 and US 101 Project

Financially Constrained Element,[2] with a combination of programmed and planned local funds totaling $18 million available over the long term of the *Plan Bay Area*.

1.1.1 Project Background

The SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges are primary access points on the State Highway System for the City, including important local destinations such as downtown Sunnyvale, Caltrain stations to the north and south, and the expanding high-tech business district to the north. The proposed Project is also located within the "Golden Triangle," an area bordered by US 101, SR 237, and Interstate 880 (I-880) that includes parts of Sunnyvale, Santa Clara, North San Jose, and Milpitas (see Figure 1-2). The Golden Triangle is named for the high concentration of employment centers within this area. US 101, SR 237, and I-880 are heavily used commute corridors to destinations within and beyond the Golden Triangle.

Figure 1-2. The Golden Triangle



[2] For *Plan Bay Area*, MTC worked with partner agencies and used financial models to forecast how much revenue will be available for transportation purposes over the 28-year duration of the plan. These forecasts are used to plan investments that fit within the "financially constrained" envelope of revenues that are reasonably expected to be available.

1.1.1.1 Mathilda Avenue

Within the Project limits, Mathilda Avenue is a six-lane divided local roadway.[3] Mathilda Avenue serves as the main access to the residential communities on the east side of Mathilda Avenue and is the only access to the constrained area contained within the US 101/SR 237/Mathilda Avenue triangle via Ross Drive (refer to Figure 1-1). Mathilda Avenue is also one of the City's designated truck routes for trucks over 3 tons in weight. The speed limit is 45 miles per hour (mph), and on-street parking is prohibited within the Project limits. Approximately 45,000 vehicles travel on Mathilda Avenue south of SR 237 on an average weekday.[4]

Existing pedestrian facilities within the Project limits include discontinuous sidewalks along Mathilda Avenue, limiting pedestrian movements in both north-south and east-west directions. Approximately 0.3 mile east of Mathilda Avenue, a pedestrian/bicycle bridge crosses SR 237 and US 101, providing an alternate north-south connection along Borregas Avenue between Moffett Park Drive to the north and Ahwanee Avenue to the south. There are no bicycle lanes on Mathilda Avenue within the Project limits.

1.1.1.2 SR 237

Within the Project limits, SR 237 provides two mixed-flow lanes (open to all motorists at all times) in each direction. On eastbound SR 237, a high occupancy vehicle lane (lanes restricted to vehicles carrying two or more passengers during the morning and evening commute) is provided east of Mathilda Avenue and becomes a high occupancy vehicle/express lane (lanes that charge a variable toll for solo motorists depending on congestion) from east of Zanker Road to the eastbound SR 237/northbound I-880 direct connector ramp. On westbound SR 237, there is a high occupancy vehicle/express lane beginning at the southbound I-880/westbound SR 237 direct connector ramp that becomes a high occupancy vehicle lane from North First Street to just east of Fair Oaks Avenue. Within the Project limits, auxiliary lanes (an extra lane on the freeway between interchanges, giving motorists time to merge in or out of the freeway) are provided in each direction between US 101 and Mathilda Avenue on SR 237. There is also an auxiliary lane on westbound SR 237 between Fair Oaks Avenue and Mathilda Avenue. SR 237 is a link for trucking between the southern part of the San Francisco Peninsula and the East Bay, providing the first connection south of the Dumbarton Bridge. SR 237 east of Mathilda Avenue currently carries approximately 90,000 vehicles daily.[5]

The SR 237/Mathilda Avenue Interchange is a full tight diamond interchange that accommodates all ramp movements with access to and from eastbound and westbound SR

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[3] The Project limits (sometimes referred to as the Project area limits) is the boundary that surrounds the 63 acre Project area (refer to Figure 1-1) that is being evaluated in this document. The terms "Project limits," "Project area," and "Project study area" are used interchangeably, as appropriate.

[4] Approximate daily vehicle counts are taken from the *Traffic Operations Analysis and Report* (Fehr & Peers 2016) prepared for the Project, which used 2013 as the existing year.

[5] Ibid.

237. All ramp termini are signalized. The westbound SR 237 on-ramp has existing ramp metering; however, there is no existing ramp metering for the eastbound SR 237 on-ramp.

1.1.1.3 US 101

Within the Project limits, US 101 provides three mixed-flow lanes plus one high occupancy vehicle lane in each direction; an auxiliary lane is also provided in the southbound direction between SR 237 and Mathilda Avenue. US 101 south of Mathilda Avenue currently carries approximately 154,000 vehicles daily.[6]

The Moffett Park Drive/US 101 northbound on-ramp is a one-lane on-ramp located along Moffett Park Drive to the west of the Mathilda Avenue/Moffett Park Drive intersection. This on-ramp merges with the westbound SR 237 off-ramp that connects to northbound US 101. The ramp terminus is signalized, and the on-ramp is not metered.

The US 101/Mathilda Avenue Interchange is a partial cloverleaf interchange with access to all but two movements: southbound Mathilda Avenue to northbound US 101 and southbound US 101 to northbound Mathilda Avenue. None of the ramp termini are signalized, but all of the on-ramps are metered.

1.1.1.4 Transit Facilities in the Project Area

Two VTA light rail transit (LRT) stations, Moffett Park and Lockheed Martin, are located within the Project limits and serve the business district to the north of SR 237. VTA also operates a local bus service with four bus stops on Mathilda Avenue (Santa Clara Valley Transportation Authority 2016).[7] The Sunnyvale Caltrain Station is in downtown Sunnyvale adjacent to West Evelyn Avenue.

1.2 Statement of Project Purpose and Need

The Project proposes to improve operations on Mathilda Avenue through the US 101 and SR 237 interchanges. Due to the proximity of the SR 237 and US 101 interchanges (less than 1 mile), modification of one interchange would affect the other.

1.2.1 Purpose

The primary purpose of the Project is to improve traffic operations on Mathilda Avenue through the US 101 and SR 237 interchanges.

Specifically, the objectives of the Project are to:

- Reduce congestion and improve traffic operations along Mathilda Avenue and at the SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges.

[6] Ibid.

[7] Route 54 is the VTA local bus service from De Anza College (in the City of Cupertino) to the City of Sunnyvale Lockheed Martin LRT Transit Center.

- Improve mobility for all travel modes in the area including motor vehicles, transit, bicycles, and pedestrians.
- Provide standard crosswalks and sidewalks along Mathilda Avenue, improving access to local destinations such as Moffett Park, VTA LRT stations, and downtown Sunnyvale.

1.2.2 Need

The Project is needed for the following reasons:

- Regional growth and new local development combined with inefficient roadway operations has resulted in substantial traffic congestion on Mathilda Avenue.
- Efficient access for all travel modes into and out of downtown Sunnyvale and development to the north of SR 237 is critical to a healthy and sustainable economy. Congestion on Mathilda Avenue adversely affects the economic vitality of the City of Sunnyvale.

1.2.2.1 Roadway Deficiencies

Existing congestion and delay on Mathilda Avenue within the Project area are associated with the following roadway deficiencies:

- Four closely spaced signalized intersections along Mathilda Avenue (Ross Drive, eastbound SR 237 ramp termini, westbound SR 237 ramp termini, and Moffett Park Drive) at and adjacent to the SR 237 interchange provide inadequate storage for queuing vehicles, and limited green signal time for conflicting turning movements.
- Uncontrolled ramp movements at the US 101 interchange ramps at Mathilda Avenue and their proximity to signalized intersections (Ross Drive and Almanor Avenue/Ahwanee Avenue) provide limited distance for traffic to move into the desired lane of travel. This is further exacerbated by queues during peak periods at adjacent signalized intersections. Furthermore, the distribution of queues across available travel lanes is uneven, as some turning movement volumes are heavier than others.
- The US 101/SR 237 interchange to the west of the Project area does not provide for all turning movements. As a result, Mathilda Avenue carries both local and regional (freeway) traffic in both directions between US 101 and SR 237. Westbound SR 237 to southbound US 101 motorists utilize southbound Mathilda Avenue, and northbound US 101 to eastbound SR 237 motorists utilize northbound Mathilda Avenue.
- The US 101/Mathilda Avenue interchange does not provide for all turning movements. As a result, southbound Mathilda Avenue to northbound US 101 and southbound US 101 to northbound Mathilda Avenue motorists shift to the SR 237/Mathilda Avenue interchange or other routes.

- Southbound Mathilda Avenue reduces from three lanes to two lanes between Ross Drive and the northbound US 101 loop off-ramp merge lane, which results in a bottleneck for through traffic.
- The northbound US 101 loop ramps have a cloverleaf configuration. The short distance between the ramps results in traffic entering and exiting the freeway at much slower speeds, which affects freeway operations.
- High levels of traffic congestion and inefficient operations also adversely affect pedestrian, bicycle, and transit access within the Project area. Existing bicycle and pedestrian facilities in the area include the following deficiencies:
- No sidewalk or crosswalks along the west side of Mathilda Avenue are provided between Almanor Avenue/Ahwanee Avenue and the southbound US 101 off-ramp, or between the northbound US 101 loop-off-ramp and Moffett Park Drive (see Figure 1-3).
- Crosswalks at the US 101 ramps along the east side of Mathilda Avenue are uncontrolled. Pedestrians cross two lanes of traffic at the southbound US 101 on-ramp.
- Using the crosswalk south of Ross Drive to access bus stops on both sides of Mathilda Avenue is a safety concern. Local residents, the elderly, and children must cross nine lanes of traffic without the benefit of a pedestrian refuge.
- No designated bicycle facilities are provided along Mathilda Avenue in the Project area.
- Bicycle lanes on Moffett Park Drive between Bordeaux Drive and Innovation Way are not continuous.

Figure 1-3. Existing Conditions at Mathilda Avenue and Almanor Way

1.2.2.2 Bicycle and Pedestrian Access

Class II bicycle lanes[8] are provided in both directions on Bordeaux Drive (between Moffett Park Drive and Java Drive) and Borregas Avenue (between Moffett Park Drive and Caribbean Drive). Bicycle lanes are provided on Mathilda Avenue (north of Bordeaux Drive) and Moffett Park Drive (east of Bordeaux Drive). A Class III bicycle route is designated on Mathilda Avenue from Bordeaux Drive to Innovation Way. A Class I bicycle path extends from the north-east of the US 101/Mathilda Avenue interchange along the John W. Christian Greenbelt from Garner Drive to Morse Avenue, where it connects with existing bike lanes along Weddell Drive. A multi-use Class I bicycle/pedestrian path north of the Project area runs parallel to SR 237 and east of Lawrence Expressway along the eastern border of the City of Sunnyvale.

The primary bicycle movement through the Project Area is along Moffett Park Drive, which is a major commuter route. As shown in Figure 1-4, while there is existing bicycle access in the surrounding Project area, bicycle access is discontinuous between Mathilda Avenue at Innovation Way, Mathilda Avenue at Ahwanee Avenue, and Mathilda Avenue at East and West Moffett Park Drive.

Existing pedestrian facilities in the Project area include sidewalks on both sides of Mathilda Avenue between Fifth Avenue and Moffett Park Drive. South of Moffett Park Drive, sidewalks are provided on the east side of Mathilda Avenue until Ross Drive. At the Mathilda Avenue/SR 237 interchange, north-south pedestrian movements are limited to the east side of Mathilda Avenue and east-west crossing of Mathilda Avenue is prohibited within the interchange area. Pedestrians crossing Mathilda (east-west) have to use the crosswalk on the north leg of the Mathilda Avenue/Moffett Park Drive intersection. Sidewalks continue on the east side of Mathilda Avenue from the SR 237 interchange to south of the US 101 interchange, at which point sidewalks continue on both sides of Mathilda Avenue.

A multi-use pedestrian/bicycle bridge crosses SR 237 and US 101 east of Mathilda Avenue, providing a pedestrian/bicycle connection between Moffett Park to the north and Ahwanee Avenue neighborhood to the south.

1.2.2.3 Local Roadway Operations

Mathilda Avenue is the primary north-south crossing of US 101 and SR 237 in the Project area. The closest crossings are Moffett Boulevard (2 miles west) and Fair Oaks Avenue (0.5 mile east). Moffett Park Drive (west of Mathilda Avenue) is the primary east-west access for the business district to the north of SR 237 and Moffett Airfield. Within the Project area, Mathilda Avenue serves as the main access to the residential communities on the east side of

[8] Per the Highway Design Manual Index 1002.1, a Class I bikeway is a bicycle *path*, a Class II bikeway is a bicycle *lane*, and a Class III bikeway is a bicycle *route*. A Class I bikeway path is completely separate from the roadway, a Class II bikeway lane has a separate striped bicycle-only lane adjacent to the roadway, and a Class III bikeway route is a shared roadway, often referred to as a *sharrow*.

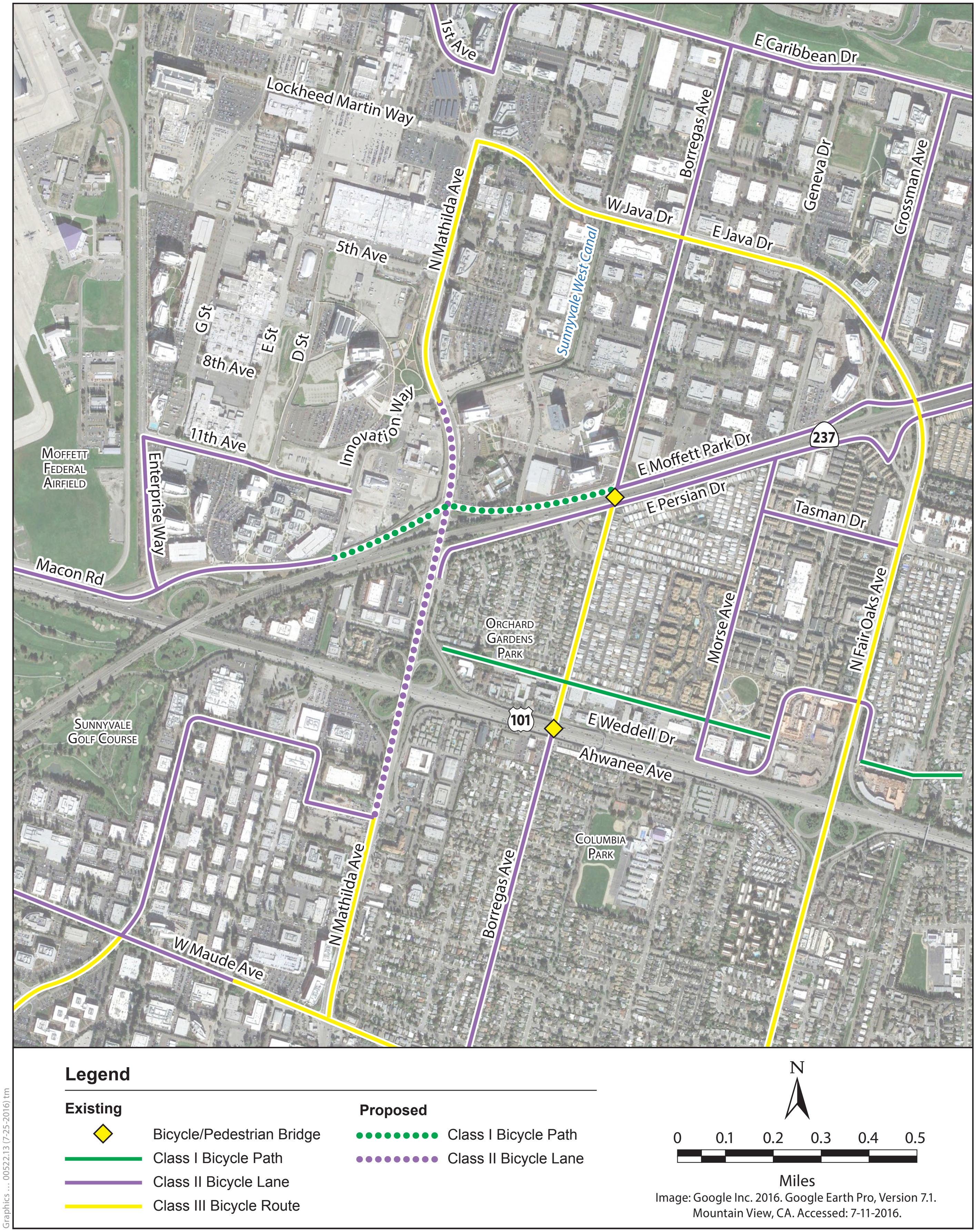

Figure 1-4
Existing and Proposed Bicycle Facilities
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Mathilda Avenue and is the only access to the landlocked area contained within the US 101/SR 237/Mathilda Avenue triangle, via Ross Drive.

Regional growth and new local development combined with physical constraints, such as closely spaced intersections, has resulted in traffic congestion on Mathilda Avenue. Existing City intersections along Mathilda Avenue within the Project area were found to operate at acceptable service levels during the peak hours between 7:00-8:00 a.m. and 5:00-6:00 p.m. However, due to the effects of closely spaced intersections, queuing occurs along Mathilda Avenue during peak periods within the Project area. Long queues (where queue length in feet exceeds available storage) indicating high peak-period traffic demand have been observed at the following seven intersections (out of 13 intersections total) along Mathilda Avenue:

- Innovation Way
- Moffett Park Drive
- Westbound SR 237 ramps
- Eastbound SR 237 ramps
- Ross Drive
- Northbound US 101 ramps
- Almanor Avenue/Ahwanee Avenue

As a result of existing and planned development, congestion and delay along Mathilda Avenue is expected to worsen over time in the Project area, particularly to the north of SR 237 in the Moffett Park development area.

1.2.2.4 Economic Development in the Project Area

Efficient access along Mathilda Avenue to downtown Sunnyvale, to the growing business district (Moffett Park) to the north of SR 237, to Moffett Airfield, and to the commercial/residential area between US 101 and SR 237 is critical to the economic vitality of the City.

Planned economic development projects within the Project area include the Moffett Place Campus Project, the Foothill-De Anza Community College District Sunnyvale Center, and expansion of the Sheraton Hotel.

The Moffett Place Campus Project is located north of the Sheraton Hotel site between Mathilda Avenue and Bordeaux Drive, and also east of Bordeaux Drive. This project will replace approximately 671,944 square feet of existing office space with six new eight-story office buildings, a two-story amenities building, surface parking, and two three-level parking structures for a total of approximately 1.8 million square feet of building area. The project's campus layout includes two large landscaped common spaces to accommodate active and passive recreation on site. All of this development will be primarily accessed by Mathilda

Avenue and local transit. The project was approved in December 2013 and is currently under construction.

The Foothill-De Anza Community College District Sunnyvale Center is located on the former Onizuka Airforce Station Site on the east side of Innovation Way. The site encompasses 9.15 acres and is just north of the Moffett Park Place development. The Foothill-De Anza development includes a two-story, 46,882-square-foot education center. This project is currently under construction with a target completion date of fall 2016.

Expansion plans for the existing 173-room Sheraton Hotel, located just off of Moffett Place Drive, include demolition of two structures and construction of a new nine-story, 342-room hotel building with an adjacent new four-level parking structure. The project is currently under review with the City.

1.3 Project Description

This section describes the Project Build and No-Build alternatives, how the alternatives were developed, and how each alternative meets or does not meet the objectives and purpose of the Project. The alternatives discussed in this EIR include the Build Alternative (see Figure 1-5) (generally referred to as the "Project" in this EIR) and the No-Build Alternative. Criteria used for evaluation included, but were not limited to, Project cost, potential for environmental impacts, and the ability of an alternative to meet the Project's objectives and purpose (refer to Section 1.2.1, *Purpose*).

1.3.1 Build Alternative

Proposed improvements included in the Build Alternative are the reconfiguration of the US 101 and SR 237 interchanges at Mathilda Avenue; modification of on- and off-ramps; removal, addition, and signalization of intersections; and provision of new left-turn lanes. In addition, the Build Alternative would include modification of existing, and construction of new, bicycle and pedestrian facilities, utility relocations, new storm water treatment facilities, enhanced street lighting, ramp metering modifications, modification of overhead signage, three new retaining walls, and LRT crossing facilities. The effects of not implementing the Project are discussed under Section 1.3.2, *No-Build Alternative*, and are detailed in each resource section of Chapter 2, *Environmental Setting, Impacts, and Avoidance, Minimization and/or Mitigation Measures*. A detailed description of the elements of the Build Alternative follows.

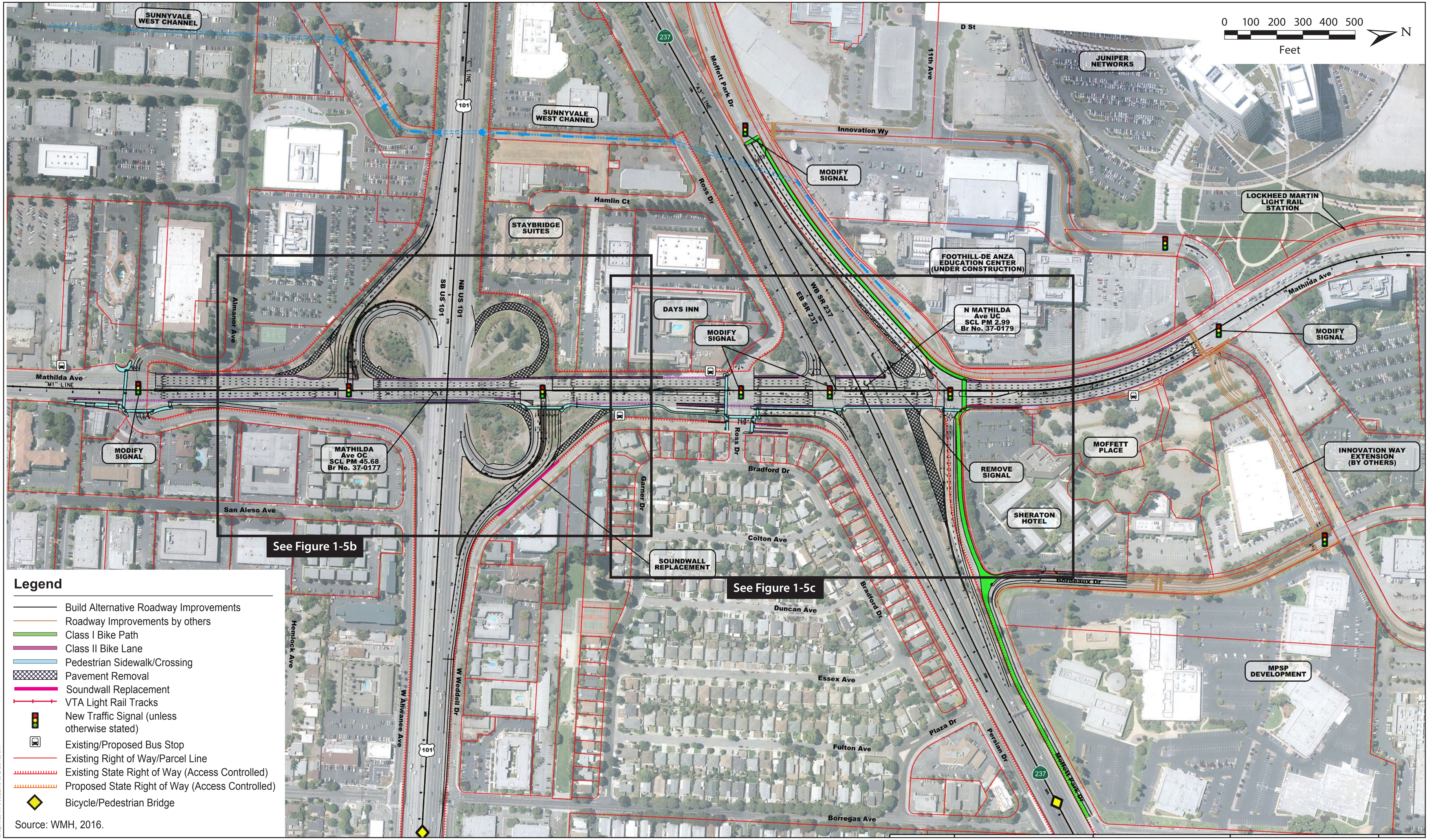

Figure 1-5a
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

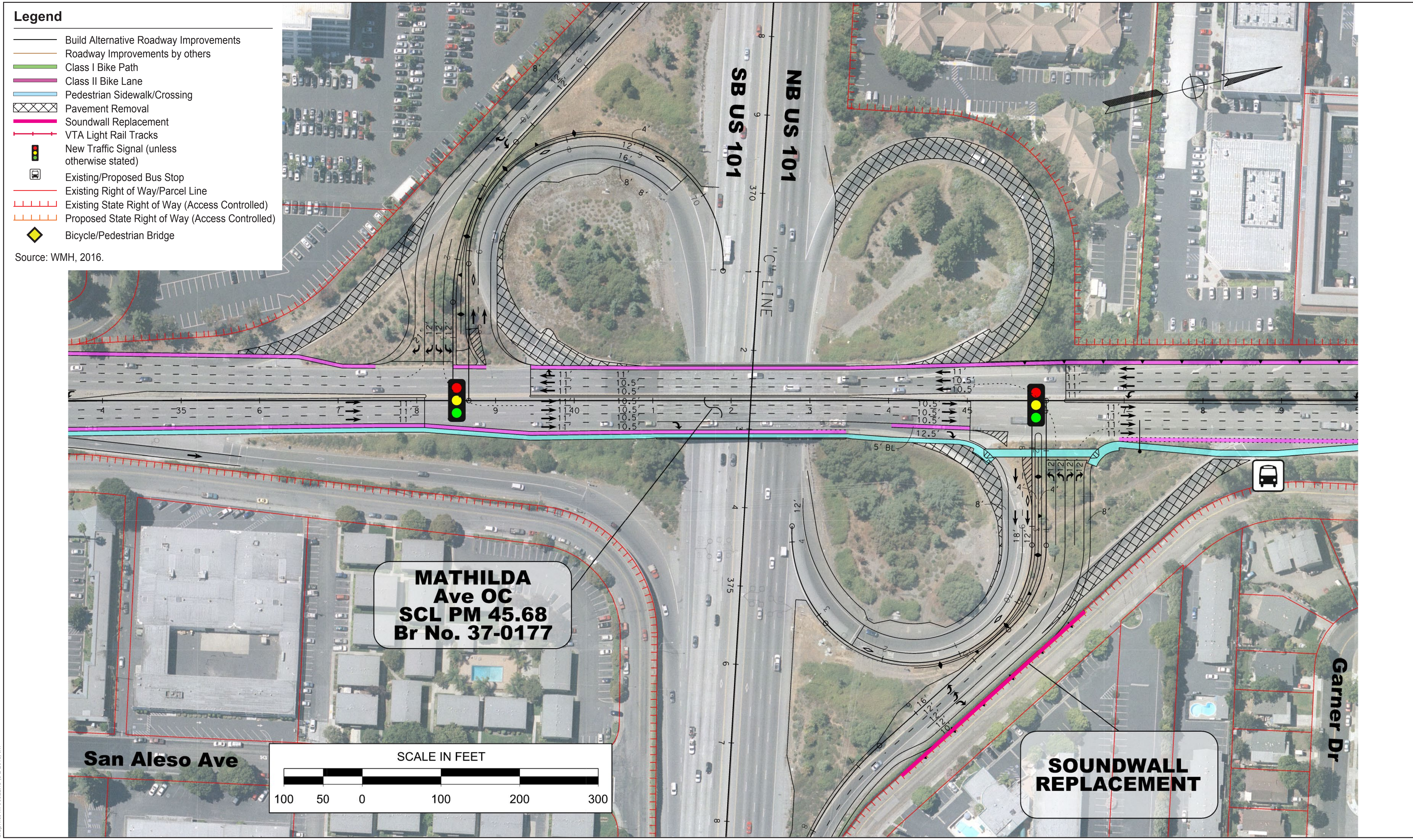

Figure 1-5b
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

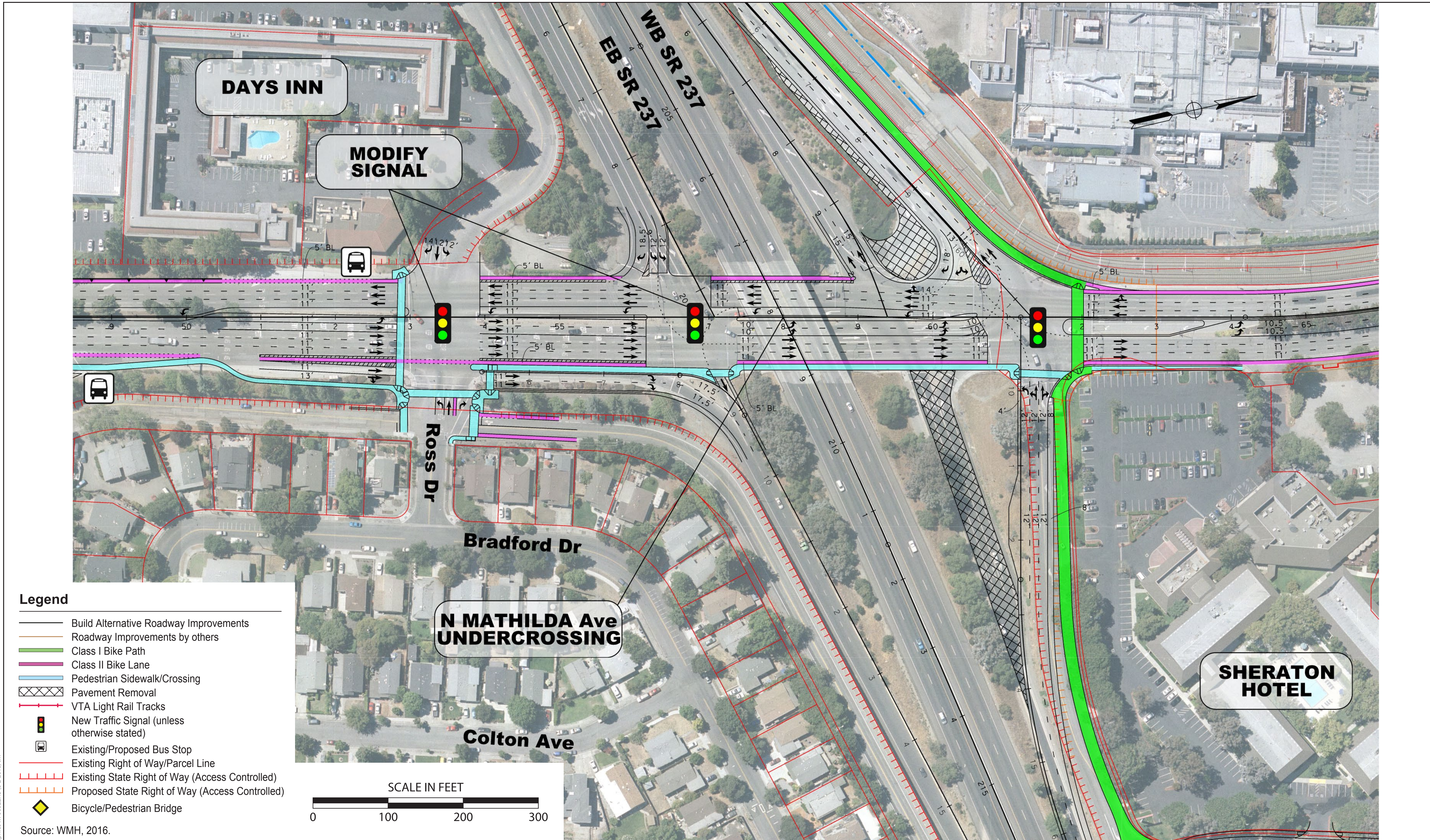

Figure 1-5c
Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

1.3.1.1 Roadway Improvements

The Project would consist of the following roadway improvements:

- Provide three continuous through lanes in each direction on Mathilda Avenue.
- Remove the northbound US 101 loop off-ramp and shift traffic to the northbound US 101 diagonal off-ramp.
- Realign and widen the northbound US 101 ramps and signalize the ramp intersection with Mathilda Avenue, and construct a left-turn lane on southbound Mathilda Avenue to access the northbound US 101 loop on-ramp.
- Realign the southbound US 101 off-ramp and loop on-ramp and signalize the ramp intersection with Mathilda Avenue.
- Modify the Mathilda Avenue/Ross Drive signal intersection.[9]
- Close Moffett Park Drive to vehicular traffic between Bordeaux Drive and Mathilda Avenue, and shift traffic to Bordeaux Drive and Innovation Way. Innovation Way would be extended from Mathilda Avenue to Bordeaux Drive as part of the Moffett Place Campus Project. Moffett Park Drive eastbound north of Mathilda Avenue would remain. Moffett Park Drive would remain open to bicyclists and would become a Class I bikeway (see Section 1.3.1.2).
- Remove the westbound SR 237 ramp signal intersection. Realign the westbound SR 237 off-ramp opposite Moffett Park Drive and modify the signal intersection. The existing signalized intersections on Mathilda Avenue at the SR 237 westbound off-ramp and Moffett Park Drive would be removed.
- Signalize the reconfigured westbound SR 237 off-ramp/Moffett Park Drive intersection. The westbound SR 237 off-ramp would be modified to intersect with Mathilda Avenue just south of the new signalized intersection. Mathilda Avenue northbound traffic heading to westbound SR 237 would have to make a U-turn movement[10] at the new signalized intersection to access the on-ramp.
- Modify the westbound SR 237 ramps to provide a diamond configuration (see Figure 1-4).

1.3.1.2 Bicycle and Pedestrian Facilities

The proposed Project would be developed to provide improved mobility for all users, including bicyclists, pedestrians, transit riders, and motorists.

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[9] The bus stop on the east side of Mathilda Avenue, south of Ross Drive, would be relocated 300 feet south, closer to US 101.

[10] U-turn movement is part of the intersection improvement.

Bicycle improvements on Mathilda Avenue would consist of Class II bike lanes, based on available pavement widths within the Project area, and would connect to the existing Class II bike lanes and Class III bike routes on Mathilda Avenue and the Class I bikeway on the Sunnyvale West Channel. Bicycle improvements on Moffett Park Drive would consist of a Class I bikeway between Bordeaux Drive and Mathilda Avenue. A signal-controlled crosswalk would be provided for bicyclists and pedestrians to cross Mathilda Avenue. Between Mathilda Avenue and Innovation Way, a Class I multi-use path would be installed.[11]

Bicycle and pedestrian improvements in the Project area would be consistent with the *City of Sunnyvale 2006 Bicycle Plan* (City of Sunnyvale 2006) and the *Santa Clara Countywide Bicycle Plan* (Santa Clara County 2008), and would include:

- Upgrading existing pedestrian facilities to incorporate current Americans with Disabilities Act (ADA) standards, including curb ramps at all crosswalks.
- Incorporating pavement delineation with new crosswalk markings.
- Installing pedestrian countdown signals at westbound SR 237 ramps, eastbound SR 237 ramps, Ross Drive, northbound US 101 ramps, and southbound US 101 ramps.
- Realigning ("teeing up") and signalizing ramp termini to provide new pedestrian crossings, where feasible.

1.3.1.3 Utility Relocations

The following utility companies have known facilities within the Project limits: Pacific Gas & Electric (PG&E) gas and electric services; American Telephone and Telegraph (AT&T) telephone service; Comcast cable and internet service; Verizon telecommunication service; San Francisco Public Utilities Commission Hetch-Hetchy Aqueduct; VTA LRT electric and communication services; and City water line, recycled water line, storm drain, and sanitary sewer services.

The Project would require the relocation of Verizon telecommunication lines and a City 8-inch recycled water line along the current alignment of Moffett Park Drive, east of Mathilda Avenue. The Project would also require adjustments to three PG&E electrical pole wires to accommodate ramp modifications at the US 101/Mathilda Avenue interchange. Utility manhole covers would be adjusted to grade in areas of pavement rehabilitation.

1.3.1.4 Storm Water Treatment

The proposed interchange ramp modifications are expected to result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, and construction of new drainage structures. The drainage design would maintain existing drainage patterns; however, during construction, temporary drainage facilities may be required to redirect runoff from construction areas.

[11] A multi-use path would accommodate both bicycle and pedestrian users.

New storm water treatment facilities for the Project may include biofiltration strips, biofiltration swales, bioretention basins, and/or detention basins within the state right-of-way near the on- and off-ramps and on City streets. Biofiltration is a pollution control technique using living material (vegetation) to capture sediment and pollutants from storm water runoff. Biofiltration strips are vegetated sections of land that capture sediment and pollutants as storm water passes over the strips in sheet flows. Biofiltration swales are vegetated ditches, frequently used in conjunction with biofiltration strips, that receive and direct sheet flows into linear, concentrated flow channels. Bioretention basins are designed to pond storm water and filter it through several layers of natural treatment: a layer of imported topsoil, followed by a layer of specially designed bioinfiltration media, and finally permeable material/gravels to encourage infiltration into native soil further below. Storm water enters the underdrain only in heavier storms, after ponding up and filtering through the cleansing media above and saturating gravels below. Detention basins temporarily detain storm water, letting sediment in the storm water settle to the bottom of the basin before discharging the water through a raised/controlled outlet. If these biofiltration techniques are not feasible on City streets due to right-of-way constraints, tree wells may also be utilized. Tree wells are optimized for high volume/flow treatment and high pollutant removal. Their small footprint allows them to be integrated into landscaped areas and streets/sidewalks.

1.3.1.5 Enhanced Lighting

The proposed Project would provide enhanced lighting to improve roadway visibility for motorists, bicyclists, and pedestrians during nighttime hours. Overhead lighting would be maintained or installed at all ramps.

1.3.1.6 Highway Planting

Existing highway plantings and irrigation infrastructure that are damaged or destroyed as a result of the Project would be repaired and replaced as necessary. Irrigation infrastructure (i.e., crossovers, electrical service, and new water meters) would be installed as needed based on Project landscaping. Highway plantings and irrigation would be installed and would commence immediately following Project roadway construction. The Project would include a 3-year plant establishment period.

1.3.1.7 Ramp Metering

Ramp metering facilities already exist at the northbound US 101 loop on-ramp, southbound US 101 ramps, and the westbound SR 237 on-ramp. Because these ramps would be modified and realigned with the Project, the affected ramp metering equipment would also be modified/replaced in-kind. The Project does not propose any additional ramp meters.

1.3.1.8 Overhead Signage

Updated overhead signs in each direction on SR 237 and US 101 would inform motorists of the approaching on- and off-ramps associated with the Project. The overhead sign structure mounted to the Mathilda Avenue overcrossing on northbound US 101 would be removed as it applies to the existing loop off-ramp, which is being relocated and integrated as both a west and east Mathilda Avenue access route from northbound US 101. The northbound US 101 off-ramp widening would require that signage be replaced just south of the Borregas Pedestrian Overcrossing.

1.3.1.9 Light Rail Transit Facilities

VTA LRT facilities crossing the Moffett Park Drive/Innovation Way and Mathilda Avenue/Innovation Way intersections would be modified as part of the Project but would continue to have their signal timing coordinated with adjacent intersection traffic signals.

1.3.1.10 Retaining Walls and Sound Walls

The Project proposes construction of three new retaining walls to minimize the amount of earthwork and right-of-way acquisitions required. The locations of proposed retaining walls (refer to Figure 1-6) are:

1. The southbound US 101 diagonal off-ramp/southbound US 101 loop on-ramp.
2. The northbound US 101 off-ramp/northbound US 101 loop on-ramp.
3. Along the west side of Mathilda Avenue.

Retaining walls would receive standard aesthetic treatments that would be determined during final design in coordination with the Caltrans Office of Landscape Architecture.

To accommodate proposed realignment and widening of the northbound US 101 off-ramp to Mathilda Avenue, the Project would remove and replace approximately 1,000 feet of an existing 10-foot-high sound wall adjacent to the ramp and West Weddell Drive (see Figure 1-6). The replacement sound wall would be supported on a retaining wall and located at the widened edge of pavement, abutting the realigned northbound US 101 off-ramp. This sound wall would be replaced in-kind to be the same height, color, and texture as the adjacent sound walls.

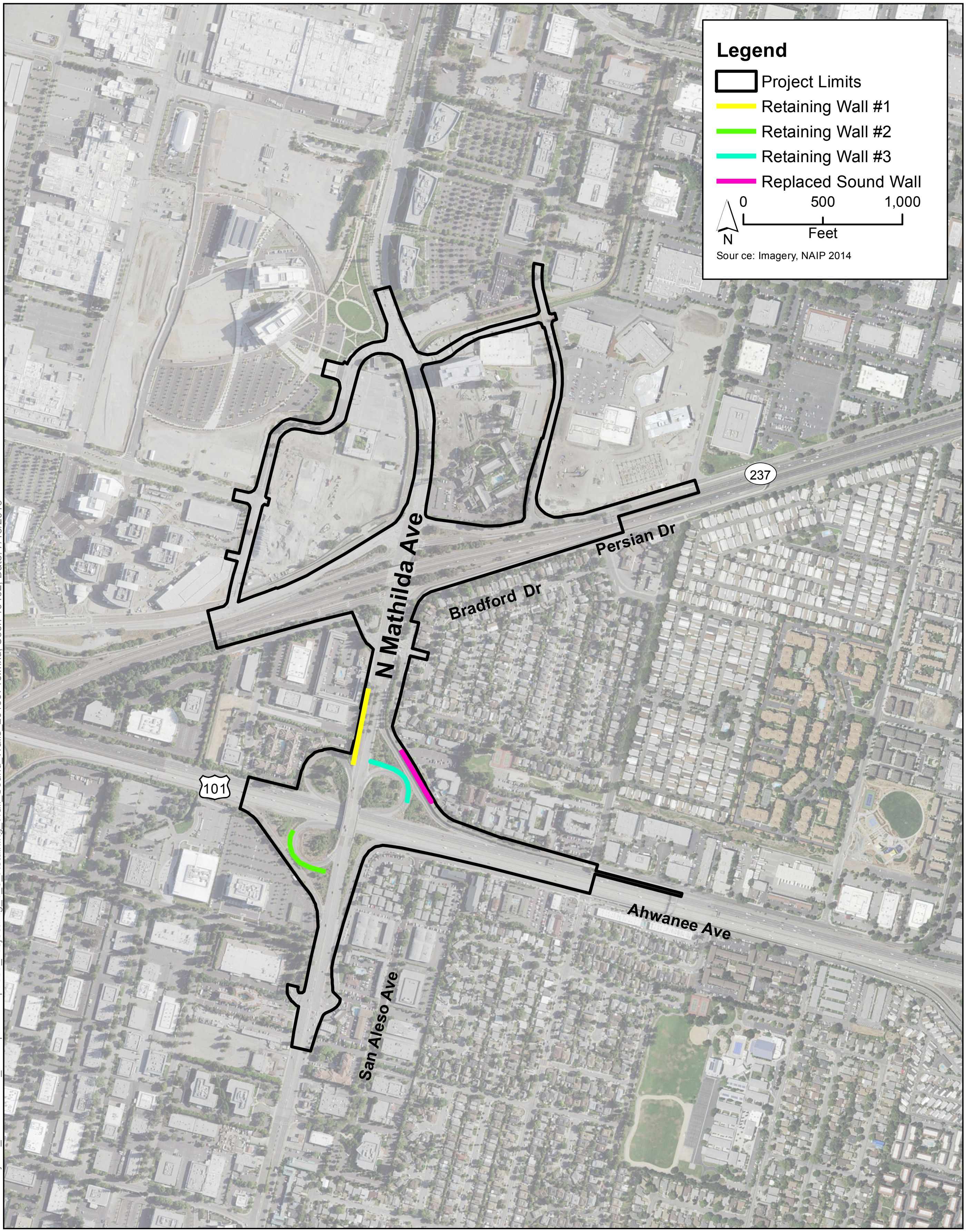

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Figure 1-6
Retaining Walls and Sound Walls
Mathilda Avenue Improvements at SR 237 and US 101 Project

1.3.1.11 Construction Staging Areas

Staging/laydown areas for equipment and materials would be needed during Project construction. Final construction staging areas are to be determined, but generally would be located within the state right-of-way adjacent to Mathilda Avenue. Potential locations are shown in Figure 1-7 and include:

- Within the northbound US 101 loop off-ramp.
- Between the northbound US 101 diagonal off-ramp and northbound loop on-ramp.
- Within the southbound US 101 loop on-ramp.
- Between the southbound US 101 loop on-ramp and diagonal off-ramp.
- Between the westbound SR 237 ramps and Moffett Park Drive.

1.3.1.12 Right-of-Way Acquisitions

Based on preliminary designs, the proposed Project would require the acquisition of right-of-way. The location of all the temporary construction easements may change as design is refined. Depending on sidewalk widths and property lines, temporary construction easements may be required in the northern portion of the Project area to modify the traffic signal along Moffett Park Drive where the Project is outside of the local roadway right-of-way. The Project would require partial acquisition of the Sheraton Sunnyvale Hotel property at 1108 North Mathilda Avenue. This partial acquisition would not affect any buildings associated with the property, but would permanently close the entrance/driveway along Moffett Park Drive. The hotel would still be accessible along North Mathilda Avenue and Bordeaux Drive. Access to all properties within the Project area would be maintained during construction. Table 1-1 lists proposed right-of-way acquisitions and temporary construction easements required for construction of the Project.

Table 1-1. Proposed Right-of-Way Acquisitions

Assessor Parcel Number (APN)	Property Owner	Temporary Construction Easement (TCE)[a]	Public Access Easement[b]	Partial Acquisition	Ownership Transfer[c]
204-01-013	PSS Enterprises Inc. (Shell Station) 776 N. Mathilda Ave. Sunnyvale, CA 94085	1,600 square feet (sf)/ 0.036 acre (ac)	-	-	-
165-43-019	Burger King 773 N. Mathilda Ave. Sunnyvale, CA 94085	370 sf/0.008 ac	-	-	-
110-08-025	Pappas, Louis G and Effie 502 Ross Dr. Sunnyvale, CA 94089	324 sf/ 0.007 ac	-	-	-
110-27-025	W2005 New Century Hotel Portfolio LP (Sheraton Sunnyvale Hotel) 1108 N. Mathilda Ave. Sunnyvale, CA 94089	11,293 sf/ 0.259 ac	-	2,383 sf/ 0.055 ac	-
N/A Moffett Park Dr. East of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave. Sunnyvale, CA 94086	-	-	-	43,774 sf/ 1.005 ac
N/A Innovation Way	Foothill-De Anza Community College 12345 El Monte Rd. Los Altos Hills, CA 94022	170,875 sf/ 3.923 ac	170,875 sf/ 3.923 ac	-	-
N/A Innovation Way	Moffett Place LLC 1183 Borregas Ave Sunnyvale, CA 94089	41,226 sf/ 0.946 ac	41,226 sf/ 0.946 ac	-	-
N/A Moffett Park Dr. West of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave Sunnyvale, CA 94086	-	-	-	4,798 sf/ 0.110 ac
N/A W. Weddell Dr. East of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave Sunnyvale, CA 94086	-	-	-	1,322 sf/0.030 ac

[a] Square footages are subject to change during subsequent engineering phases.

[b] A public access easement allows the general public to use a street that passes through private property.

[c] A transfer of ownership of street or highway between the City and a state agency, pursuant to Section 83 of the California Streets and Highway Code.

Source: VTA Real Estate 2016.

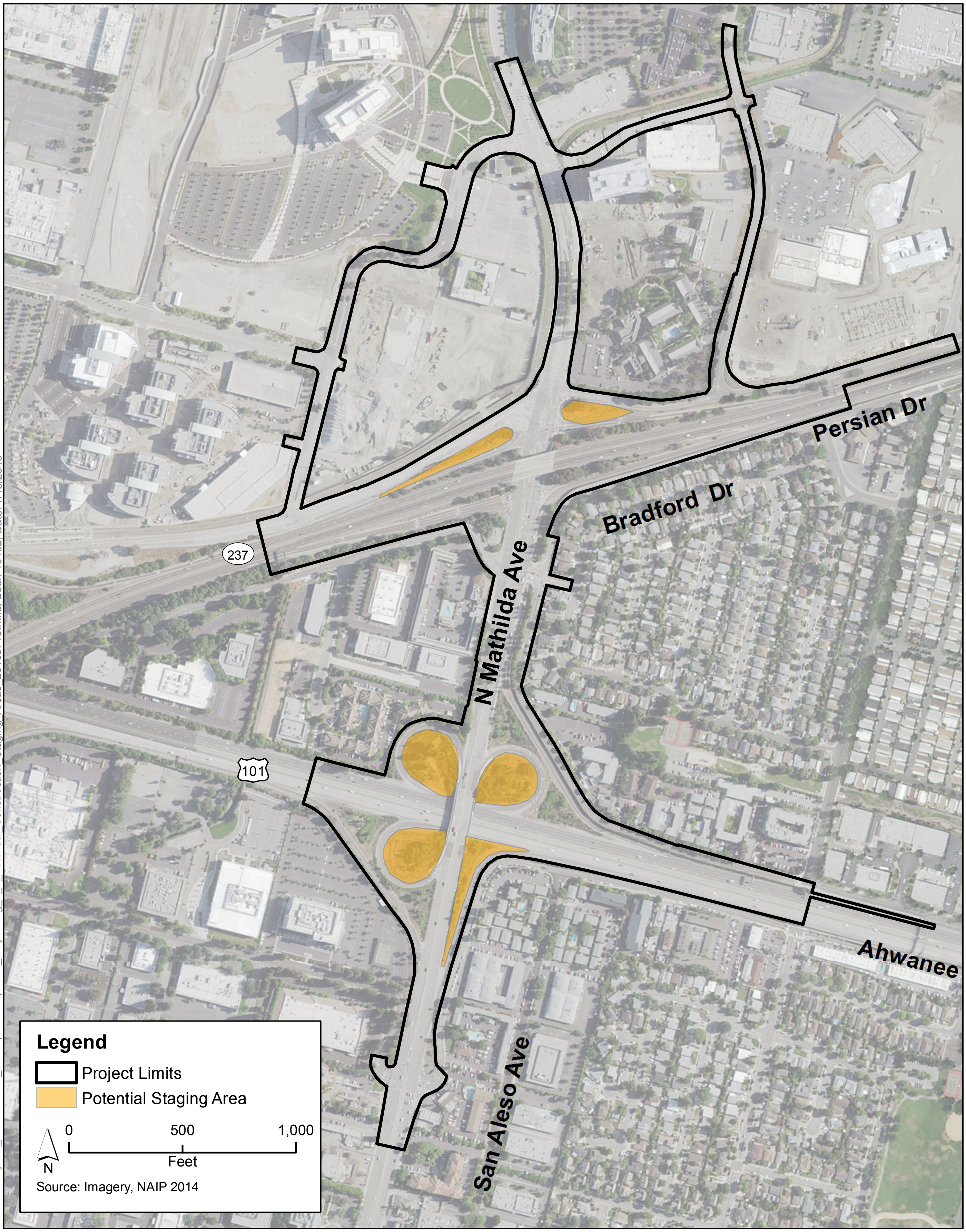

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Figure 1-7
Potential Construction Staging Areas
Mathilda Avenue Improvements at SR 237 and US 101 Project

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1.3.2 No-Build Alternative

Under the No-Build Alternative, no changes would be made to the existing local roadways or freeway ramps within the Project limits. No construction activities would occur, and there would be no change in the operations of the existing facilities. Other planned and approved land use development and transportation improvements along local routes may be implemented by local agencies or under other projects.

Under CEQA, the baseline for environmental impact analysis consists of the existing conditions at the time of the Notice of Preparation. Under the No-Build Alternative, existing roadway deficiencies on Mathilda Avenue would not be addressed, bicycle and pedestrian access (provision of sidewalk/crosswalk/designated bicycle facilities) would not be provided, and congestion and delay in the Project area is expected to worsen. Improvements to accommodate existing demand and prepare for future regional growth and new local development would not be implemented, which may indirectly impact the economic health of the City. As such, the No-Build Alternative would not meet any objectives of the Project, as listed in Section 1.2.1, *Purpose*. Under the No-Build Alternative, projected increases in traffic would cause congestion to worsen, as described in Section 2.14, *Transportation/Traffic*.

1.3.3 Cost

The Project is included in the 2015 Federal Statewide Transportation Improvement Program (ID No. SCL130001) (California Department of Transportation 2014) and the current Regional Transportation Plan/Sustainable Communities Strategy (Project No. 240554 in *Plan Bay Area*), which is updated by the Metropolitan Transportation Commission (Metropolitan Commission 2013). The Project is also identified in the Valley Transportation Plan 2040 (Santa Clara Valley Transportation Authority 2009) under ID H43 and in the City's Capital Improvement Program for Fiscal Year 2013/2014 as Project No. 826890 (City of Sunnyvale 2013).

Under the No-Build Alternative, no improvements would be made to the existing local roadways or freeway ramps within the Project limits. There would be no construction activities and therefore no capital costs. In comparison, the Build Alternative is anticipated to cost $41.3 million dollars.[12] The City has committed local funding to the development of the Project. Other funding sources have yet to be determined, but may include a combination of state and local transportation funds.

[12] The escalated (2018) total Project cost is $41.3 million dollars. The current (2013) total Project cost is $39.8 million dollars.

1.3.4 Schedule

Construction of these improvements would take approximately 250 working days, or 12 months, and is expected to start in early 2018. A combination of day and night work is anticipated. Weekend work is not anticipated. Short-term lane and ramp closures would be necessary to facilitate construction. A Traffic Management Plan (refer to Chapter 2, Section 2.14, *Traffic/Transportation*) would be implemented during construction to minimize and prevent delay and inconvenience to the traveling public.

1.3.5 Comparison of Alternatives

This section summarizes the differences between the Build Alternative and the No-Build Alternative. Table 1-2 presents a comparison of the alternatives.

Table 1-2. Comparison of Alternatives

	Build Alternative	**No-Build Alternative**
Objectives		
Congestion, operation, and delay	• Improvement of operational conditions by decreasing delay and accommodating the continued and planned growth in the Project area.	• Congestion would continue to worsen over time as planned development continues.
Mobility for all travel modes	• Enhanced bicycle and pedestrian facilities would be provided.	• No improvements.
Access to local destinations	• Provide for all traffic movements at US 101/Mathilda Avenue interchange.	• No improvements.
Purpose		
Roadway improvements to address closely spaced intersections, inadequate storage for and distribution of queuing, accommodation of turning movements	• Remove Moffett Park Drive between Bordeaux Drive and Mathilda Avenue; shift traffic to Bordeaux Drive and Innovation Way to access Mathilda Avenue. • Realign and widen the westbound SR 237 off-ramp and signalize. • Remove existing signalized intersections on Mathilda Avenue at SR 237 westbound off-ramp and Moffett Park Drive.	• No changes would be made to the existing local roadways or freeway ramps within the Project limits.
Provision of sidewalk or crosswalks and bicycle facilities	• Enhanced bicycle and pedestrian facilities would be provided.	• No improvements.

1.3.6 Alternatives Considered but Eliminated from Further Discussion

The objectives of the proposed Project, as described in Section 1.2.1, *Purpose*, are to reduce congestion on Mathilda Avenue, improve mobility for all travel modes, particularly for bicyclists and pedestrians, and provide better access to local destinations, particularly for bicyclists and pedestrians. The alternatives that were evaluated focused on achieving these objectives through various alterations to the Mathilda Avenue and SR 237 interchange, Mathilda Avenue and US 101 interchange, and/or local streets.

An alternatives assessment study was conducted to identify viable alternatives for further study during early stages of Project development. A total of 19 conceptual alternatives were considered, and a screening process was conducted with the Project Development Team (PDT) to assess each alternative and identify reasons to withdraw alternatives from further study. Conceptual alternatives considered and removed during the project development process are summarized in Table 1-3. Table 1-3 also provides a brief discussion of Transportation System Management (TSM), Transportation Demand Management (TDM), and Mass Transit Alternatives.

During the environmental planning phase, the PDT agreed to eliminate a second Build Alternative (Diverging Diamond Interchange [DDI]). The DDI alternative proposed to realign and widen the existing westbound SR 237 ramps and close Moffett Park Drive (West) at Mathilda Avenue, and modify the SR 237/Mathilda Avenue Interchange to provide a DDI configuration. This alternative was proposed to provide free left turns for ramp movements and additional storage between ramp intersections.

As part of the preliminary engineering studies conducted during Project development, this alternative was withdrawn from further consideration due to safety concerns associated with the DDI configuration, including the proximity of local street intersections, narrow lane widths, and bicycle and pedestrian access.

Table 1-3. Alternatives and Options Considered but Eliminated from Further Discussion

Alternatives and Options[a]	Description	Reason(s) for Withdrawal
Alternatives		
1	Transportation System Management (TSM)	• SR 237 ramps and local street intersections spaced too close. • Eliminating left-turn movements at the Mathilda Avenue/Moffett Park Drive intersection would result in traffic shifting to other routes, which may cause congestion elsewhere.
2	Diamond Interchange	• Would close Moffett Park Drive (West) at Mathilda Avenue, causing traffic to shift onto Innovation Way or choose alternate routes. The Innovation Way/Mathilda Avenue intersection does not have adequate capacity to accommodate the increased level of traffic. Releasing this traffic onto Mathilda Avenue would increase congestion and not meet the Project objectives.
3	Diamond Interchange at SR 237 with Loop On-Ramp	• High capital cost to serve estimated low volume of users for new loop on-ramp (approximately 100 vehicles per hour existing). • Reduced vertical clearance on Mathilda Avenue to nonstandard height.
4	Tight Diamond Interchange at SR 237 with Loop On-Ramp	• SR 237 ramps and local street intersections spaced too close. • High capital cost to serve estimated low volume of users for new loop on-ramp (approximately 100 vehicles per hour existing). • Reduced vertical clearance on Mathilda Avenue to nonstandard height. • Potential safety issue concern associated with left turning traffic traveling eastbound on Moffett Park Drive to northbound Mathilda Avenue making a wrong-way movement onto the westbound SR 237 off-ramp.
5	Diverging Diamond Interchange (DDI)[c]	• Nonstandard interchange configuration would require special approvals. • Free left turns at ramp termini are undesirable for safe passage of pedestrians/bicycles. • The combination of small curve radii and narrow lanes through the DDI crossover intersections would result in vehicles (especially large trucks) “off-tracking” into shoulder areas. This raises safety concerns for bicyclists using the DDI facility. • Stopping sight distance for traffic traveling through the crossover intersections would be impeded by the SR 237/Mathilda Avenue Undercrossing bridge columns and abutment walls. This would increase the potential for rear-end type collisions.
6	Diamond Interchange at SR 237 with Roundabouts	• Not enough right-of-way to accommodate roundabouts. • Entries and exits on the roundabout would be closely spaced and would adversely affect operations and cause safety issues for pedestrians and bicyclists.
7	Diamond Interchange at SR 237 with Braided Ramps	• SR 237 ramps and local street intersections would be spaced too close together. • The improved SR 237 weave operations would adversely affect downstream northbound US 101 operations.

Alternatives and Options[a]	Description	Reason(s) for Withdrawal
8	Parallel Street Interchange	• There would be minimal improvements to eastbound ramp operations. • Access to Ross Drive to the west of Mathilda Avenue would be significantly modified.
9	Westbound SR 237 Braided Ramps	• The radius of the westbound SR 237 to Moffett Park Drive ramp would be too tight. • The US 101/SR 237 separation would require widening. • The improved SR 237 weave operations would adversely affect downstream northbound US 101 operations.
10	Westbound SR 237 Collector/ Distributor	• SR 237 ramps and local street intersections would be spaced too close together. • The US 101/SR 237 separation would require widening.
11	Westbound SR 237 Collector/ Distributor with Braided Ramps	• Radius of the westbound SR 237 to Moffett Park Drive ramp would be too tight. • US 101/SR 237 separation would require widening. • The improved SR 237 weave operations would adversely affect downstream northbound US 101 operations.
12	Single Point Diamond Interchange at SR 237	• Would require complete reconstruction of the interchange (bridge, ramps, and intersections), which has associated stage construction complexities and high capital cost. • Left turn access for Ross Drive would be eliminated.
13	Flyover from Eastbound SR 237 to Northbound Mathilda Avenue	• The distance between the SR 237 ramps and local street intersections would be too close. • U-turn movement would be required to access the westbound SR 237 on-ramp from northbound Mathilda Avenue. • Would have substantial right-of-way and driveway access impacts on the Sheraton Hotel.
15	Full Partial-Clover Interchange at SR 237	• Realignment of the southbound US 101 diagonal on-ramp would require realignment of the frontage road (West Ahwanee Avenue). • Substantial right-of-way impacts on residential apartment and commercial properties adjacent to West Ahwanee Avenue, including loss of driveway access and onsite parking, and removal of buildings requiring relocation of residents. • Would result in reduced capacity for vehicles waiting at the on-ramp meter, or would require extending the ramp merge south, which would require reconstruction of the pedestrian/bicycle overcrossing at Borregas Avenue.
A	Northbound US 101 Partial-Clover Interchange	• Would result in queues on the northbound US 101 off-ramp extending to the mainline and disruption of the flow of northbound US 101 traffic. • Would maintain the existing interchange configuration at US 101/Mathilda Avenue and maintain a partial interchange configuration.

Alternatives and Options[a]	Description	Reason(s) for Withdrawal
B	Northbound US 101 Partial-Clover Interchange with Loop On-Ramp	• Would result in queues on the northbound US 101 off-ramp extending to the mainline and disruption of the flow of northbound US 101 traffic.
C	Northbound US 101 Partial-Clover Interchange with Diagonal On-Ramp	• Would result in queues on the northbound US 101 off-ramp extending to the mainline and disruption of the flow of northbound US 101 traffic. • The additional traffic from the new northbound US 101 diagonal on-ramp would impact US 101 mainline operations. • Would result in additional environmental impacts on creek/riparian habitat and a cultural resources site. • Would have additional right-of-way impacts.
D	Southbound US 101 Partial-Clover Interchange	• Would result in queues on the southbound US 101 off-ramp extending to the mainline and the disruption of flow of southbound US 101 traffic.
TDM/Mass Transit	Transportation Demand Management (TDM) and Mass Transit Alternatives	• The proposed Project includes measures to improve accessibility for other modes of travel (bicycle and pedestrian facilities) and would improve traffic signal coordination. Implementation of other measures typically included as part of the TDM and Mass Transit alternatives would not meet the Project objectives and purpose, as described in Sections 1.2.1, *Purpose*, and 1.2.2, *Need*, respectively. • TDM alternatives focus on regional strategies for reducing the number of trips and miles traveled as well as increasing vehicle occupancy. As stated, the Project already includes improved bicycle and pedestrian facilities, expanding traveler choice in terms of travel method and routes. TSM alternatives (discussed previously) include actions that increase the efficiency of existing facilities and the number of vehicle trips a facility can accommodate; and include strategies such as auxiliary lanes, turning lanes, reversible lanes, and traffic signal coordination; as well as encouraging automobile, public, and private transit as elements of a unified transport system. As such, the TDM and Mass Transit alternatives were not considered further.

Alternatives and Options[a]	Description	Reason(s) for Withdrawal
Alternative Options – Considered features that could be incorporated into the alternatives described		
Option 1	Roundabout Intersections	• In accordance with the Caltrans Intersection Control Evaluation screening project, an evaluation of yield-controlled roundabouts as a potential method of intersection control was conducted. Analysis of two-lane roundabouts was conducted at the proposed SR 237 and US 101 ramp intersections with Mathilda Avenue, and found that two-lane roundabouts with bypass lanes to accommodate the heavy right-turn volumes would not provide adequate capacity at these locations and would operate under congested conditions during peak hours. • Roundabout intersections cannot be accommodated due to various physical constraints, including right-of-way and property impacts, impacts on light rail transit, proximity of Ross Drive, and reduced storage for queuing vehicles between ramp intersections. A three-lane roundabout is not considered viable either, given the significant right-of-way impacts and potential safety issues entering and exiting a three-lane roundabout. Based on this analysis, a roundabout intersection was withdrawn from further consideration at these locations.
Option 2	Class I Bicycle Facility	• A continuous Class I trail was considered along the east side of Mathilda Avenue between Ahwanee Way and Innovation Way, in lieu of the Class II bicycle lanes and east sidewalk proposed for the Project. The Class I trail option was discussed with the PDT and withdrawn from further consideration for the following reasons: o Bicyclists using the Class I trail would need to cross over Mathilda Avenue to connect with existing Class III facilities north and south of the Project limits. o Experienced bicyclists are anticipated to continue to share the road with traffic rather than cross over to a trail shared with pedestrians. o There are no planned improvements to extend bicycle facilities north and south of the Project limits.

[a] Alternative 14 (Build Alternative 1) has been carried forward and is evaluated in this document as the proposed Build Alternative. Therefore, it is not included in this table.

[b] TSM refers to a set of strategies that largely aim to reduce GHG emissions by reducing congestion, primarily by improving transportation system capacity and efficiency. TSM strategies could also address a wide range of other externalities associated with driving such as pedestrian/driver safety, efficiency, congestion, travel time, and driver satisfaction. Some TSM strategies are designed to reduce total and systemic congestion and improve system-wide efficiency, while other strategies target particularly problematic areas where improvements could greatly affect congestion, safety, efficiency, and GHG emissions.

[c] Alternative 5 (Build Alternative 2 [Diverging Diamond Interchange or DDI]) was carried forward for further study and later withdrawn from consideration. It is described in Appendix F of this document.

1.4 Permits and Approvals Needed

Table 1-4 shows the permits, reviews, and approvals that would be required for Project construction.

Table 1-4. Permits and Approvals Needed During Construction

Agency	Permit/Approval	Status
California Public Utilities Commission	General Order 88-B authorization	As necessary, Caltrans will seek authorization for any modifications to VTA’s LRT facilities; to the extent feasible, the LRT crossings will be avoided.
California Department of Transportation (Caltrans)	Access Encroachment Permit for work within the right-of-way	Application for access encroachment permit will be submitted prior to construction if VTA administers construction of the Project.

Chapter 2
Environmental Setting, Impacts, and Avoidance, Minimization and/or Mitigation Measures

2.1 Introduction

This chapter addresses environmental impacts and provides an evaluation of the Project. The evaluation is consistent with the CEQA Appendix G: Environmental Checklist Form, provided in Appendix A. Many of the environmental resource discussions presented in this chapter are based on technical reports and studies listed in Appendix E, *List of Technical Studies*.

Avoidance, minimization, and/or mitigation measures are summarized in Table ES-1 of the Executive Summary, discussed in Sections 2.2 through 2.14, and included in the *Environmental Commitments Record*, provided as Appendix C.

As part of the scoping and environmental analysis conducted for the Project, Table 2.1-1 shows environmental resource areas and individual Appendix G Checklist items that were considered, but for which no impacts were identified. Consequently, there is no further discussion required regarding these issues. However, this document does include analysis for specific resource areas (topics) that have no impact, which are not listed in Table 2.1-1, but which are provided for the reader's information (e.g., there would be no impacts on population and housing as a result of the Project, but Section 2.12, *Population and Housing*, has been included to provide information on the area demographics and employment).

Table 2.1-1. Environmental Resource Areas (Topics) Not Evaluated Further

Resource Area (*Topic*) Considered	**Reason for Rejection**
Farmlands/Timberlands	There are no agricultural farmlands or forest/timberland resources in the Project area.
Air Quality (*Objectionable Odors*)	The Project would not create any objectionable odors affecting a substantial number of people.
Biological Resources (*Riparian Habitat/Sensitive Natural Communities, Wetlands, Special-Status Species, Wildlife Corridors, Habitat Conservation Plan/Natural Community Conservation Plan*)	There is no suitable riparian habitat in the Project area. There are no natural communities or special-status plant or animal species identified within the Project area. The Project does not include any wetlands or wildlife corridors and would not conflict with the provisions of an adopted Habitat Conservation Plan/Natural Community Conservation Plan.
Geology, Soils, and Seismicity (*Septic Tanks*)	The Project does not include use of septic tanks or alternative wastewater disposal systems.
Hydrology and Water Quality (*Seiche/Tsunami/Mudflow*)	The Project area is not subject to inundation by seiche, tsunami, or mudflow.

Resource Area (*Topic*) Considered	**Reason for Rejection**
Mineral Resources	Mineral resources (including oil, gas, and geothermal resources) have not been mapped within or adjacent to the Project site. Therefore, the Project is not anticipated to impact existing or potential mineral resources.
Noise and Vibration (*Public Airport/Private Airstrip*)	The Project is within 2 miles of the Moffett Federal Airfield. However, the Project is within an existing transportation facility, and would not increase the exposure of people residing or working in the Project area to excessive noise levels.
Public Services and Utilities (*Schools/Parks/Other Public Facilities*)	The Project is within an existing transportation facility and no physical impacts associated with new facilities for schools, parks/recreational facilities, or other public facilities would occur.
Coastal Zones	The Project is not located within the coastal zone.
Wild and Scenic Rivers	No wild and scenic rivers run through the Project area.
Energy	When balancing energy used during construction and operation against energy saved by relieving congestion and other transportation efficiencies, the Project would not have substantial energy impacts.

Each environmental topic considered in this chapter comprises four primary sections:

- **Regulatory Setting** – provides an overview of statutory and regulatory considerations that are applicable to the specific environmental topic. Applicable land use and recreation plans and programs are included under Section 2.10.2, *Consistency with Federal, State, Regional, and Local Plans and Programs*.
- **Existing Conditions** – provides a description of the baseline physical setting for the Project site and its surroundings at the beginning of the environmental review process.
- **Impact Analysis –** discusses the impacts that could result from construction and operation of the Project (No-Build and Build Alternatives). Impacts specific to construction and operation of the Project are identified separately, as appropriate.
- **Avoidance, Minimization, and/or Mitigation Measures** – identifies avoidance, minimization, and/or mitigation measures.

2.2 Aesthetics

The information in this section is based on the *Visual Impact Assessment – Mathilda Avenue Improvements at SR 237 and US 101 Project*. This assessment was approved in May 2016. Please refer to this assessment for a detailed discussion of the information contained in this section.

2.2.1 Regulatory Setting

There are no federal regulations or plans applicable to aesthetics. On the state level, CEQA establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of *aesthetic,* natural, scenic, and historic environmental qualities" (PRC Section 21001[b]).

2.2.2 Existing Conditions

For this analysis, the Project site is defined as the area of land that is visible from, adjacent to, and outside the highway right-of-way, and is determined by topography, vegetation, and viewing distance.

The Project site is generally flat, except at the highway interchanges that are built up to accommodate the grade-separated crossing of SR 237 over Mathilda Avenue and the crossing of Mathilda Avenue over US 101. Land uses primarily include hotels and office complexes on either side of Mathilda Avenue; single- and multi-family residences east of Mathilda Avenue; and major and minor transportation facilities associated with SR 237, US 101, Mathilda Avenue, and adjoining local roadways and associated signage. Trees, shrubs, and other vegetation are present within medians and interchange loops, and along the roadway associated with businesses and residential areas. These landscaping areas provide visual buffering from Mathilda Avenue, SR 237, and US 101. A portion of US 101 within the Project site is classified by Caltrans as a Landscaped Freeway[1] beginning near the northbound Mathilda Avenue exit ramp and continuing north past the Project limits on US 101.

The Project is not located within an eligible or officially designated state scenic highway and does not include scenic resources. However, the wide corridors of Mathilda Avenue, SR 237, US 101, and the elevated SR 237/Mathilda Avenue and Mathilda Avenue/US 101 overcrossings allow for scenic background views of the Diablo Range to the northeast and

[1] As defined by the Outdoor Advertising Act, a landscaped freeway "means a section or sections of a freeway that is now, or hereafter may be, improved by the planting at least on one side or on the median of the freeway ROW of lawns, trees, shrubs, flowers, or other ornamental vegetation requiring reasonable maintenance." Landscaped freeways must have planting areas that are at least 1,000 feet in length that are in healthy condition and improve the aesthetic appearance of the highway. Functional plantings (i.e., plantings for erosion control, traffic safety, reduction of fire hazards, and traffic noise abatement, or other non–ornamental purposes) do not qualify. The placement of advertising is prohibited within 660 feet of the edge of the ROW of a landscaped freeway (Caltrans 2014b).

the Santa Cruz Mountains to the southwest. Vista views are not available due to buildings, infrastructure, and mature trees that intervene within potential vista views.

The Project site is well lit from street lighting along Mathilda Avenue and at the SR 237 and US 101 interchanges, safety lighting in parking lots, and interior and exterior building lighting associated with residences and businesses.

2.2.3 Impact Analysis

Visual impacts are determined by assessing changes to the existing visual resources and predicting viewer response to those changes. Resource change is assessed by evaluating the visual character and the visual quality of the visual resources that comprise the Project corridor before and after construction of the Project. Changes in visual character and visual quality can be described in terms of low, moderate-low, moderate, moderate-high, and high changes, and viewer response is based on the type of viewer (e.g., neighbors, roadway users) can be described as low-, moderate-, and high sensitivity.

2.2.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing visual environment. No impacts related to aesthetics are anticipated.

2.2.3.2 Build Alternative

There are two types of viewers considered when evaluating impacts on visual resources: neighbors (people with views to the road) and roadway users (people with views from the road). Neighbors consist of business employees, business patrons, residents who immediately border the Project corridor, and motorists connecting to the Project site from local roadways. Roadway users include local commuters traveling to and from work, shoppers, recreational travelers, and commercial vehicle drivers on Mathilda Avenue, SR 237, US 101, Moffett Park Drive, Bordeaux Drive, and Innovation Way.

Business employees and residents are considered to have high visual sensitivity because, while they are accustomed to views of the existing roadways and passing traffic, they generally view the Project site for an extended period of time. Therefore, business employees and residents are likely to have a high sense of ownership over local views, and are more likely to be affected by changes in these views than business patrons or people passing by on local roadways. Business patrons have intermittent and limited views of the Project corridor. Therefore, they are likely to have moderate-low visual sensitivity.

Depending on their speed, roadway users (drivers and passengers) experience brief to longer views of the surrounding scenery. Most views from the Project corridor are of surrounding development; however, sections of the roadway provide scenic views of the vegetated roadway corridor with hillsides and mountains in the background. Therefore, roadway users are considered to have moderate visual sensitivity.

Simulations for key observation points (KOP) were used to evaluate Project impacts. The KOPs are mapped on Figure 2.2-1 and post-Project simulations are provided on Figures 2.2-2 to 2.2-4.

Visual Character

Permanent Impacts

Minor visual changes would result from operation of the Project. Relocated utilities would be consistent with existing conditions, and would not substantially alter the visual character of views of and from the Project site. Similarly, ramp metering facilities and overhead signage already exists at the Project site, and their relocation and modification would be visually consistent with existing conditions. The commercial property entrance/driveway on Moffett Park Drive between Mathilda Avenue and Bordeaux Drive would be closed as a result of the Project. Modifications to the two remaining entrances/driveways (one on Mathilda Avenue and the other on Bordeaux Drive) would be minor and visually consistent with existing conditions.

The most notable visual changes would be modifications to Mathilda Avenue and to the SR 237 and US 101 on- and off-ramps, with associated vegetation removal. Impacts on vegetation, including trees, are addressed in further detail in Section 2.4, *Biological Resources*.

Mature landscaping is considered to be an attractive visual resource. Areas where vegetation would be removed would be replanted as a part of the Project, with the exception of the clear recovery zone[2] and the areas that would be converted to bioretention basins (refer to Section 1.3.1.4, *Storm Water Treatment*). Implementation of Avoidance and Minimization Measure AES-1, *Restore Highway Planting*, and Avoidance and Minimization Measure AES-2, *Incorporate Bioretention Basins in Planting Design*, would ensure that the replacement planting and bioretention basins will be designed to blend with existing highway planting and create a cohesive landscape. Avoidance and Minimization Measure BIO-2, *Implement Tree Avoidance, Minimization, or Replacement*, would further aid in improving Project aesthetics.

Figure 2.2-2 *Simulated Views* for KOP 1 and Figure 2.2-3, *Simulated Views* for KOP 2, show changes to the Mathilda Avenue corridor that would result in slight changes to views. However, the changes would be consistent with the existing visual character. As shown in the figures, there would be changes to landscaping (1) on both sides of the northbound US 101 on- and off-ramp to accommodate the reconfigured ramp; (2) west of Mathilda Avenue to accommodate the new retaining wall; and (3) east of Mathilda Avenue to accommodate new lanes for the SR 237 on-ramp and right hand turns onto Ross Drive. Each would result in slight visual changes. However, views would still be of vegetation.

[2] An area clear of fixed objects adjacent to the traveled way.

As seen in the *Simulated View* for KOP 1, vegetation removal would be needed to shift the ramps over, to create a perpendicular connection for the northbound US 101 on- and off-ramps to Mathilda Avenue. The relocated sidewalk and crosswalk would be slightly more visible from this vantage point. New elements within this view would be the new traffic signal and a short, concrete barrier to separate traffic entering and exiting the ramp. These changes would create a slightly wider ramp but would allow for the existing northbound US 101 off-ramp to be removed and revegetated, with groundcover and accent shrubs planted in the old ramp alignment. The proposed southbound on- and off-ramps would result in similar visual changes associated with creating a perpendicular intersection with Mathilda Avenue. These changes would be visible to roadway users on Mathilda Avenue and on the ramps, and to pedestrians using sidewalks.

One new retaining wall would be installed north of the existing northbound US 101 loop off-ramp. This wall would be located within the existing state right-of-way, on the west side of Mathilda Avenue. The wall would be approximately 400 feet long and vary in height from 2 to 4 feet. Construction of the retaining wall would require vegetation removal. Removal of mature trees and shrubs west of Mathilda Avenue would slightly detract from views, but this area would be replanted with screening shrubs. Also, the new retaining wall would not be visible from Mathilda Avenue as it would be even with or at a slightly lower elevation than the roadway, as shown in the *Simulated View* for KOP 1. Views from the parking lot of businesses to the west of this new retaining wall would be slightly affected by tree removal. However, views of the wall would be screened by an existing privacy fence along the parking lot that buffers views of the roadway, and replanting with screening shrubs would help to replace screening that existing trees and shrubs provide. As shown in the *Simulated View* for KOP 2, the landscaping changes west of Mathilda Avenue would blend in with the existing roadside vegetation and are would therefore not be very noticeable. Avoidance and Minimization Measure AES-3, *Implement Aesthetic Treatments on Bridge Barriers, Sound Walls, and Retaining Walls*, would ensure that the aesthetic treatment of any visible wall surface will be included.

The Project would require that vegetation between Mathilda Avenue and Persian and Weddell Drives be removed to accommodate new lanes for the SR 237 on-ramp and right hand turns onto Ross Drive, which can be seen in the *Simulated View* for KOP 2. As shown in the simulation, this area would be replanted with trees, shrubs, and groundcover; however, it would take several years for this landscaping to mature and provide the same level of vegetative cover and shade. Nevertheless, the landscaping would still be attractive and add to the vegetated roadway corridor. These changes would be most visible to roadway users and pedestrians but would not be readily visible from adjacent residences because the existing sound wall along Mathilda Avenue would remain and residential privacy fencing and landscaping helps limit views. However, some of the tall evergreen trees growing along Persian and Weddell Drives (refer to *Existing View* for KOP 2) would be removed.

The roadway widening would slightly increase the roadway surface area, and roadway striping would be altered. This would not substantially change the roadway character. As

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Figure 2.2-1
KOP Simulation Location Map
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Figure 2.2-2
KOP 1 – Existing and Simulated Views for the Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Figure 2.2-3
KOP 2 – Existing and Simulated Views for the Build Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Figure 2.2-4
KOP 3 – Existing and Simulated Views for Build the Alternative
Mathilda Avenue Improvements at SR 237 and US 101 Project

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shown in the *Existing View* for KOPs 1 and 2, cobbles pave the thinner portion of the median and mature trees are growing where the median is slightly wider. As shown in the simulations, the median footprint would be slightly modified and cobbles would still pave thinner portions of the median. As shown in KOP 1, the thinner median sections would not be wide enough to accommodate replacement plantings; thus, there would be views of a slightly wider roadway corridor. As shown in the simulation for KOP 2, instead of trees, low-growing groundcover and accent shrubs would be planted in the median near the Mathilda Avenue intersection with Ross Drive, which would slightly alter views but would not substantially alter the visual character of the Project site. The medians from the US 101 ramps and south to Almanor Avenue and north of Ross Drive would be slightly reconfigured, but would remain paved with cobbles and concrete, consistent with existing views. However, wider portions of these reconfigured medians would also be planted with low-growing groundcover and accent shrubs. This would increase the amount of shrub and groundcover plantings within the medians.

Pedestrian facilities along Mathilda Avenue would be very similar to existing conditions. Sidewalks would be only slightly shifted to accommodate turn lanes, as shown in the *Simulated Views* for KOP 1 and KOP 2. Similarly, striping would be added to delineate bicycle facilities. The existing concrete barrier on the Mathilda Avenue Bridge over US 101 that separates vehicular from pedestrian traffic would be removed. There would be a bicycle lane on both sides of the bridge, separated from traffic only by striping. The outermost bridge barrier would be replaced with a new barrier. This would slightly alter views on the bridge by removing the intermediate barrier between the roadway and sidewalks and using roadway striping in place of the barrier. Avoidance and Minimization Measure AES-3, *Implement Aesthetic Treatments on Bridge Barriers, Sound Walls, and Retaining Walls*, would ensure that the aesthetic treatment of any visible wall surface will be included in the Project. New bicycle facilities to the north of Ross Drive would have the same visual character that is associated with striping to delineate the bicycle lanes. Bicycle facilities associated with the Project would increase recreational viewer access because currently there are few such facilities.

The SR 237 ramp connections to Mathilda Avenue would also result in small areas of vegetation removal that would be needed for the ramp reconfigurations. These changes are primarily associated with the westbound SR 237 ramps. However, shifting the westbound off-ramp to follow the current alignment of Moffett Park Drive creates a newly available space for planting in the area where the old ramp segment would be removed. The Project would provide bicycle facilities between Mathilda Avenue and Bordeaux Drive. The Project would also connect Moffett Park Drive to Bordeaux Drive to maintain vehicular access to Mathilda Avenue via Innovation Way. The westbound SR 237 on-ramp would be slightly reconfigured and would have a bioretention area.

Views from SR 237 and US 101 would not be greatly altered by the Project because roadway users on the freeways would quickly pass by the interchanges. However, even at highway speeds, viewers would notice minor visual changes resulting from vegetation removal.

Implementation of Avoidance and Minimization Measure AES-1, *Restore Highway Planting*, would ensure that infill plantings will be provided to further supplement replacement plantings and create a visually cohesive highway landscape. Avoidance and Minimization Measure BIO-2, *Implement Tree Avoidance, Minimization, or Replacement*, will maximize tree preservation to the extent possible and further improve Project aesthetics.

The eastbound SR 237 on- and off-ramps would not result in visually apparent changes when seen in passing on the freeway because changes would primarily be lane striping occurring further up the ramps, closer to the intersection with Mathilda Avenue. Views from westbound SR 237 would be of slightly wider ramp exits and altered lane striping to accommodate an additional off-ramp lane. These views would only occur in passing.

From US 101, there would be noticeable visual changes due to hardscape changes associated with ramp reconfiguration, landscape changes associated with vegetation removal and replacement plantings, and changes resulting from the modification and installation of safety barriers. As shown in the *Simulated View* for KOP 3 (Figure 2.2-4), the southbound US 101 off-ramp would be slightly wider, and the off-ramp intersection with Mathilda Avenue would be more exposed. The wider ramp would slightly increase the amount of visible pavement and result passing traffic on Mathilda Avenue being more visible from this vantage point. As shown in the foreground of the simulation, the most notable changes from this vantage point would be associated with vegetation removal along the right side of the ramp. Removing the existing mature trees and shrubs and replanting with shorter shrubbery would create more direct views of an office building, parking lot, parked cars, and fencing. A limited amount of vegetation would also be removed to the left of the ramp to accommodate the ramp realignment; this area would be replanted with low-growing groundcovers. In addition, portions of existing vegetation within the ramp loop, which is behind existing vegetation that will remain and which is not visible within the simulation, would be affected by the Project. However, most of these areas would be replanted with low-growing groundcovers and shrubs, except for within the clear recovery zone and in areas that would be converted to bioretention basins. Replacement plantings would improve aesthetics, and implementation of Avoidance and Minimization Measure AES-1, *Restore Highway Planting*, would ensure that infill plantings will be provided to supplement replacement plantings and further improve Project aesthetics. Avoidance and Minimization Measure BIO-2, *Implement Tree Avoidance, Minimization, or Replacement*, will maximize tree preservation to the extent possible and further improve Project aesthetics.

The bioretention basins would not be visible to viewers from the vantage of KOP 3 due to screening provided by existing and newly planted trees and shrubs. The bioretention basins would appear as sunken, grassy depressions that would hold water for short periods of time until the water infiltrates or enters the drainage system, and would mostly be seen by roadway users traveling on the US 101 ramps. Implementation of Avoidance and Minimization Measure AES-2, *Incorporate Bioretention Basins in Planting Design*, would use design means to blend the bioretention basins with the overall highway planting, thus improving Project aesthetics.

Similar visual changes associated with vegetation removal, replacement plantings, and bioretention basins would be seen when traveling on northbound US 101. Reconfiguration of the existing northbound US 101 off-ramp to northbound Mathilda Avenue would occur in the Project area that corresponds to the portion of US 101 that is classified as Landscaped Freeway. Replacement plantings would occur in this area. Consequently, views of this section of US 101 would not be greatly affected, and the replacement planting would serve to retain the designation of Landscaped Freeway. In addition, landscaping would be planted where the northbound loop off-ramp is removed, increasing the overall amount of landscaping associated with the interchange. Implementation of Avoidance and Minimization Measure AES-1, *Restore Highway Planting*, would ensure that additional plantings will be provided to supplement replacement plantings to create a visually cohesive highway landscape. Avoidance and Minimization Measure BIO-2, *Implement Tree Avoidance, Minimization, or Replacement*, will maximize tree preservation to the extent possible and further improve Project aesthetics.

The outer barrier along the Mathilda Avenue Bridge over US 101 would be replaced, and barriers along the ramps, placed to separate traffic traveling in opposite directions, would be visible from the vantage of KOP 3, as shown in the *Simulated View*. Avoidance and Minimization Measure AES-3, *Implement Aesthetic Treatments on Bridge Barriers, Sound Walls, and Retaining Walls*, would ensure that the aesthetic treatment of any visible barrier and wall surfaces will be included. Aesthetic treatment of these roadway features would enhance the visual character of the Project setting and would be consistent with transportation corridor aesthetics. The barrier along the ramp would be hard difficult to seek out and focus upon in passing at fast freeway speeds but would be visible to roadway users on the ramps as they drive past the barrier. As shown in the simulation, new lane striping on the ramps would be consistent with existing visual conditions.

The sound wall between Weddell Drive and the northbound US 101 off-ramp would be replaced. The new wall would be the same height and would be shifted 3 feet towards Weddell Drive to accommodate the slightly wider ramp at this location. This would not allow enough space on the Weddell Drive side of the wall to replant the creeping vines that would be removed. Therefore, the bare wall surface would remain visible along this affected segment. While this is a relatively short segment of sound wall, it would negatively affect views from multi-family residences located along this portion of Weddell Drive. It would also be visible for pedestrians, recreationists, and roadway users traveling Weddell Drive and its associated sidewalks. These viewers would now see a stark wall surface, instead of a more pleasing vegetated wall surface. It would only briefly detract from views seen by roadway users along US 101 and on the northbound US 101 off-ramp, as viewers tend to pass by quickly. Avoidance and Minimization Measure AES-3, *Implement Aesthetic Treatments on Bridge Barriers, Sound Walls, and Retaining Walls*, would ensure that the aesthetic treatment of any visible barrier and sound wall surface will be included and help maintain the visual quality of the Project setting.

Given the above, permanent impacts on the existing visual character or quality of the site and its surroundings would be less than significant.

Temporary Impacts

The most visible activities during construction would be modifications occurring on the roadway and ramps. Other visible activities occurring during construction include removal of mature landscaping such as trees, shrubs, and vines; replacement of the sound wall between Weddell Drive and the northbound US 101 off-ramp; installation of a new retaining wall within existing state right-of-way on the west side of Mathilda Avenue north of the existing northbound US 101 loop off-ramp; modification of the local roadway intersection connections and driveway entrances to Mathilda Avenue; relocation of utilities; modification and installation of lighting, ramp metering, and overhead signage; and enhancement of bicycle and pedestrian facilities. These activities would be seen as a continuation of construction activities associated with roadway and ramp improvements and would only result in minor visual changes as the modifications are occurring.

Individuals most affected by construction would be at single-family residences along Weddell Drive and Persian Drive and multi-family residences along Weddell Drive, who would experience visually disruptive construction activities. Construction occurring north of SR 237 would not greatly affect businesses in this area because of existing and on-going construction activities. Construction activities would be visible from SR 237 and US 101, but roadway users would pass by the Mathilda Avenue interchanges very quickly and would have only brief, passing views. The majority of construction activities would be visible to roadway users on Mathilda Avenue. Specific equipment that would be used for construction includes graders, excavators, pavers, compactors, and various types of construction vehicles (e.g., pickup trucks, dump trucks). The visual presence of construction activities is considered temporary because the Project would take approximately 12 months to construct, and the temporary visual changes from construction signaling, signage, and lighting would not be significant. Therefore, temporary construction impacts on the existing visual character or quality of the site and its surroundings would be less than significant.

Light and Glare

Permanent Impacts

The Project would result in a nominal increase in daytime glare by increasing the paved area and by removing mature roadside vegetation that provides shade. To minimize daytime glare, the new pavement would be grey, similar to existing conditions, and some mature roadside vegetation would remain along the right-of-way to provide shade. Although it would take a few years to mature and provide the same level of shading as currently exists, new highway and street planting would be provided within the Project corridor. Therefore, the Project would not create a permanent new source of substantial glare that would adversely affect daytime or nighttime views in the area.

The Project proposes minor physical changes to signalized intersections and street lighting. Existing signalized intersections and changes to these intersections include:

- *Mathilda Avenue with Innovation Way*- Signal modified (including the light rail crossing signals and facilities)
- *Mathilda Avenue with Moffett Park Drive*- Signal removed
- *Mathilda Avenue with SR 237 West*- Signal removed, new signals would be installed for the relocated ramp entrances
- *Mathilda Avenue with SR 237 East*- Signal removed, new signals would be installed for the relocated ramp entrances
- *Mathilda Avenue with Ross Drive*- Signal modified (including the light rail crossing signals and facilities)
- *Mathilda Avenue with Almanor Avenue*- No change to signal
- *Innovation Way with Moffett Park Drive*- Signal modified (including the light rail crossing signals and facilities)

In addition, new traffic signals would be installed at the Mathilda Avenue intersection with northbound and southbound US 101.

Signal modification and the overall contribution of one additional signalized intersection compared to existing conditions would result in an inconsequential increase in lighting from signals in an area that is already well lit. The existing overhead street lighting would also need to be modified to accommodate the new, slightly expanded roadway corridor and reconfigured ramps. Lighting would be relocated where the widened corridor would affect existing light posts along the edge of the roadway and ramps, and within the median near Moffett Place.

In addition, lighting would be enhanced for security and safety purposes, resulting in an increased amount of light within the corridor. If shielding is not provided and blue-rich white light lamps are used, lights can negatively affect humans by increasing nuisance light and glare, in addition to increasing ambient light glow (International Dark-Sky Association 2010a, 2010b, 2015). This could result in a substantial source of nighttime light and glare that could adversely affect nighttime views in the area. Avoidance and Minimization Measure AES-4, *Apply Minimum Lighting Standards*, would ensure that impacts associated with lighting would be less than significant.

Temporary Impacts

Nighttime construction would occur, requiring the use of nighttime lighting at the construction site, which would result in nuisance light. Avoidance and Minimization Measure AES-5, *Minimize Fugitive Light from Portable Sources Used for Construction*, would ensure that lighting used for construction would be directed downward and that spill light would be minimized to the greatest extent possible through use of shielding, if necessary, to prevent spill lighting on adjacent offsite uses. Temporary construction impacts resulting from changes to light and glare would be less than significant.

2.2.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures would be incorporated into the Project during construction, as applicable, to reduce the effects of the impacts discussed above in Section 2.2.3, *Impact Analysis*.

Avoidance and Minimization Measure AES-1: Restore Highway Planting

A restored highway landscape will be provided within the interchanges of SR 237 and US 101 with Mathilda Avenue. A cohesive highway planting design, including additional plantings in areas not directly impacted by Project construction, will ensure that replacement plantings are integrated with the existing landscape to meet community expectations. Replacement planting will be installed within 2 years of roadway construction in keeping with Caltrans Replacement Highway Planting policy defined in Chapter 29 of the *Project Development Procedures Manual*. A plant establishment period of 3 years will be provided to ensure that new planting matures.

Avoidance and Minimization Measure AES-2: Incorporate Bioretention Basins in Planting Design

Bioretention basins will be integrated with the overall highway planting design, using landform grading[3] and/or ornamental planting.

Avoidance and Minimization Measure AES-3: Implement Aesthetic Treatments on Bridge Barriers, Sound Walls, and Retaining Walls

Architectural treatment will be provided on new bridge barriers, sound walls, and the visible side of retaining walls.

Avoidance and Minimization Measure AES-4: Apply Minimum Lighting Standards

All artificial outdoor lighting and overhead street lighting will be designed to have minimum impact on the surrounding environment. Design measures to reduce light pollution will use technologies such as downcast, cut-off type fixtures that are shielded and that direct only the minimum light necessary toward objects requiring illumination.

[3] A design concept which utilizes grading techniques that replicate natural slopes, resulting in aesthetically pleasing elevations and profiles.

Avoidance and Minimization Measure AES-5: Minimize Fugitive Light from Portable Sources Used for Construction

The construction contractor will be required to minimize Project-related light and glare to the maximum extent feasible, given safety considerations. Color corrected lights that minimize white light (or an appropriate substitute) will be used. Portable lights will be operated at the lowest allowable wattage and height and will be raised to a height no greater than 20 feet. All lights will be screened or shielded and directed downward toward work activities and away from the night sky, highway users, highway neighbors, and, particularly, adjacent offsite uses (i.e., residential areas), to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.

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2.3 Air Quality

The information in this section is based on the *Air Quality Study Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This report was approved in May 2016. Please refer to this report for a detailed discussion of the information contained in this section.

2.3.1 Regulatory Setting

The Federal Clean Air Act, as amended, is the primary federal law that governs air quality. The California Clean Air Act is its companion state law. These laws, and related regulations by the United States Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (ARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards (see Table 2.3-1) have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM10) and particles of 2.5 micrometers and smaller (PM2.5), and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility-reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics or TACs) and mobile source air toxics (MSAT). Toxic air contaminants and mobile source air toxics are pollutants that may result in an increase in mortality or serious illness, or that may pose a present or potential hazard to human health. Health effects of toxic air contaminants include cancer, birth defects, neurological damage, damage to the body’s natural defense system, and diseases that lead to death. Some criteria pollutants are also air toxics or may include certain air toxics in their general definition. In addition, the U.S. EPA identified the following seven compounds as priority mobile source air toxics (MSATs):

- Acrolein
- Benzene
- 1,3-Butadiene
- Diesel particulate matter/diesel exhaust organic gases
- Formaldehyde
- Naphthalene
- Polycyclic organic matter

Table 2.3-1. National and California Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Average Time	Standard (ppm)		Standard (μg/m³)		Violation Criteria	
			California	National	California	National	California	National
Ozone	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA
		8 hours	0.070	0.070	137	137	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.18	0.100	339	188	If exceeded	NA
Sulfur dioxide	SO_2	Annual arithmetic mean	NA	0.030	NA	NA	NA	If exceeded
		24 hours	0.04	0.14	105	NA	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	75	655	196	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA
Inhalable Particulate Matter (PM)	PM10	Annual arithmetic mean	NA	NA	20	NA	If exceeded	If exceeded at each monitor within area
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year
	PM2.5	Annual arithmetic mean	NA	NA	12	12.0	If exceeded	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	35	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded

Pollutant	Symbol	Average Time	Standard (ppm)		Standard (µg/m^3)		Violation Criteria	
			California	National	California	National	California	National
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded on more than 1 day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA
		Rolling 3-month average	NA	NA	NA	0.15	If equaled or exceeded	Averaged over a rolling 3-month period

Source: California Air Resources Board 2015

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure; national standards shown are the primary (health effects) standards; ppm = parts per million; µg/m3 = micrograms per cubic meter; NA = not applicable.

The Federal Clean Air Act Section 176(c) outlines federal transportation conformity requirements, which prohibit federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to the State Implementation Plan (SIP) for attaining the NAAQS. The Transportation Conformity Act takes place on two levels: the regional, or planning and programming level, and the project level. A project must conform at both levels to be approved. Conformity requirements apply only in nonattainment and maintenance (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. Where a project does not conform, the project must be evaluated under the regional transportation conformity requirements unless the project is already included in an approved Regional Transportation Plan (RTP) and/or Transportation Improvement Program (TIP), and the project design concept or scope remains the same as that described in the RTP and/or TIP.

2.3.2 Existing Conditions

The Project lies within the Santa Clara Valley region of the San Francisco Bay Area Air Basin. The northwest-southeast oriented Santa Clara Valley is bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north, and the convergence of the Gabilan Range and the Diablo Range to the south. Temperatures are warm in summer, under mostly clear skies, although a relatively large diurnal range results in cool nights. Winter temperatures are mild, except for very cool but generally frostless mornings. At the northern end of Santa Clara Valley, the Norman Y. Mineta San Jose International Airport mean maximum temperatures range from the high 70s to the low 80s Fahrenheit during the summer to the high 50s to the low 60s Fahrenheit during the winter. Mean minimum temperatures range from the high 50s during the summer to the low 40s during the winter. Farther inland, where the moderating effect of the San Francisco Bay is not as strong, temperature extremes are greater. Rainfall amounts are modest, ranging from 13 inches per year in the lowlands to 20 inches per year in the hills.

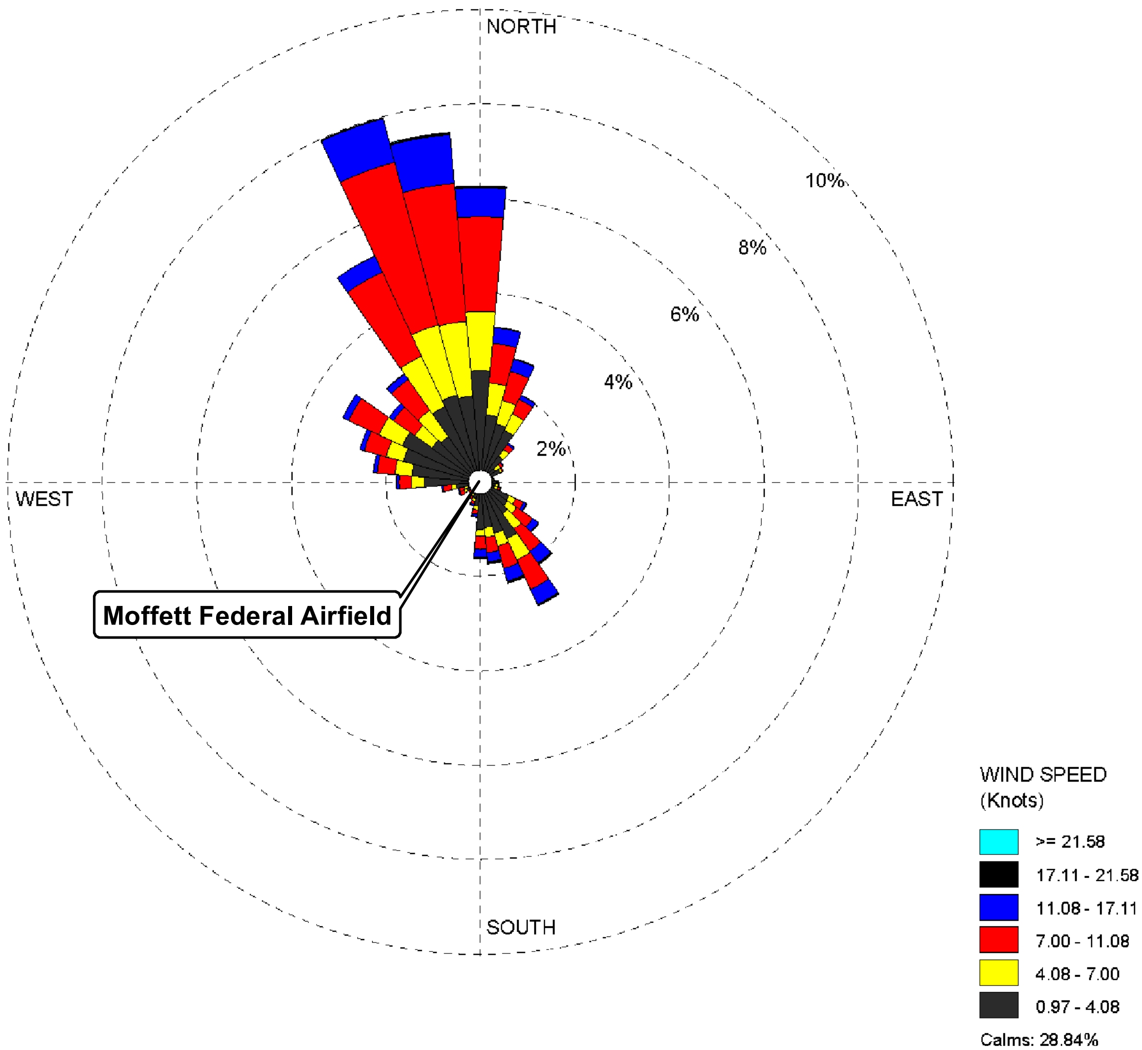
Figure 2.3-1 indicates the predominant wind direction in the region based on meteorological data from Moffett Federal Airfield in Sunnyvale, located about 1 mile west of the Project site (California Air Resources Board 2015). The wind patterns in Santa Clara Valley are influenced greatly by the terrain, resulting in a prevailing flow roughly parallel to the Valley's northwest-southeast axis, with a north-northwesterly sea breeze extending up the Valley during the afternoon and early evening and a light south-southeasterly drainage flow occurring during the late evening and early morning. In summer, a convergence zone is sometimes observed in the southern end of Santa Clara Valley between Gilroy and Morgan Hill, when air flowing from the Monterey Bay through the Pajaro Gap gets channeled northward into the south end of the Santa Clara Valley and meets with the prevailing north-northwesterlies. Speeds are greatest in the spring and summer seasons, and least in the fall and winter seasons. Nighttime and early morning hours have light winds and are frequently calm in all seasons, while summer afternoon and evenings are quite breezy. Strong winds are rare, coming only with an occasional winter storm.

WIND ROSE PLOT:

Sunnyvale Wind Rose Plot

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/1967 - 00:00** **End Date: 12/31/1971 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **28.84%**	TOTAL COUNT: **43824 hrs.**	
	AVG. WIND SPEED: **4.23 Knots**	DATE: **3/25/2016**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

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Figure 2.3-1
Sunnyvale Wind Rose Plot
Mathilda Avenue Improvements at SR 237 and US 101 Project

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The air pollution potential of Santa Clara Valley (Valley) is high. The Valley has a large population and the largest complex of mobile sources (which include motor vehicles) in the Bay Area, making it a major source of CO, particulate, and photochemical air pollution. In addition, photochemical precursors to ozone formation—nitrogen oxides (NOx) and volatile organic compounds (VOCs)—from San Francisco, San Mateo, and Alameda counties can be carried along by the prevailing winds to Santa Clara Valley, making it also a major ozone receptor. Geographically, the Valley tends to channel pollutants to the southeast with its northwest/southeast orientation, and concentrate pollutants by its narrowing to the southeast. Meteorologically, on high-ozone, elevated temperature inversion[1] days in the summer and fall, pollutants can be recirculated by the prevailing northwesterlies in the afternoon and the light drainage flow in the late evening and early morning, increasing the impact of emissions significantly. On high particulate and CO days during late fall and winter, clear, calm, and cold conditions associated with a strong surface-based temperature inversion prevail.

2.3.2.1 Existing Air Quality

Existing air quality conditions in the Project area can be characterized in terms of the NAAQS and California ambient air quality standards (CAAQS) that the federal and state governments have established for several different pollutants and by monitoring data collected in the region. The Bay Area Air Quality Management District monitors air quality conditions at over 30 locations throughout the Bay Area. These stations are used by the ARB and U.S. EPA to determine whether the County and San Francisco Bay Area Air Basin meet CAAQS and NAAQS and to determine the region's attainment status related to these standards. There are six air quality monitoring stations located within Santa Clara County, and the nearest stations to the Project site were used to characterize existing air quality conditions in the Project area.

The nearest air quality monitoring station is about 6.0 miles southwest of the Project site in the City of Cupertino on Voss Avenue. Until 2014, this station monitored for all criteria pollutants, except for CO, which was monitored until 2013. The closest monitoring station that monitors for all criteria pollutants through 2014, the most current reporting year, is in the City of San Jose on Jackson Street, about 7.5 miles southeast of the Project site. The San Jose monitoring station exceeded the state 1-hour ozone standard once in 2012 and the state and national 8-hour standards once for each standard during 2013. The Cupertino monitoring station also experienced an exceedance of the state and national 8-hour ozone standards once during 2013. The San Jose monitoring station reported state PM10 standard and federal PM2.5 standard exceedances in multiple instances during the 3-year monitoring period for which complete data are available (2012 to 2014). No violations of the state or federal CO standards have occurred at either monitoring station during the 3-year monitoring period. Table 2.3-2 identifies the attainment status of pollutants in Santa Clara County.

[1] Thermal inversion occurs when a layer of warm air settles over a layer of cooler air that lies near the ground. The warm air holds down the cool air and prevents pollutants from rising dispersing.

Table 2.3-2. Attainment Status of Santa Clara County

Pollutant	Attainment Status	
	State	Federal
8-hour Ozone	Nonattainment	Marginal Nonattainment
Carbon Monoxide	Attainment	Moderate Maintenance
PM10	Nonattainment	Attainment
PM2.5	Nonattainment	Nonattainment
Sources: California Air Resources Board 2014; U.S. Environmental Protection Agency 2015a.		

2.3.2.2 Sensitive Receptors

Sensitive receptors are generally defined as facilities or land uses that include members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of sensitive receptors include schools, hospitals, and residential areas. Primary pollutants of concern to sensitive receptors are CO, diesel particulate matter (DPM), and, to a lesser extent, odors or odorous compounds such as ammonia and sulfur dioxide. Sensitive receptors would not be directly affected by emissions of regional pollutants, such as ozone precursors (ROG [Reactive Organic Gases] and NO_X).

The Project area is located within an existing urban environment that includes a number of sensitive receptors, such as single- and multi-family homes, park/recreational land uses, and schools. Sensitive receptors near the Project area are shown on Figure 2.3-2. Figure 2.3-2 does not include the locations of scattered or individual sensitive receptors. The nearest sensitive receptors are 25 feet from the Project site.

2.3.3 Impact Analysis

2.3.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to air quality are anticipated.

2.3.3.2 Build Alternative

Operation

The primary operational emissions associated with the Project are CO, PM10, PM2.5, the ozone precursors ROG and NO_X, and carbon dioxide (CO_2) emitted as vehicle exhaust. Various models were used to determine emissions under the Project and the effects of criteria pollutants (ozone precursors, CO, PM10, and PM2.5), as well as CO_2 emissions, were quantified using emission factors obtained from Caltrans' CT-EMFAC emission modeling program (version 6.0) and traffic data provided by the Project traffic engineers. The effects of localized CO hot-spot emissions were evaluated through CO dispersion modeling using the *Transportation Project-Level Carbon Monoxide Protocol* developed for Caltrans by the Institute of Transportation Studies at the University of California, Davis (Garza et al. 1997)

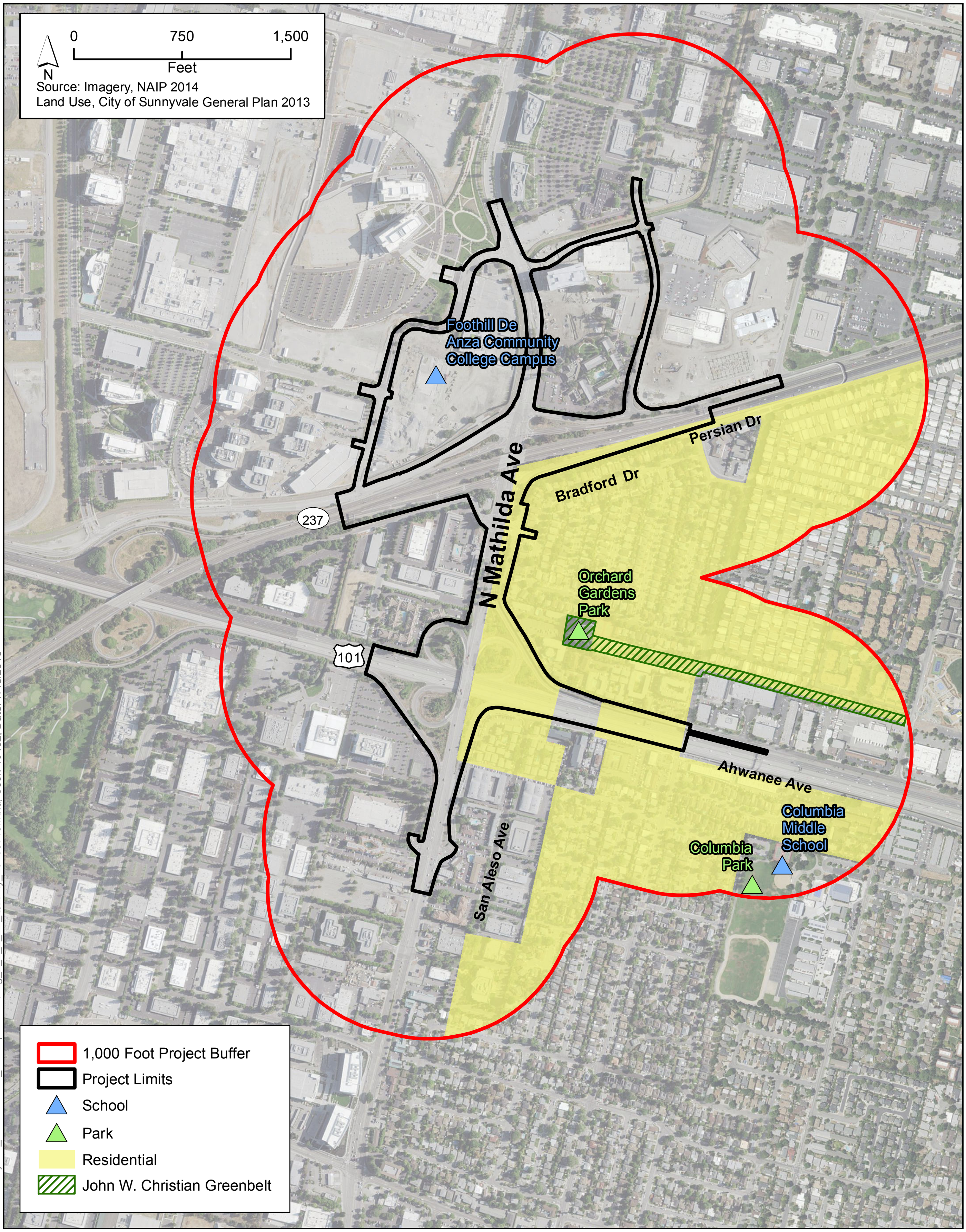

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Figure 2.3-2
Air Quality Sensitive Receptors
Mathilda Avenue Improvements at SR 237 and US 101 Project

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and traffic data provided by the Project traffic engineers. The effects of localized PM were evaluated using the EPA and Federal Highway Administration's (FHWA) guidance manual, *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* (U.S. Environmental Protection Agency 2015b). MSAT emissions were evaluated using the FHWA's *Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.

Conformity of the Regional Transportation Plan with the State Implementation Plan

The Project is located in a marginal nonattainment for the federal 8-hour ozone standard. Because ozone and its precursors are regional pollutants, the Project must be evaluated under the regional transportation conformity requirements unless the Project is already included in an approved RTP and/or TIP, and the Project design concept or scope remains the same as that described in the RTP and/or TIP.

The Project is included in the Metropolitan Transportation Commission's (MTC) 2013 Regional Transportation Plan, Plan Bay Area (2040 RTP), which the FHWA and Federal Transit Administration determined to be in conformity with the State Implementation Plan on July 18, 2013. The Project is also included in the Metropolitan Transportation Commission's financially constrained 2015 TIP (ID SCL130001). The design concept and scope of the Project is consistent with the project description in the 2040 RTP, the 2015 TIP, and the assumptions in MTC's regional emissions analysis. Therefore, the Project does not need to be evaluated under regional transportation conformity requirements.

Carbon Monoxide

Existing year (2013), opening year (2018), and design year (2040) conditions were modeled to evaluate CO concentrations at 4 receptor locations at each of the 12 intersections (see Figure 2.14-1 in Section 2.14, *Transportation/Traffic*) analyzed, for a total of 48 receptors. Traffic volumes and operating conditions used in the model were obtained from traffic data prepared by the Project traffic engineers. Only the PM peak hour traffic was modeled, as the traffic congestion would generally be worse in the PM peak hour than in the AM peak hour. The following intersections were included in the model for the specific Project conditions (Existing, No-Build, or Build):

- Mathilda Avenue and Moffett Park Drive (Existing and No-Build)
- Mathilda Avenue and SR 237 westbound ramps (Existing and No-Build)
- Mathilda Avenue and Moffett Park Drive - SR 237 westbound off-ramp (Build)
- Mathilda Avenue and SR 237 westbound on-ramp (Build)
- Mathilda Avenue and US 101 northbound ramps (Existing and No-Build)
- Mathilda Avenue and US 101 northbound ramps (Build)
- Mathilda Avenue and US 101 southbound ramps (Existing and No-Build)

- Mathilda Ave and 101 southbound ramps (Build)
- Mathilda Ave and Almanor Ave-Ahwanee Ave (Existing, No-Build and Build)
- Innovation Way and Juniper Networks Drive (Existing, No-Build and Build)
- Bordeaux Drive and Innovation Way (Existing and No-Build)
- Bordeaux Drive and Innovation Way (Build)

The 1- or 8- hour CAAQS for concentrations of CO is 20 parts per million (ppm) and 9 ppm, respectively. The analysis shows that the highest modeled concentrations of CO occur under Existing Conditions at the intersection of Mathilda Avenue and the US 101 southbound ramps, with a model result of 6.63 ppm for 1-hour and 4.90 ppm for 8-hour (see Table 2.3-3). The concentration of CO for all other intersections and all other Project conditions is less than these calculations. Therefore, the Project would not result in an exceedance of the 1- or 8- hour CAAQS for concentrations of CO.

Table 2.3-3. CO Modeling Concentration Results (Parts per Million)

Intersection	Receptor[a]	Existing (2013)		Opening Year (2018) No Build		Opening Year (2018) Build Alternative		Design Year (2040) No Build		Design Year (2040) Build Alternative	
		1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]
3A. Mathilda Avenue/Moffett Park Drive (Existing/No Build)	1	**4.73**	**3.57**	**3.83**	**2.94**	N/A	N/A	**3.63**	**2.80**	N/A	N/A
	2	**4.43**	**3.36**	**3.63**	**2.80**	N/A	N/A	**3.53**	**2.73**	N/A	N/A
	3	**5.03**	**3.78**	**3.93**	**3.01**	N/A	N/A	**3.83**	**2.94**	N/A	N/A
	4	**4.23**	**3.22**	**3.63**	**2.80**	N/A	N/A	**3.53**	**2.73**	N/A	N/A
3B. Mathilda Ave/SR 237 westbound Ramps (Existing/No Build)	5	**4.53**	**3.43**	**4.23**	**3.22**	N/A	N/A	**3.83**	**2.94**	N/A	N/A
	6	**5.33**	**3.99**	**3.53**	**2.73**	N/A	N/A	**3.53**	**2.73**	N/A	N/A
	7	**5.23**	**3.92**	**4.13**	**3.15**	N/A	N/A	**4.03**	**3.08**	N/A	N/A
	8	**5.03**	**3.78**	**3.53**	**2.73**	N/A	N/A	**3.63**	**2.80**	N/A	N/A
3A. Mathilda Avenue/Moffett Park Drive-SR 237 westbound Off-Ramp (Build Alternative)	9	N/A	N/A	N/A	N/A	**4.53**	**3.43**	N/A	N/A	**4.23**	**3.22**
	10	N/A	N/A	N/A	N/A	**3.73**	**2.87**	N/A	N/A	**3.63**	**2.80**
	11	N/A	N/A	N/A	N/A	**4.43**	**3.36**	N/A	N/A	**4.03**	**3.08**
	12	N/A	N/A	N/A	N/A	**3.53**	**2.73**	N/A	N/A	**3.53**	**2.73**
3B. Mathilda Avenue/SR 237 westbound On-Ramp (Build Alternative	13	N/A	N/A	N/A	N/A	**4.43**	**3.36**	N/A	N/A	**4.13**	**3.15**
	14	N/A	N/A	N/A	N/A	**3.53**	**2.73**	N/A	N/A	**3.33**	**2.59**
	15	N/A	N/A	N/A	N/A	**4.53**	**3.43**	N/A	N/A	**4.13**	**3.15**
	16	N/A	N/A	N/A	N/A	**3.53**	**2.73**	N/A	N/A	**3.43**	**2.66**
6. Mathilda Avenue/US 101 northbound Ramps (Existing/No Build)	17	**6.53**	**4.83**	**4.83**	**3.64**	N/A	N/A	**4.43**	**3.36**	N/A	N/A
	18	**4.53**	**3.43**	**3.73**	**2.87**	N/A	N/A	**3.53**	**2.73**	N/A	N/A
	19	**6.33**	**4.69**	**4.73**	**3.57**	N/A	N/A	**4.33**	**3.29**	N/A	N/A
	20	**4.83**	**3.64**	**3.83**	**2.94**	N/A	N/A	**3.63**	**2.80**	N/A	N/A
7. Mathilda Avenue/US 101 southbound Ramps (Existing/No Build)	21	**6.63**	**4.90**	**4.93**	**3.71**	N/A	N/A	**4.53**	**3.43**	N/A	N/A
	22	**5.23**	**3.92**	**4.13**	**3.15**	N/A	N/A	**3.93**	**3.01**	N/A	N/A
	23	**5.63**	**4.20**	**4.33**	**3.29**	N/A	N/A	**4.03**	**3.08**	N/A	N/A
	24	**5.03**	**3.78**	**3.93**	**3.01**	N/A	N/A	**3.73**	**2.87**	N/A	N/A

Intersection	Receptor[a]	Existing (2013)		Opening Year (2018) No Build		Opening Year (2018) Build Alternative		Design Year (2040) No Build		Design Year (2040) Build Alternative	
		1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]	1-hr CO[b]	8-hr CO[c]
6. Mathilda Avenue/US 101 northbound Ramps (Build Alternative)	25	N/A	N/A	N/A	N/A	**4.03**	**3.08**	N/A	N/A	**3.73**	**2.87**
	26	N/A	N/A	N/A	N/A	**4.03**	**3.08**	N/A	N/A	**3.83**	**2.94**
	27	N/A	N/A	N/A	N/A	**4.43**	**3.36**	N/A	N/A	**4.13**	**3.15**
	28	N/A	N/A	N/A	N/A	**4.03**	**3.08**	N/A	N/A	**3.83**	**2.94**
7. Mathilda Avenue/US 101 southbound Ramps (Build Alternative)	29	N/A	N/A	N/A	N/A	**4.83**	**3.64**	N/A	N/A	**4.53**	**3.43**
	30	N/A	N/A	N/A	N/A	**4.13**	**3.15**	N/A	N/A	**3.93**	**3.01**
	31	N/A	N/A	N/A	N/A	**4.83**	**3.64**	N/A	N/A	**4.53**	**3.43**
	32	N/A	N/A	N/A	N/A	**4.03**	**3.08**	N/A	N/A	**3.83**	**2.94**
8. Mathilda Avenue/ Almanor Avenue/ Ahwanee Avenue	33	**5.43**	**4.06**	**4.23**	**3.22**	**4.23**	**3.22**	**3.93**	**3.01**	**3.93**	**3.01**
	34	**5.13**	**3.85**	**4.03**	**3.08**	**4.03**	**3.08**	**3.83**	**2.94**	**3.83**	**2.94**
	35	**5.63**	**4.20**	**4.33**	**3.29**	**4.33**	**3.29**	**4.03**	**3.08**	**4.03**	**3.08**
	36	**4.43**	**3.36**	**3.63**	**2.80**	**3.63**	**2.80**	**3.53**	**2.73**	**3.53**	**2.73**
12. Innovation Way/Juniper Networks Drive	37	**3.23**	**2.52**	**3.03**	**2.38**	**3.13**	**2.45**	**3.03**	**2.38**	**3.13**	**2.45**
	38	**3.63**	**2.80**	**3.23**	**2.52**	**3.23**	**2.52**	**3.13**	**2.45**	**3.23**	**2.52**
	39	**3.33**	**2.59**	**3.13**	**2.45**	**3.13**	**2.45**	**3.13**	**2.45**	**3.23**	**2.52**
	40	**3.33**	**2.59**	**3.03**	**2.38**	**3.13**	**2.45**	**3.13**	**2.45**	**3.13**	**2.45**
13. Bordeaux Drive/Innovation Way (Existing/No Build)	41	**2.93**	**2.31**	**2.83**	**2.24**	N/A	N/A	**2.73**	**2.17**	N/A	N/A
	42	**2.83**	**2.24**	**2.73**	**2.17**	N/A	N/A	**2.73**	**2.17**	N/A	N/A
	43	**2.93**	**2.31**	**2.83**	**2.24**	N/A	N/A	**2.73**	**2.17**	N/A	N/A
	44	**2.83**	**2.24**	**2.73**	**2.17**	N/A	N/A	**2.73**	**2.17**	N/A	N/A
13. Bordeaux Drive/Innovation Way (Build Alternative)	45	N/A	N/A	N/A	N/A	**3.03**	**2.38**	N/A	N/A	**3.03**	**2.38**
	46	N/A	N/A	N/A	N/A	**3.13**	**2.45**	N/A	N/A	**3.13**	**2.45**
	47	N/A	N/A	N/A	N/A	**2.93**	**2.31**	N/A	N/A	**2.93**	**2.31**
	48	N/A	N/A	N/A	N/A	**3.03**	**2.38**	N/A	N/A	**3.03**	**2.38**

a Receptors are located at 3 meters from the intersection, at each of the four corners. All intersections modeled have two intersecting roadways.

b Average 1-hour background concentration between 2012 and 2014 was 2.63 ppm (U.S. Environmental Protection Agency 2016).

c Average 8-hour background concentration between 2012 and 2014 was 2.10 ppm (U.S. Environmental Protection Agency 2016).

To be considered a Project of Air Quality Concern (POAQC), and require a PM.2.5 hotspot analysis, a project would need to be one of the following types of projects, as defined by the U.S. EPA's POAQC Guidance:

i) *New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles.*

The Project would improve operations on Mathilda Avenue through the US 101 and SR 237 interchanges to reduce existing and future traffic congestion. Maximum Average Annual Daily Traffic[2] (AADT) under design year 2040 conditions will vary between approximately 51,000 and 65,000 on SR 237 and approximately 87,000 and 102,000 on US 101, depending on the direction of traffic flow. Heavy-duty trucks comprise 3.86 percent of US 101 AADT and 2.95 percent of SR 237 AADT, resulting in a truck AADT of 3,366 to 3,914 on US 101 and 1,520 to 1,913 on SR 237 (Fehr & Peers 2016). Truck percentages on SR 237 and US 101 would remain constant for all years of analysis and for the Build or No-Build Alternatives (i.e., the Project would not affect truck percentages between the Build and No-Build Alternatives). Truck volumes proportionally increase as total AADT increases with time, but predicted truck volumes would be well below the U.S. EPA's guidance criteria of 8 percent or 10,000 vehicles per day (maximum truck volume is 3,914). Accordingly, the Project would not serve a significant number of diesel vehicles or result in a significant increase in diesel vehicles.

ii) *Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.*

Section 2.14.4 of the *Transportation/Traffic* section describes peak-hour Level of Service[3] (LOS) and delay at study area intersections under existing year (2013), opening (2018), and design year (2040) conditions. The peak-hour LOS and delay indicates three degradations in opening year LOS between the No-Build and Build Alternatives and six improvements each in opening year LOS between the No-Build and Build Alternatives. Under existing year (2013) conditions, total vehicle hours of delay during the AM peak hour would decrease from 1,319 hours under No-Build conditions to 493 hours under Build Alternative conditions. During the PM peak hour, total vehicle hours of delay would decrease from 1,504 hours under No-Build conditions to 1,285 hours for the Build Alternative conditions. There would be four degradations in design year LOS between the No-Build and the Build Alternatives. However, there would be two improvements in design year (2040) LOS between the No-Build and the Build Alternatives. Under design year (2040) conditions, total vehicle hours of delay during the AM peak hour would decrease from 2,989 hours under No-Build conditions to 1,948 hours for the Build Alternative conditions. During the PM peak hour, total vehicle hours of delay would decrease from 3,830 hours under No-Build conditions to 3,130 hours for Build

[2] Total volume of vehicle traffic of a highway or road for a year.

[3] A qualitative measure of operating conditions within a traffic stream, and their perception by motorists and/or passengers. A LOS definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort and convenience, and safety.

Alternative conditions. Refer to Section 2.14, *Transportation/Traffic* for more information.

iii) *New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location.*

The Project does not include new bus or rail terminals and transfer points.

iv) *Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location.*

The Project does not include new or expanded bus or rail terminals and transfer points.

v) *Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.*

Currently, there is no SIP for the federal PM2.5 standard.

Accordingly, the Project is not considered to be a POAQC, and project-level particulate matter conformity determination requirements are thus satisfied.

Criteria Pollutants – Generation of Operation-Related Emissions of Reactive Organic Gases, Oxides of Nitrogen, Carbon Monoxide, and Particulate Matter

Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the Project area. Emissions of ROG, NO_X, CO, PM10, PM2.5, and CO_2 for existing year (2013), opening year (2018), and design year (2040) conditions were evaluated. Table 2.3-4 summarizes the modeled Project-related criteria pollutant emissions. The differences in emissions between the Build Alternative and No-Build Alternative conditions represent emissions generated directly as a result of implementation of the Project. Vehicular emission rates are anticipated to lessen in future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

In 2018, the Project would result in decreases in all pollutants compared to existing conditions. Compared to No-Build Alternative conditions in 2018, the Project shows a decrease in all pollutants, except for no change in ROG emissions. In 2040, the Project would result in decreases in all pollutants compared to existing conditions.

Table 2.3-4. Mathilda Avenue Improvements Project-Related Criteria Pollutant Emissions (pounds per day)

Scenario	ROG	NO_X	CO	PM10	PM2.5
2013 Existing	313	2,070	7,727	243	117
2018 No-Build	147	977	3,991	237	101
2018 Build	147	970	3,962	235	100
2040 No-Build	100	350	2,217	283	115
2040 Build	98	343	2,169	277	113
Note: Emissions calculations based on CT-EMFAC v6.0.					

Mobile Source Air Toxic Emissions

As discussed in Section 2.14, *Transportation/Traffic*, the Project would result in a decrease in vehicle miles traveled (VMT) compared to No-Build Alternative conditions (see Table 2.3-5). This decrease in VMT would not result in changes in vehicle mix (i.e., the mix of on-road vehicles modeled in the analysis), basic project location, or any other factor that would cause an increase in MSAT impacts.

Table 2.3-5. Criteria Pollutant, MSAT, and CO_2 Modeling VMT Data Alternatives Comparison

Comparison of VMT by Alternatives	Increase in Daily VMT	Increase in Annual VMT[a]
Comparison of 2018 Build Conditions to Existing Conditions		
2018 No Build—Existing	180,183	62,523,364
2018 Build Alternative 1—Existing	164,333	57,023,689
2018 Build Alternative 2—Existing	172,310	59,791,476
Comparison of 2040 Build Conditions to Existing Conditions		
2040 No Build—Existing	694,990	241,161,552
2040 Build Alternative 1—Existing	633,857	219,948,514
2040 Build Alternative 2—Existing	664,623	230,624,266
Comparison of 2018 Build Conditions to 2018 No Build Conditions		
2018 Build Alternative 1—2018 No Build	-15,849	-5,499,676
2018 Build Alternative 2—2018 No Build	-7,873	-2,731,889
Comparison of 2040 Build Conditions to 2040 No Build Conditions		
2040 Build Alternative 1—2040 No Build	-61,133	-21,213,037
2040 Build Alternative 2—2040 No Build	-30,367	-10,537,286
[a] Annual VMT values derived from Daily VMT values multiplied by 347, per ARB methodology (California Air Resources Board 2008). *Source*: Brooke pers. comm.		

Table 2.3-6 indicates that implementation of the Project would result in either no change or a decrease in MSAT emissions under opening year (2018), and design- year (2040) conditions when compared to the existing and No-Build conditions. Therefore, the Project would have no MSAT effects, and a quantitative analysis of MSAT emissions is not required.

Table 2.3-6. Mathilda Avenue Improvements Project MSAT Emissions (pounds per day)

Scenario	Naphthalene	Acrolein	Benzene	1, 3-Butadiene	Formaldehyde	Diesel Particulate Matter	Polycyclic Organic Matter
2013 Existing	0	0	10	2	16	29	0
2018 No-Build	0	0	5	1	6	6	0
2018 Build	0	0	5	1	6	6	0
2040 No-Build	0	0	3	1	5	1	0
2040 Build	0	0	3	1	5	1	0
Note: Emissions calculations based on CT-EMFAC v6.0.							

Moreover, U.S. EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with the U.S. EPA's Motor Vehicle Emissions Simulator model forecasts a combined reduction of over 80 percent in the total annual emission rate for MSAT emissions from 2010 to 2050, while VMT is projected to increase by over 100 percent. This will reduce the background level of MSAT emissions and potentially reduce minor MSAT emissions from this Project.

Construction

Criteria Pollutants – Potential for Temporary Increase in Emissions during Grading and Construction Activities

Implementation of the Build Alternative would result in the construction of widened and reconfigured roads as well as intersection improvements. Temporary construction emissions of ozone precursors ROG and NO_X, CO, and PM10 emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade construction, paving activities, and construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather.

To provide a realistic, yet conservative scenario, maximum daily emissions from construction activities were estimated assuming all equipment would operate at the same time during individual construction phases. Because of this conservative assumption, actual emissions could be less than those forecasted. Table 2.3-7 summarizes maximum daily emissions levels for the opening year 2018. The Bay Area Air Quality Management District (BAAQMD) thresholds are also provided for reference.

Table 2.3-7. Worst-Case Construction Emission Estimates (pounds per day)

				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust
Project Phases	**ROG**	**CO**	**NO_X**	**PM10**	**PM10**	**PM10**	**PM2.5**	**PM2.5**	**PM2.5**
Grubbing/Land Clearing	1.4	11.0	15.4	25.7	0.7	25.0	5.8	0.6	5.2
Grading/ Excavation	8.4	50.9	96.0	29.5	4.5	25.0	9.2	4.0	5.2
Drainage/Utilities /Sub-Grade	4.7	28.6	43.5	27.5	2.5	25.0	7.4	2.2	5.2
Paving	2.1	14.8	19.1	1.2	1.2	-	1.1	1.1	-
Maximum (pounds/day)	8.4	50.9	96.0	29.5	4.5	25.0	9.2	4.0	5.2
Total (tons/ construction project)	0.7	4.4	7.7	3.2	0.4	2.8	0.9	0.3	0.6
BAAQMD Threshold	*54*	-	*54*	-	*82*	*BMPs*	-	*54*	*BMPs*
Notes: BMPs = best management practices									

Construction activities are subject to requirements found in Caltrans' Standard Specifications (California Department of Transportation 2015), Section 14-9.02, which includes specifications relating to controlling air pollution by complying with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the contract, including air pollution control rules, regulations, ordinances, and statutes provided in Government Code Section 11017 (Public Contract Code §10231). Standard specification Sections 14-11.04 and 18 address dust control and palliative requirements. Implementation of Avoidance and Minimization Measure AQ-1, *Implement California Department of Transportation Standard Specification Section 14*, and Avoidance and Minimization Measure AQ-2, *Implement Basic and Additional Control Measures for Construction Emissions of Fugitive Dust*, would ensure that air quality impacts from construction activities are less than significant.

Potential for Disturbance of Soil Containing Naturally Occurring Asbestos

There are no geologic features normally associated with naturally occurring asbestos (i.e., serpentine rock or ultramafic rock near fault zones) in or near the Project area. However, the disturbance of naturally occurring asbestos in embankment fill during construction activities (e.g., excavation, grading, soil stockpiling) could generate asbestos-containing dust and pose an inhalation hazard for construction workers and the public. Potential impacts related to naturally occurring asbestos emissions during construction activities are discussed in Section 2.8, *Hazardous Waste/Materials*. Impacts would be reduced by implementation of Avoidance and Minimization Measure HAZ-1: *Prepare Preliminary Site Investigation* and Avoidance and Minimization Measure HAZ-2: *Prepare Construction Risk Management Plan*.

Furthermore, any construction activities that involve the demolition of any building or structure containing asbestos would be subject to the U.S. EPA's National Emissions Standards for Hazardous Air Pollutants and ARB's Airborne Toxic Control Measures.

2.3.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures will be incorporated into the Project during construction, as applicable, to reduce the effects of the impacts discussed above in Section 2.3.3, *Impact Analysis*.

Avoidance and Minimization Measure AQ-1: Implement California Department of Transportation Standard Specification Section 14

To control the generation of construction-related PM10 emissions, the Project will follow Standard Specification Section 14, "Environmental Stewardship," which addresses the contractor's responsibility on many items of concern such as air pollution. Section 14-9.02 includes specifications relating to controlling air pollution by complying with air pollution control rules, regulations, ordinances, and statutes provided in Government Code Section 11017 (Public Contract Code §10231). Section 14-11.04 is directed at controlling dust.

Avoidance and Minimization Measure AQ-2: Implement Basic and Additional Control Measures for Construction Emissions of Fugitive Dust

Additional measures to control dust required by the BAAQMD (see Table 2.3-8) will be implemented to the extent practicable when the measures have not already been incorporated and do not conflict with requirements of Caltrans' Standard Specifications, Special Provisions, and the National Pollutant Discharge Elimination System stormwater permit.

Table 2.3-8. BAAQMD Feasible Control Measures for Construction Emissions of Particulate Matter

Basic Construction Measures Recommended for ALL Projects
1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 mph. 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 6. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Additional Construction Measures Recommended for Projects with Construction Emissions Above the Threshold
1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12%. Moisture content can be verified by lab samples or moisture probe. 2. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph. 3. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity. 4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. 5. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surface at any one time. 6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site. 7. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel. 8. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%.

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2.4 Biological Resources

The information in this section is based on the *Natural Environment Study – Minimal Impact – for the Mathilda Avenue Improvements at SR 237 and US 101 Project* and the *Wetlands Assessment for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. These reports were approved in March 2016 and January 2016, respectively. The Wetlands Assessment is found as Appendix D in the Natural Environment Study. Please refer to these studies for a detailed discussion of the information contained in this section.

2.4.1 Regulatory Setting

2.4.1.1 Federal Endangered Species Act

The federal Endangered Species Act (ESA) is administered by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service. The National Marine Fisheries Service is responsible for protection of ESA-listed marine species and anadromous fishes, whereas other listed species are under USFWS jurisdiction. *Endangered* refers to species, subspecies, or distinct population segments that are in danger of extinction through all or a significant portion of their range; *threatened* refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

2.4.1.2 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) protects migratory birds, their occupied nests, and their eggs. Most actions that result in "take" or in permanent or temporary possession of a protected species constitute violations of the MBTA. *Take* means "to pursue, hunt, take, capture, kill, possess, offer for sale, sell, offer to purchase, purchase, or transport…any migratory bird, or any part, nest or egg of any such bird" (USFWS 1998). The USFWS is responsible for overseeing compliance with the MBTA.

2.4.1.3 Clean Water Act

The federal Clean Water Act (CWA) was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law to protect the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain a water quality certification from the state in which the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. If a project would result in impacts on waters of the United

States (or waters of the State), the project applicant would obtain and comply with Section 401 and Section 404 permits, and all conditions attached to those permits would be implemented as part of the project.

2.4.1.4 California Endangered Species Act

The California Endangered Species Act prohibits the take of endangered and threatened species; however, habitat destruction is not included in the state's definition of take. Pursuant to California Fish and Game Code (CFGC) Section 86, *take* means "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Section 2090 of the California Endangered Species Act requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act and authorizes take through Section 2081 permits (except for species that are designated as fully protected). CDFW can adopt a federal biological opinion as a state biological opinion under CFGC Section 2095. In addition, for species listed under both the ESA and California Endangered Species Act, CDFW can issue a consistency determination stating that a document written in compliance with Section 7 of the ESA is consistent with CESA.

2.4.1.5 California Fish and Game Code

The CFGC provides protection from take for a variety of species, referred to as fully protected species. CFGC 3511 lists fully protected birds and prohibits take of these species. The code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected birds is prohibited.

CFGC 3513 prohibits the take or possession of any migratory non-game bird, as designated in the MBTA, or any part of such migratory non-game bird, except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA. In addition, CFGC 3503 prohibits the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and destruction of raptor nests.

2.4.1.6 Porter-Cologne Water Quality Control Act

California Water Code Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the State to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Act definition, waters of the State are "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the State, the reverse is not true. Therefore, California retains authority to regulate discharges of waste into any waters of the State, regardless of whether the U.S. Army Corps of Engineers (USACE) has concurrent jurisdiction under CWA Section 404. If USACE determines that a wetland is not subject to regulation under Section 404, CWA Section 401 water quality certification is not required.

However, the Regional Water Quality Control Board may impose waste discharge requirements if fill material is placed into waters of the State.

2.4.1.7 California Native Plant Protection Act

The California Native Plant Protection Act of 1977 prohibits importation of rare and endangered plants into California, take of rare and endangered plants, and the sale of rare and endangered plants. The California Endangered Species Act defers to the California Native Plant Protection Act, which ensures that state-listed plant species are protected when state agencies are involved in projects that are subject to CEQA. In this case, plants that are listed as rare under the California Native Plant Protection Act are not protected under the California Endangered Species Act but rather under CEQA.

2.4.2 Existing Conditions

The Project area encompasses approximately 63 acres. Biological resources and potential Project impacts on such resources were identified through a literature and database review, correspondence with USFWS, and reconnaissance field surveys. Field surveys were conducted within the Project area to identify vegetation and land cover types and assess habitat suitability for special-status species. During the botanical field surveys (March 6 and July 29, 2015), vegetation communities were identified and mapped, and trees were identified and recorded. A wetlands assessment was conducted concurrently with the botanical field surveys. During the wildlife survey (March 6, 2015), observations of habitat conditions and wildlife species were recorded in field notes.

2.4.2.1 Natural Communities

Sensitive natural communities are communities (vegetation types) that are of limited distribution statewide or within a county or region, such as California sycamore woodlands. There are no sensitive natural communities within the Project area.

Land cover types within the Project area include developed and landscaped (Figure 2.4-1). For the purpose of this EIR land cover types are defined as the dominant character of the land surface as determined by vegetation, water, or human uses.

The developed land cover type consists of the existing paved Mathilda Avenue, on- and off-ramps from US 101 and SR 237, other existing roads, parking lots, and residential and commercial development. Developed land cover totals 48 acres in the Project area.

The landscaped land cover type comprises the remainder of the Project area (15 acres). Landscaped vegetation is typically planted and consists of non-native, ornamental plant species, and/or cultivars of native plant species that may or may not be regularly maintained or managed. Although not considered a natural vegetation community, landscaped vegetation can provide habitat and food sources for wildlife.

Trees in the Project area occur within the landscaped land cover type and consist mostly of non-native species. Table 2.4-1 includes a list of all 626 trees identified within the Project area and their approximate DBH. Refer to Figure 2.4-2 for the general locations of the identified trees.

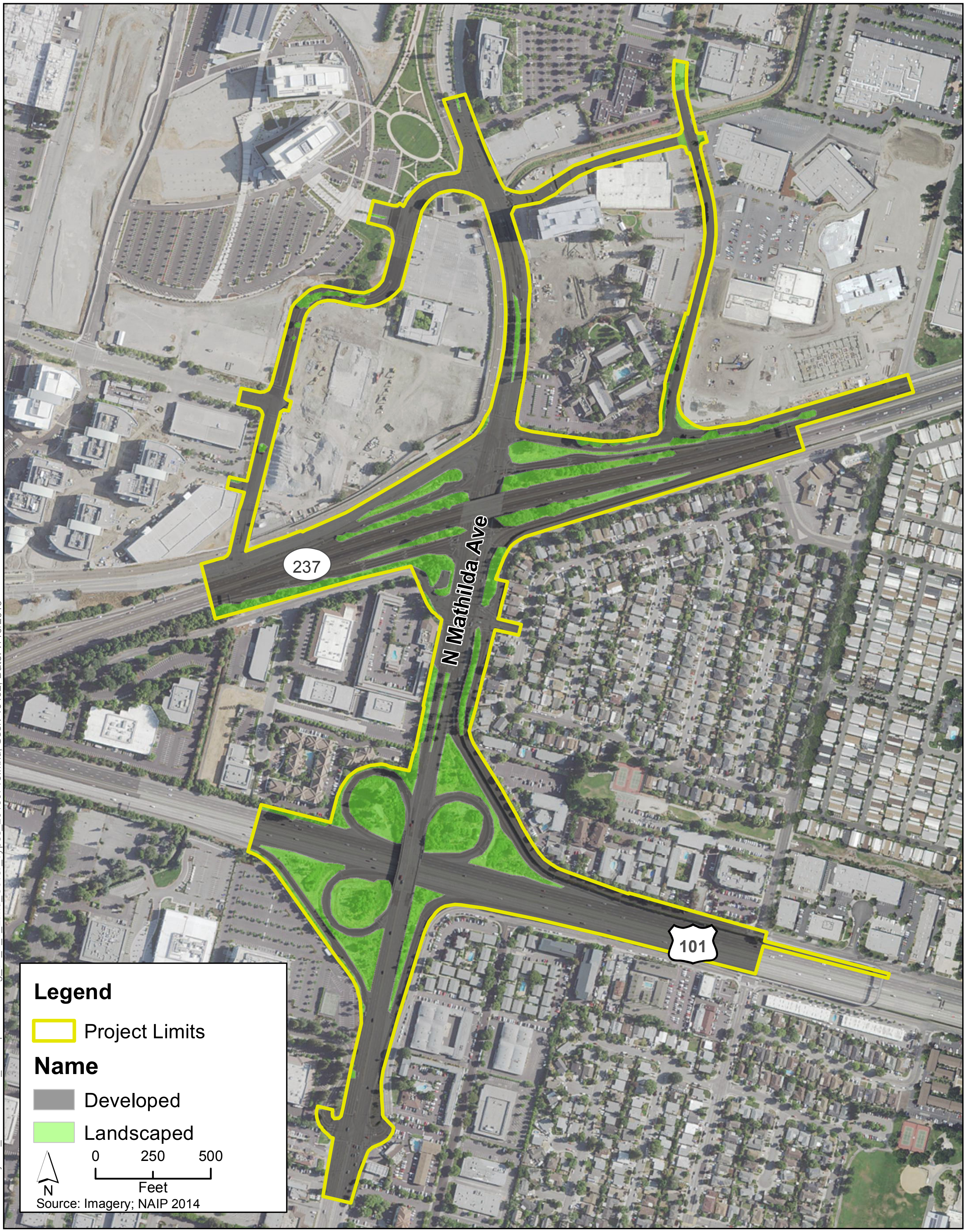

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Figure 2.4-1
Land Cover Types within the Study Area
Mathilda Avenue Improvements at SR 237 and US 101 Project

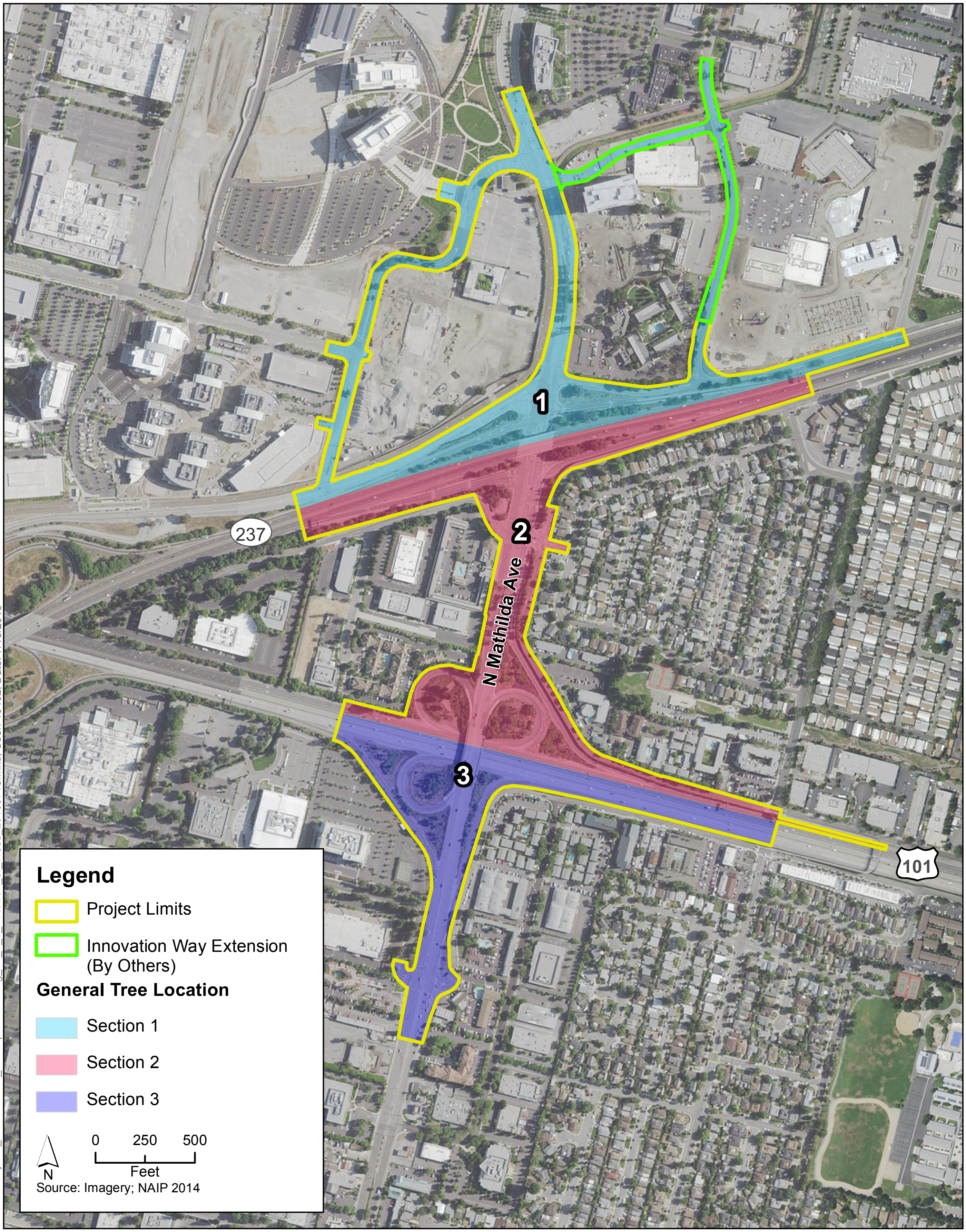

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Figure 2.4-2
General Locations of Trees within the Study Area
Mathilda Avenue Improvements at SR 237 and US 101 Project

Table 2.4-1. Trees in the Study Area

Common Name	Scientific Name	Number of Trees	DBH (in inches)	General Location
ash	*Fraxinus* sp.	7	2–6	Project limits north of SR 237, including Moffett Park Drive (Figure 2.4-2, Section 1)
ash, autumn purple	*Fraxinus americana*	1	8	
ash, velvet	*Fraxinus velutina*	1	2–6	
blackwood acacia	*Acacia melanoxylon*	2	2–8	
Bradford pear	*Pyrus calleryana*	13	8–12	
camphor tree	*Cinnamomum camphora*	2	4–8	
Chinese elm	*Ulmus parvifolia*	5	2–8	
Chinese elm	*Ulmus parvifolia*	3	16	
Chinese pistache	*Pistacia chinesis*	1	6–10	
coast redwood*	*Sequoia sempervirens*	27	4–12	
crape myrtle	*Lagerstroemia* sp.	6	2–6	
crape myrtle	*Lagerstroemia* sp.	4	6–8	
gum	*Eucalyptus* sp.	1	20–30	
gum, blue	*Eucalyptus globulus*	1	14–18	
gum, blue	*Eucalyptus globulus*	3	20–30	
gum, red	*Eucalyptus camaldulensis*	8	30	
gum, silver dollar	*Eucalyptus polyanthemos*	2	30	
Italian stone pine	*Pinus pinea*	19	50–100	
oak, coast live*	*Quercus agrifolia*	10	6–10	
oak, southern live	*Quercus virginiana*	32	4–10	
oak, southern live	*Quercus virginiana*	1	30	
Peruvian pepper	*Schinus molle*	9	16–30	
purple-leaf plum	*Prunus cerasifera*	6	6–10	
sheoak	*Casuarina* sp.	1	6–10	
sheoak	*Casuarina* sp.	1	30–50	
unknown ornamental	—	1	6	

Common Name	Scientific Name	Number of Trees	DBH (in inches)	General Location
ash	*Fraxinus* sp.	4	6–12	Adjacent to Mathilda Avenue between SR 237 and US 101 (Figure 2.4-2, Section 2)
ash, autumn purple	*Fraxinus americana*	2	8	
blackwood acacia	*Acacia melanoxylon*	7	4–10	
California black walnut*	*Juglans californicus*	11	8–16	
camphor tree	*Cinnamomum camphora*	7	10–20	
Chinese elm	*Ulmus parvifolia*	5	6–10	
Chinese elm	*Ulmus parvifolia*	10	10–20	
Chinese pistache	*Pistacia chinesis*	29	8–12	
Chinese pistache	*Pistacia chinesis*	1	20	
Chinese privet	*Ligustrum lucidum*	19	6–10	
coast redwood*	*Sequoia sempervirens*	27	20–40	
crimson bottlebrush	*Callistemon citrinus*	2	6–10	
deodar cedar	*Cedrus deodara*	16	12–20	
deodar cedar	*Cedrus deodara*	17	20–30	
gum	*Eucalyptus* sp.	7	14–18	
gum, blue	*Eucalyptus globulus*	19	12–30	
gum, red	*Eucalyptus camaldulensis*	1	10–20	
gum, red	*Eucalyptus camaldulensis*	1	20	
Italian cypress	*Cupressus sempervirens*	1	8–12	
Lombardy poplar	*Populus nigra*	9	16–26	
London plane	*Platanus acerifolia*	4	10–20	
oak, coast live*	*Quercus agrifolia*	5	4–10	
oak, southern live	*Quercus virginiana*	34	4–10	
Peruvian pepper	*Schinus molle*	15	20–30	
Peruvian pepper	*Schinus molle*	28	8–16	
pine	*Pinus* sp.	6	6–10	
pine, Canary Island	*Pinus camariensis*	9	16–24	
purple-leaf plum	*Prunus cerasifera*	8	6–10	
purple-leaf plum	*Prunus cerasifera*	7	8–12	

Common Name	**Scientific Name**	**Number of Trees**	**DBH (in inches)**	**General Location**
red maple	*Acer rubrum*	3	8–12	Adjacent to Mathilda Avenue between SR 237 and US 101 (Figure 2.4-2, Section 2)
silk oak	*Grevillea robusta*	12	12–18	
silver birch	*Betula pendula*	2	16	
southern magnolia	*Magnolia grandiflora*	3	8–14	
unknown ornamental	*Prunus* sp.	5	8–12	
wax myrtle	*Myrica cerifera*	7	8–12	
western redbud*	*Cercis occidentalis*	1	4–8	
ash	*Fraxinus* sp.	1	6–12	Project limits south of US 101 (Figure 2.4-2, Section 3)
ash, autumn purple	*Fraxinus americana*	1	10	
blackwood acacia	*Acacia melanoxylon*	3	6–10	
California black walnut*	*Juglans californicus*	3	8–16	
Chinese elm	*Ulmus parvifolia*	8	6–10	
Chinese pistache	*Pistacia chinesis*	12	4–8	
Chinese privet	*Ligustrum lucidum*	3	6–10	
crape myrtle	*Lagerstroemia* sp.	18	4–8	
deodar cedar	*Cedrus deodara*	17	12–20	
gum	*Eucalyptus* sp.	3	12–20	
oak, southern live	*Quercus virginiana*	12	8–14	
olive	*Olea europaea*	2	6–10	
Peruvian pepper	*Schinus molle*	20	16–30	
pine	*Pinus* sp.	1	6–10	
southern magnolia	*Magnolia grandiflora*	1	16	
unknown ornamental	*Prunus* sp.	10	6–12	
Total		**626**		

* Native species
DBH = diameter at breast height

2.4.2.2 Wetlands and Other Waters

The Sunnyvale West Channel (refer to Figure 2.9-1 in Section 2.9, *Hydrology and Water Quality*) is a concrete-lined, flood control channel within the Project area. The channel is culverted underground as it crosses SR 237 and Mathilda Avenue. This channel is identified as a water of the United States that is subject to USACE jurisdiction. This channel is also assumed to be a water of the state that is subject to jurisdiction by the San Francisco Bay Regional Water Quality Control Board.

Storm water drainage ditches within the Project area do not meet the criteria to qualify as waters of the United States.[1,2] The ditches are excavated in dry land and do not drain wetlands or relocate tributaries. The ditches drain storm water runoff during rain events, but flow does not persist after rain events. Where there is vegetation associated with the ditches, instead of bare ground or gravel/cobble, the vegetation consists of ruderal or weedy species including wild oat, Italian thistle, and ripgut grass.

2.4.2.3 Plant Species

Based on the California Natural Diversity Database search results (California Department of Fish and Wildlife 2016), the California Native Plant Society (CNPS) inventory (California Native Plant Society 2016), and the USFWS species list (U.S. Fish and Wildlife Service 2016) for the Project region, it was determined that six plant species have the potential to occur in the Project region (Table 2.4-2). However, after completing field surveys, Project biologists determined that suitable habitat is not present for any of these plant species because of the predominant developed or landscaped land cover types.

2.4.2.4 Animal Species

The pallid bat is a California Species of Special Concern (see Table 2.4-3). The underside of the Mathilda Avenue overpass above US 101 was inaccessible during Project biologists' site visits because of the high volume of traffic on US 101. However, the pallid bat is not expected to occur under the overpass due to the species' incompatibility with urban development (Desert Renewable Energy Conservation Plan 2012; Technology Associates 2009); the urban character of the Project area, including high traffic volumes and human

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[1] Waters of the United States are defined in33 Code of Federal Regulations (CFR) Part 328 as "(1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide, all interstate waters including interstate wetlands; (3) all other waters such as interstate lakes, rivers streams…(4) all impoundments of waters otherwise defined as waters of the United States under the definition; (5) tributaries of waters…(6) the territorial seas; (7) wetlands adjacent to waters…(8) Waters of the United States do not include prior converted cropland. Refer to 33 CFR Part 328 for complete description.

[2] Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Refer to Section 404 of the Clean Water Act for complete description.

activity; and the species having been extirpated[3] from the Santa Clara Valley floor due to extensive development (Johnston pers. comm.). Also, there was no observation of bat guano and staining under the overpass during the field survey.

Nesting Birds and Raptors

The trees and shrubs within the undeveloped portions of the Project area provide suitable nesting substrate[4] for numerous bird species that are protected by the MBTA and CFGC.

While no active nests were observed during the March 2015 survey, an inactive cliff swallow nest was observed under the northern portion of the Mathilda Avenue overpass above US 101. Therefore, this species, as well as other swallows and black phoebes, could nest on this structure in the future.

[3] Extirpated species are those that no longer survive in a region that was once part of their range.

[4] Nesting substrate is the material that physically supports a bird's nest, such as branches of a tree or a cavity in a tree or light post, or on which a nest is constructed, such as the ground (for ground-nesting birds) or the eaves of a building or bridge (for birds that attach mud nests to structures).

Table 2.4-2. Special-Status Plant Species Known or with Potential to Occur in the Project Region

Common Name	Scientific Names	Status[a] Federal/ State/CNPS	Geographic Distribution	General Habitat Description	Blooming Period	Habitat (Present/ Absent)	Rationale
Alkali milk-vetch	*Astragalus tener* var. *tener*	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, east San Francisco Bay Area.	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkaline soils; 1–200 feet.	Mar–June	Absent	Playas, valley and foothill grassland, vernal pools, and adobe clay and alkaline soils not present in the Project area. Not observed during March or July 2015 surveys.
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*	–/–/1B.1	East San Francisco Bay Area, Salinas Valley, Los Osos Valley.	Alkaline soils in annual grassland, on lower slopes, flats, and swales (sometimes on saline soils); below 755 feet.	May–Oct (Nov)	Absent	Alkaline and saline soils not present in the Project area. Not observed during March or July 2015 surveys.
Point Reyes bird's-beak	*Chloropyron maritimum* ssp. *palustre*	–/–/1B.2	Coastal Northern California, from Humboldt to Santa Clara County; Oregon.	Coastal salt marsh; below 33 feet.	June–Oct	Absent	Coastal salt marsh not present in the Project area. Not observed during March or July 2015 surveys.
Hoover's button-celery	*Eryngium aristulatum var. hooveri*	–/–/1B.1	South San Francisco Bay Area; South Coast Ranges in Alameda, San Benito, Santa Clara, and San Luis Obispo Counties.	Vernal pools; 9–148 feet.	July (Aug)	Absent	Vernal pools not present in the Project area. Not observed during March or July 2015 surveys.

Common Name	Scientific Names	Status[a] Federal/ State/CNPS	Geographic Distribution	General Habitat Description	Blooming Period	Habitat (Present/ Absent)	Rationale
Slender-leaved pondweed	*Stuckenia filiformis* ssp. *alpina*	–/–/2B.2	Scattered locations in California: Contra Costa, El Dorado, Lassen, Merced, Mono, Modoc, Mariposa, Placer, Santa Clara, and Sierra Counties; Arizona, Nevada, Oregon, Washington.	Freshwater marsh, shallow emergent wetlands and freshwater lakes, drainage channels; 984–7,054 feet.	May–July	Absent	Freshwater marsh, shallow emergent wetlands, freshwater lakes not present in the Project area. Not observed during March or July 2015 surveys.
California seablite	*Suaeda californica*	FE/–/1B.1	Morro Bay, San Luis Obispo County, and San Francisco and Contra Costa Counties; historically found in the south San Francisco Bay.	Margins of tidal salt marsh; below 49 feet.	July–Oct	Absent	Tidal salt marsh not present in the Project area. Not observed during March or July 2015 surveys.

[a] Status explanations:

Federal

FE = listed as *endangered* under the Endangered Species Act (ESA)

– = no listing

State

– = no listing

California Native Plant Society (CNPS)

1A = List 1A species: presumed extinct in California

1B = List 1B species: rare, threatened, or endangered in California and elsewhere

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere

CNPS Code Extensions:

0.1 = seriously endangered in California (more than 80% of occurrences threatened/high degree and immediacy of threat)

0.2 = fairly endangered in California (20–80% of occurrences threatened)

Table 2.4-3. Special-Status Wildlife Species Known or with Potential to Occur in the Project Region

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
Invertebrates					
San Bruno elfin butterfly	*Callophrys mossii bayensis*	FE/–	North-facing slopes and ridges that face the Pacific Ocean that support *Sedum spathulifolium*, its host plant; 600 to 1,100 feet.	Absent	No suitable slopes or ridges that face the Pacific Ocean present in the Project area. No *Sedum spathulifolium* observed in the Project area during March or July 2015 surveys.
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT/–	Native grasslands on outcrops of serpentine soil; California plantain and owl's clover are host plants.	Absent	No suitable native grasslands on outcrops of serpentine soil present in the Project area.
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE/–	Found in vernal pools and ephemeral stock ponds.	Absent	No suitable vernal pool or ephemeral stock pond habitat in the Project area.
Amphibians					
California tiger salamander	*Ambystoma californiense*	FT/ST	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	Absent	No suitable aquatic breeding or upland (rodent burrow complexes within uplands) habitat in the Project area.
California red-legged frog	*Rana draytonii*	FT/SSC	Permanent and semipermanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	Absent	No suitable aquatic breeding or upland habitat (rodent burrow complexes) in the Project area.

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
Reptiles					
Western pond turtle	*Actinemys marmorata*	—/SSC	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Absent	No suitable marsh habitat in the Project area.
Birds					
Tricolored blackbird	*Agelaius tricolor* (nesting colony)	—/SSC	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.	Absent	No suitable marsh habitat in the Project area.
Burrowing owl	*Athene cunicularia*	—/SSC	Level, open, dry, heavily grazed, or low-stature grassland or desert vegetation to forage in with available burrows for refuge and nesting.	Absent	No suitable level, open, dry, heavily grazed, or low-stature grassland or desert vegetation with available rodent burrows in the Project area.
Western snowy plover	*Charadrius alexandrinus nivosus*	FT/SSC	Coastal beaches above the normal high-tide limit in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent.	Absent	No suitable coastal beach habitat in the Project area.

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
Northern harrier	*Circus cyaneus*	—/SSC	Grasslands, meadows, marshes, and seasonal and agricultural wetlands; nests on the ground within a thicket of vegetation.	Present (foraging)/ A (nesting)	No suitable grassland, meadow, marsh, or wetland habitat in the Project area. Known to occur within 2 miles of the Project area (California Department of Fish and Wildlife 2015) but not expected to nest because of ongoing disturbance and lack of suitable nesting substrate. Individuals may occasionally forage in undeveloped open areas within the Project area.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/SE	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.	Absent	No suitable riparian habitat in the Project area.
American peregrine falcon	*Falco peregrinus*	—/FP	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; on human-made structures.	Absent	No suitable wetland, lake, riparian, or cliff habitat in the Project area. Unlikely to occur on buildings surrounding Project site because of the high level of human activity/disturbance.
San Francisco (=salt marsh) common yellowthroat	*Geothlypis trichas sinuosa*	—/SSC	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover.	Absent	No suitable marsh or riparian habitat in the Project area.

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
California black rail	*Laterallus jamaicensis coturniculus*	—/ST	Tidal salt marshes associated with dense pickleweed; also occurs in brackish or freshwater marshes at low elevations.	Absent	No suitable marsh habitat in the Project area.
Alameda song sparrow	*Melospiza melodia pusillula*	—/SSC	Tidal marshes dominated by pickleweed; nests in tall vegetation (gumplant) or dense stands of pickleweed.	Absent	No suitable tidal salt marsh habitat in the Project area.
California clapper rail	*Rallus longirostris obsoletus*	FE/—	Restricted to tidal salt marshes; usually associated with dense pickleweed and abundant tidal channels.	Absent	No suitable tidal salt marsh habitat in the Project area.
California least tern	*Sternula antillarum (=Sterna, =albifrons) browni*	FE/SE	Nests on sandy, upper ocean beaches, and occasionally uses mudflats; forages on adjacent surf line, estuaries, or the open ocean.	Absent	No suitable nesting or foraging habitat in the Project area.
Mammals					
Pallid bat	*Antrozous pallidus*	—/SSC/WBWG-High	Occurs throughout California, primarily at lower and mid-level elevations in a variety of habitats, from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in Northern California and oak woodland, grassland, and desert scrub in Southern California. Daytime roosts include rock outcrops, mines, caves, hollow trees, buildings, and bridges. Extremely intolerant of urban development.	Absent	Extirpated from the Santa Clara Valley floor (Johnston pers. comm.).

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
Townsend's big-eared bat	*Corynorhinus townsendii*	—/SCT, SSC/ WBWG-High	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings; very sensitive to disturbances; may abandon roost after one on-site visit.	Absent	No suitable roosting habitat in the Project area, due to the species' sensitivity to disturbance and the presence of routine vehicular disturbance.
Hoary bat	*Lasiurus cinereus*	—/—/WBWG-Medium	Roosts in trees, typically within forests.	Absent	No suitable native tree habitat in the Project area. Vehicular disturbance reduces the likelihood of the species roosting within the Project area.
Salt marsh harvest mouse	*Reithrodontomys raviventris*	FE/SE, FP	Tidal salt marshes with dense pickleweed and fat hen with sufficient high-tide cover in adjacent uplands.	Absent	No suitable tidal salt marsh habitat in the Project area.
Salt marsh wandering shrew	*Sorex vagrans halicoetes*	–/SSC	Mid-elevation salt marsh habitats with dense pickleweed; requires driftwood and other objects for nesting cover.	Absent	No suitable tidal salt marsh habitat in the Project area.
Fish					
Green sturgeon	*Acipenser medirostris*	FT/–	Ocean water, bays, and estuaries while not spawning; spawns in the mainstem of freshwater rivers with connections to marine habitat and suitable deep pools.	Absent	No suitable ocean, bay, estuary, river, or deep-pool habitat in the Project area.
Delta smelt	*Hypomesus transpacificus*	FT/SE	Occurs in estuary habitat in the Delta where fresh and brackish water mix, in the salinity range of 2 to 7 parts per thousand (Moyle 2002).	Absent	No suitable estuary habitat in the Project area.

Common Names	Scientific Names	Legal Status (Federal/State/ Other)[a]	General Habitat Description	Habitat Present/ Absent	Rationale
Coho salmon—central California coast	*Oncorhynchus kisutch*	FE/–	Occurs in coastal streams with water temperatures < 15°C; needs cool, clear water with instream cover; spawns in tributaries to large rivers or streams that are directly connected to the ocean (Moyle 2002).	Absent	No suitable coastal streams or large rivers that are directly connected to the ocean in the Project area.
Central California Coastal steelhead, Central Valley steelhead	*Oncorhynchus mykiss*	FT/—	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean.	Absent	No suitable stream or ocean habitat in the Project area.
Central Valley Chinook salmon	*Oncorhynchus tshawytscha*	FT (spring run)/—FE (winter run)/—	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean.	Absent	No suitable stream or ocean habitat in the Project area.
Longfin smelt	*Spirinchus thaleichthys*	Candidate for federal listing/ST, SSC	Bay, estuary, Humboldt Bay, Gulf of the Farallones, San Francisco Bay, San Pablo Bay, and the Sacramento (from upstream of Rio Vista) and San Joaquin River Delta (from Cache Slough and Medford Island) through Suisun Bay and Suisun Marsh.	Absent	No suitable bay, estuary, gulf, river delta, or marsh habitat in the Project area.

Notes:

[a] **Status codes**

— = no status

FE = listed as *endangered* under the federal Endangered Species Act
FT = listed as *threatened* under the federal Endangered Species Act
PD = proposed for delisting under the federal Endangered Species Act
SE = listed as *endangered* under the California Endangered Species Act
ST = listed as *threatened* under the California Endangered Species Act
SCT = candidate for listing as *threatened* under the California Endangered Species Act
SSC = California Species of Special Concern
FP = California fully protected species
WBWG = Western Bat Working Group conservation priority (high or medium)

Based on the California Natural Diversity Database search results and the USFWS species list for the Project region, 27 special-status wildlife species were identified as potentially occurring in the Project region. However, after completing field surveys and reviewing information on species distribution and habitat requirements, Project biologists determined that 26 of the 27 species are not expected to occur in the Project area because it lacks suitable habitat and/or is outside the species' known range (Table 2.4-3). Individual northern harriers, a California Species of Special Concern, may occasionally forage over landscaped portions of the Project area but are not expected to nest due to the lack of habitat (i.e., marsh or grassland with dense ground cover) and high disturbance levels.

2.4.2.5 Invasive Species

Invasive plant species include those that threaten California's wildlands and are categorized as non-native invasive plants by the California Invasive Plant Council (California Invasive Plant Council 2013). Roads, highways, and construction projects are some of the principal dispersal pathways for invasive plant species. The introduction and spread of invasive plants adversely affects natural communities by displacing native plant species that provide shelter and forage for wildlife species. Table 2.4-4 lists invasive plant species identified in the Project area.

Table 2.4-4. Invasive Plant Species Identified in the Study Area

Species	California Department of Food and Agriculture	California Invasive Plant Council Category
blackwood acacia (*Acacia melanoxylon*)	—	Limited
bristly ox-tongue (*Helminthotheca echioides*)	—	Limited
California burclover (*Medicago polymorpha*)	—	Limited
edible fig (*Ficus carica*)	—	Moderate
English ivy (*Hedera helix*)	—	High
fennel (*Foeniculum vulgare*)	—	High
gum, blue (*Eucalyptus globulus*)	—	Limited
gum, red (*Eucalyptus camaldulensis*)	—	Limited
Italian thistle (*Carduus pycnocephalus*)	C	Moderate
oat (*Avena* sp.)	—	Moderate
olive (*Olea europaea*)	—	Limited
Peruvian pepper tree (*Schinus molle*)	—	Limited
ripgut brome (*Bromus diandrus*)	—	Moderate
Russian thistle (*Salsola tragus*)	C	Limited
soft chess (*Bromus hordeaceus*)	—	Limited
summer mustard (*Hirschfeldia incana*)	—	Moderate

Sources: California Invasive Plant Council 2013; California Department of Food and Agriculture 2003

Notes:

The California Department of Food and Agriculture category indicated in the table is defined as follows:

C: State-endorsed holding action and eradication only when found in a nursery; action to retard spread outside nurseries at the discretion of the county agricultural commissioner.

The California Invasive Plant Council categories indicated in the table are defined as follows:

High: Species with severe ecological impacts, high rates of dispersal and establishment, and usually wide distribution.

Moderate: Species with substantial and apparent ecological impacts, moderate to high rates of dispersal, and limited to widespread distribution; establishment dependent on disturbance.

Limited: Species with minor ecological impacts, low to moderate rates of invasion, and limited distribution; locally persistent and problematic.

2.4.3 Impact Analysis

2.4.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to biological resources are anticipated.

2.4.3.2 Build Alternative

Impacts on biological resources would be limited to the potential disturbance of nesting birds and raptors, the removal of landscaped vegetation that can provide habitat and food sources for wildlife trees, and the potential to spread invasive species.

Nesting Birds and Raptors

Native migratory birds and raptors have the potential to nest in trees and shrubs in the Project area. Swallows and black phoebes also have the potential to nest under the highways in the Project area. Although these species are not considered special-status wildlife species, their occupied nests and eggs are protected by CFGC Sections 3503 and 3503.5 and the MBTA.

The trees and shrubs within the undeveloped portions of the Project area provide suitable nesting substrate for numerous bird species. Vegetation clearing, ground disturbance, and construction-generated noise and vibration could result in direct or indirect mortality of nesting birds through crushing, parental abandonment of young, reduced fitness, reduction in amount of available prey, and degradation or loss of habitat. Removal of trees or other vegetation could result in the destruction of active bird nests. Birds that nest on existing structures within or near the Project area could be disturbed by the demolition or modification of these structures (particularly the Mathilda Avenue overpass above US 101). One inactive cliff swallow nest was observed attached to a vertical support column below the Mathilda Avenue overpass above US 101 during the survey on March 6, 2015.

Construction activities during the breeding season could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. With implementation of avoidance measures, this type of impact would not be considered substantial for either colonial nesters or other bird species that could potentially nest in or adjacent to the Project area due to the local and regional abundances of these species and/or the low magnitude of the potential impact of the Project on these species. Implementation of Avoidance and Minimization Measure BIO-1, *Implement Nesting Bird Avoidance Measures,* would avoid or reduce impacts on nesting migratory birds from construction activities to a less-than-significant level.

Tree Removal

Approximately 626 trees were identified in the Project area; however, the majority of the trees will be unaffected by construction or operation of the Project. The precise number of trees to be removed by the Project will be determined during subsequent design phases.

Many of the trees meet the size requirements to be considered protected under the Sunnyvale Municipal Code. The intent of the City's tree preservation ordinance is to maintain the benefits to the community provided by trees, including keeping public rights-of-way cooler in the summer, providing aesthetic value, and removing air pollutants. Trees may also provide habitat or food sources for local wildlife. Damage to and/or removal of trees reduces these benefits to the community and wildlife.

While Caltrans is exempt from the City's tree ordinance, the Project will replace trees removed by the Project at ratios that are consistent with the spirit and intent of the City's tree ordinance, as described in Avoidance and Minimization Measure BIO-2, *Implement Tree Avoidance, Minimization, or Replacement*, which would avoid or reduce impacts on trees to a less-than-significant level.

Invasive Species

The Project area is entirely within a developed area; therefore, the Project is not likely to contribute to the spread of invasive species to sensitive natural communities in adjacent areas. Numerous invasive species already occur within the Project area; therefore, the Project area itself is not as sensitive to the introduction of invasive species compared to areas that lack invasive species. Vegetation removed by the Project during construction will be transported and disposed of in accordance with best practices to address the potential of invasive plants spreading to uninfested areas outside the Project limits. Avoidance and Minimization Measure BIO-3, *Minimize the Introduction and Spread of Invasive Plants*, would avoid or reduce impacts on invasive species to a less-than-significant level.

2.4.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures would be incorporated into the Project during construction, as applicable, to reduce the effects of the impacts discussed in Section 2.4.3, *Impact Analysis*.

Avoidance and Minimization Measure BIO-1: Implement Nesting Bird Avoidance Measures

To avoid impacts on nesting birds, the following avoidance measures will be implemented to ensure that Project activities comply with the MBTA and CFGC.

- To the extent feasible, Project activities should be scheduled outside the avian nesting season to avoid impacts on nesting birds (including raptors) protected under the MBTA and CFGC. The nesting season for most birds in Santa Clara County typically extends from February 1 through August 31, although some raptors may nest as early as January 1.

- If it is not possible to schedule Project activities between September 1 and January 1, then preconstruction surveys will be conducted by a qualified biologist to identify any nests within the Project area so that protection measures can be implemented to avoid disturbance to these nests. These surveys will be conducted no more than 48 hours prior to the initiation of Project activities. During this survey, a qualified biologist will inspect all potential nesting habitats (e.g., trees, shrubs, and overpasses) within 300 feet of impact areas for raptor nests and within 100 feet of impact areas for nests of non-raptors. If an active nest (i.e., a nest with eggs or young, or any completed raptor nest attended by adults) is found sufficiently close to work areas to be disturbed by these activities, the biologist, in consultation with CDFW, will determine the extent of a disturbance-free buffer zone to be established around the nest (typically 300 feet for raptors and 50–100 feet for other species), to ensure that no nests of species protected by the MBTA and CFGC will be disturbed during Project implementation.
- Nest Prevention. If Project activities will not be initiated until after the start of the nesting season, potential nesting substrate (e.g., bushes, trees, other vegetation, and structures) that is scheduled to be removed by the Project, if any, may be removed prior to the start of the nesting season (e.g., prior to January 1) to reduce the potential for initiation of nests.

Avoidance and Minimization Measure BIO-2: Implement Tree Avoidance, Minimization, or Replacement

- To the maximum extent practicable, damage to or removal of trees will be avoided by the Project. If trees need to be removed or are damaged as a result of the Project, they will be replaced within the Project site to the extent feasible. Native trees with a DBH of less than 12 inches will be replaced at a 2:1 ratio. Native trees with a DBH of 12 inches or more will be replaced at a 3:1 ratio. If urban trees (non-natives and ornamentals) are replaced with native trees, a reduced minimization ratio of 1:1 for all trees smaller than 12 inches DBH, and 2:1 for all trees with a DBH of 12 inches or more, will be implemented. Trees will be replaced within one (1) year of the impact. Should tree impacts occur at different times during the Project, an appropriate number (per the preceding ratios) of replacement (minimization) trees will be planted within one (1) year of the associated tree impact(s). These trees will be irrigated and maintained for a period of not less than three (3) years. If trees cannot be replaced at the stated ratios within the Project site, replacement trees will be planted within two (2) miles of the Project site within the City's limits along bike trails, in existing parks, or adjacent to creeks (native replacement tree species only). Replacement trees will not be planted within 500 feet of salt marsh habitat, occupied burrowing owl habitat (per current CDFW's California Natural Diversity Database data: https://www.dfg.ca.gov/biogeodata/cnddb/

mapsanddata.asp), or the San Francisco Bay. If trees cannot be replaced at such locations within two (2) miles of the Project site, in-lieu fees will be paid to an appropriate fund so that trees can be planted elsewhere within the City.

Avoidance and Minimization Measure BIO-3: Minimize the Introduction and Spread of Invasive Plants

To minimize introduction and spread of non-native invasive plant species, the following avoidance and minimization measures will be implemented by the Project:

- Prior to construction, Project disturbance areas infested with invasive plant species will be identified, mapped, and cleared of vegetation. All vegetative material will be incinerated offsite or disposed of in a landfill, taking care to prevent any seed dispersal during the process.
- During construction, vehicles and all equipment will be washed (including wheels, undercarriages, and bumpers) before and after entering the Project area. Vehicles will be cleaned at existing construction yards or legally operating car washes. In addition, tools, such as chainsaws, hand clippers, pruners, etc., will be washed before and after entering the Project work area.
- Following Project implementation, areas where vegetation was removed will be either hydroseeded with native seed from a local source or planted with landscaping vegetation and properly maintained per Caltrans standards to reduce the risk of non-native invasive species establishment. Native species and/or drought-tolerant plants will be used in landscaping to the extent practicable.

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2.5 Cultural Resources

The information in this section is based on the *Historic Resources Compliance Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project* and the *Paleontological Identification Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. These reports were approved in March 2016 and December 2015, respectively. Please refer to these reports for detailed discussions of the information contained in this section.

2.5.1 Regulatory Setting

The term "cultural resources" as used in this document refers to all "built environment" resources (structures, bridges, railroads, water conveyance systems, etc.), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance.

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP).

Historical resources are considered under CEQA, as well as California PRC Section 5024.1, which established the California Register of Historical Resources (CRHR). PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet NRHP listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the State Historic Preservation Officer (SHPO) before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks.

Assembly Bill (AB) 52 (Chapter 532, Statutes of 2014) establishes a formal consultation process for California Native American tribes as part of CEQA and equates significant impacts on "tribal cultural resources" with significant environmental impacts (new PRC Section 21084.2).

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils. Paleontological resources are protected under CEQA.

2.5.2 Existing Conditions

The Project Area Limits (PAL) were established to determine the historic architectural, archaeological, and paleontological resources within the boundaries of or near the Project site in which it can be reasonably expected that the Project may have a direct or indirect effect, if such resources exist.

2.5.2.1 Historic Architectural Resources

Thirteen properties were identified within the PAL. Seven of these properties contain buildings constructed less than 30 years ago, four are vacant, and two are bridges previously determined not eligible for listing in the NRHP/CRHR. Generally, resources must be at least 50 years old to be considered for listing on the CRHR.

2.5.2.2 Archaeological Resources

A prehistoric and historic site record and literature search by the California Historical Resources Information System, Northwest Information Center at Sonoma State University, was undertaken to determine if known archaeological resources are within a 0.5-mile radius of the PAL. The records search did not identify any previously recorded archaeological resources therein.

2.5.2.3 Paleontological Resources

The Project is within the Santa Clara Valley in the central portion of the Coast Ranges geomorphic province of California. Geologically, the Project site is underlain by alluvial and fluvial deposits consisting of clay, silt, sand, and gravel. These deposits range in age from Holocene Alluvium and Pleistocene Older Alluvium to the Pliocene–Pleistocene Santa Clara Formation. Both Holocene and Pleistocene deposits may contain paleontological resources.

2.5.3 Impact Analysis

The PAL was studied to determine whether cultural or paleontological resources are present and, if so, to assess the impacts of the Project on those resources. Several methodologies were employed for the purpose of determining the presence of cultural or paleontological resources within the PAL:

- Existing records and historic inventories including the NRHP, California Inventory of Historic Resources, and the Office of Historic Preservation Historic Properties Directory were consulted. This included a search for previously recorded historic resources within the PAL and a 0.5-mile radius, as well as a review of pertinent historic material. A records search was conducted at the Northwestern Information Center at Sonoma State University on February 5, 2015.
- Consultation with the Native America Heritage Commission and local Native American communities and individuals was undertaken. A request for a search of the Sacred Lands File, as well as a list of individuals who might have information or interest in the Project, was originally issued in March 2015, and a response was received March 26, 2015. A request for updated information was submitted to the Native American Heritage Commission on December 3, 2015. Letters containing general Project information were sent to the individuals listed by the Native American Heritage Commission on December 3, 2015. Follow-up phone calls were made on February 10, 2016. Responses (or lack thereof) from the individuals contacted are as follows: The Muwekma Ohlone Indian

Tribe of the San Francisco Bay Area expressed that that they should be contacted if a resource is found. The Amah Mutsun Tribal Band of Mission San Bautista asked that an archaeologist be called “right away” if a resource is found. The Indian Canyon Mutsun Band of Costanoan expressed confidence in the preparation of the Archaeological Survey Report and had no other comments or concerns regarding the Project. The Amah Mutsun Tribal Band responded that the Project is outside of their jurisdiction. The Ohlone Indian Tribe did not respond.

- A desktop geoarchaeological analysis was undertaken to determine general archaeological sensitivity based on soils present within the PAL.
- An intensive pedestrian survey of the PAL was conducted on March 9, 2015.

Specific to paleontological resources, the following sources of information were reviewed: geologic mapping of the Project area; published geologic and paleontological literature; the University of California Berkeley, Museum of Paleontology online collections database; and evaluations of paleontological sensitivity/potential from other projects. In addition, an air photo inspection and windshield survey of the Project site was conducted.

2.5.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to cultural resources or paleontology are anticipated.

2.5.3.2 Build Alternative

Historic Architectural Resources

There are no historic architectural resources within the Project area. As stated previously, 13 properties were identified within the PAL. Seven of these contain buildings constructed less than 30 years ago, four are vacant, and two are bridges previously determined not eligible for listing in the NRHP/CRHR. As stated, resources must generally be at least 50 years old to be considered for listing on the CRHR. A resource less than 50 years old may be considered for listing in the CRHR if it embodies a particularly substantial contribution to the broad patterns of California’s history, is associated with the lives of important historical figures, or shows exceptional architectural or artistic merit. There is no scholarly or other information that establishes the historical significance of the properties within the PAL, and the extant buildings and structures are typical, rather than exceptional, examples of their style type. Therefore, the Project would have no impacts on historical architectural resources.

Archaeological Resources (Human Remains)

No cultural resources were identified within the PAL either through the Northwest Information Center (Sonoma State University) records search or during the field survey. In addition, previous studies conducted within the PAL indicate low potential to encounter previously unrecorded subsurface archaeological sites. The majority of ground-disturbing construction activities would be in previously disturbed contexts. The Project includes Avoidance and Minimization Measure CUL-1, *Stop Work if Cultural Resources are Encountered During Ground-Disturbing Activities*, in the event that unrecorded subsurface archaeological sites are encountered. As such, the Project would have no impacts on archaeological resources.

Similarly, no human remains were identified as occurring within the PAL either through the background records search or during the Project site survey. The Project includes Avoidance and Minimization Measure CUL-2, *Stop Work if Human Remains are Encountered During Ground-Disturbing Activities*. As such, the Project would have no impacts on human remains.

While desktop geoarchaeological research indicates that the PAL is within an area sensitive for encountering subsurface deposits, soils testing conducted in 2014 and 2015 within the PAL demonstrate the lack of sensitive soils. All testing returned negative results for cultural material. Therefore, the Project would have no impacts on intact unknown archaeological resources.

Paleontological Resources

The Project would not involve deep construction excavation into the native Holocene deposits. The majority of Project work, and all Project staging, would occur within an area already disturbed and would consist largely of changing existing lanes and flows of traffic. The Project focuses on minor modifications and improvements requiring minimal and superficial ground disturbance, ranging from 3 feet for roadway widening/ramp modifications/auxiliary lane construction/retaining wall foundations/storm water treatment basins, up to 6 feet for storm drain improvements/larger wooden pole post holes for street signage, and up to 25 feet for overhead sign foundations. The Project includes Avoidance and Minimization Measure CUL-3, *Conduct Protocol and Procedures for Encountering Paleontological Resources*, in the event that paleontological resources are uncovered. As such, the Project would have no impacts related to paleontological resources.

2.5.4 Avoidance, Minimization, and/or Mitigation Measures

If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will stop until a qualified archaeologist can assess the nature and significance of the find. Furthermore, should human remains be discovered, State Health and Safety Code Section 7050.5 states that disturbances and activities must stop in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. Pursuant to PRC Section 5097.98, if human remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Kathryn Rose, District 4 Branch Chief, Archaeology so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

Avoidance and minimization measures would be incorporated into the Project and would reduce the effects of the impacts discussed in Section 2.5.3, *Impact Analysis*.

Avoidance and Minimization Measure CUL-1: Stop Work if Cultural Resources are Encountered During Ground-Disturbing Activities

While there is low potential to encounter or impact archaeological resources during construction, VTA or its contractor will issue a stop work order if prehistoric or historic-period cultural materials are unearthed during ground-disturbing activities. All work within a minimum of 100 feet of the find will be stopped until a qualified archaeologist can assess the significance of the find. If the find is determined to be potentially significant, the archaeologist, in consultation with Environmental Planning staff of VTA and Caltrans Office of Cultural Resource Studies, will develop a treatment plan that could include site avoidance, capping, or data recovery.

Avoidance and Minimization Measure CUL-2: Stop Work if Human Remains are Encountered During Ground-Disturbing Activities

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall stop immediately in any area or nearby area (typically a minimum of 100 feet) suspected to overlie remains. The person who discovered the remains will immediately contact their project oversight staff, the Resident Inspector or Resident Engineer, who will then notify VTA Environmental Planning staff. VTA staff will notify the County Coroner and Caltrans Office of Cultural Resource Studies the District Environmental Branch. Pursuant to CA PRC Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the MLD. VTA and Caltrans staff will coordinate with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

Avoidance and Minimization Measure CUL-3: Conduct Protocol and Procedures for Encountering Paleontological Resources

While there is low potential to encounter or impact paleontological resources during construction, if a fossil is encountered during construction, all work within 50 feet of any potential fossil find will be stopped, and a qualified paleontologist will be notified to evaluate the find's significance. If a fossil is determined to be significant and avoidance is not feasible, the paleontologist will develop and implement an excavation and salvage plan in accordance with Society of Vertebrate Paleontology standards. Construction work in these areas will be halted or diverted to allow recovery of fossil remains in a timely manner. Fossil remains collected during monitoring and salvage activities will be cleaned, repaired, sorted, and cataloged. Prepared fossils, along with copies of all pertinent field notes, photos, and maps, will then be deposited in a scientific institution with paleontological collections.

2.6 Geology, Soils, and Seismicity

The information in this section is based on the *Preliminary Geological Assessment* for the Mathilda Avenue Improvements Project. This assessment was approved in December 2015. Please refer to this report for a detailed discussion of the information contained in this section. Note: information regarding soil erosion is included in Section 2.9, *Hydrology and Water Quality*.

2.6.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under CEQA.

This section discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Caltrans' Office of Earthquake Engineering is responsible for assessing the seismic hazard for its projects. Structures are designed using Caltrans' Seismic Design Criteria. For more information, please see the Caltrans' Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.[1]

2.6.2 Existing Conditions

The Project site is located in the San Francisco Bay Area, which includes numerous active faults. Table 2.6-1 shows faults within 10 miles of the Project site, and Figure 2.6-1 shows the location of the Project with respect to nearby faults. Potential seismic hazards associated with active faults include surface fault rupture, ground shaking, liquefaction, and landslides.

Table 2.6-1. Active and Potentially Active Faults within 10 Miles of the Project Site

Fault	Distance to (miles) and Direction from the Project Site	Maximum Expected Earthquake (Moment Magnitude)
Cascade	3.9 (southwest of Project site)	6.7
Silver Creek	4.5 (east of Project site)	6.9
Monte Vista-Shannon	5.0 (southwest of Project site)	6.4
Hayward	7.6 (east of Project site)	6.7
San Andreas	9.1 (west of Project site)	8
Source: United States Geological Survey 2016; BASELINE Environmental Consulting 2015; Caltrans 2012.		

[1] Available at: http://www.dot.ca.gov/hq/esc/earthquake_engineering/sdc/.

Surface fault rupture occurs when the ground surface is broken due to fault movement during an earthquake. The location of surface fault rupture generally occurs along an existing fault trace, which is the intersection of a fault with the ground surface. As shown in Table 2.6-1, the closest fault to the Project site is the Cascade fault, 3.9 miles to the southwest.

The extent of ground shaking is a function of the magnitude and intensity of an earthquake, distance from the epicenter, and local geologic conditions. The Project site is located on Holocene alluvium soils, which can intensify ground shaking. Preliminary estimates of ground motion at the Project site from nearby active faults at the maximum earthquake magnitude suggest that the Project site could experience severe to violent ground shaking.

Ground shaking can also result in liquefaction, which is the temporary transformation of loose, saturated, granular sediments to a fluid-like state. In the process, soil undergoes transient loss of strength, which commonly causes ground displacement. The Project site is located within the California Geological Survey's Seismic Hazard Zone for liquefaction (refer to Figure 2.6-2).

Landslides can occur as either rapid movement of large masses of soil or imperceptibly slow movement of soils on slopes. Landslides are generally triggered by rainfall, excavation, or seismic activity. The elevation profile of the Project site is relatively flat, and the Project site is not located within the California Geological Survey's Seismic Hazard Zone for landslides (refer to Figure 2.6-2).

Soils mapped within 45 inches below ground surface on the Project site have a high to very high expansion potential. Expansive soils are characterized by the potential for shrinking and swelling as the moisture content of the soil decreases and increases, respectively. Shrink-swell potential is influenced by the amount and type of clay minerals present. Soils mapped on the Project site also have a high potential to corrode uncoated steel and a moderate potential to corrode concrete due to the moisture content, texture, acidity, electrical conductivity, and sulfate and sodium content of the soil.

2.6.3 Impact Analysis

The analysis included in this section was performed in accordance with Chapter 7 of the Caltrans *Standard Environmental Reference* (Caltrans 2015b). Documents, databases, maps, and geospatial data from Caltrans, the United States Geological Survey, the United States Department of Agriculture, and the California Geological Survey were reviewed to characterize existing conditions, described above, and identify known or potential hazards at the Project site. Any hazards identified were evaluated to determine the potential impacts to or from the Project.

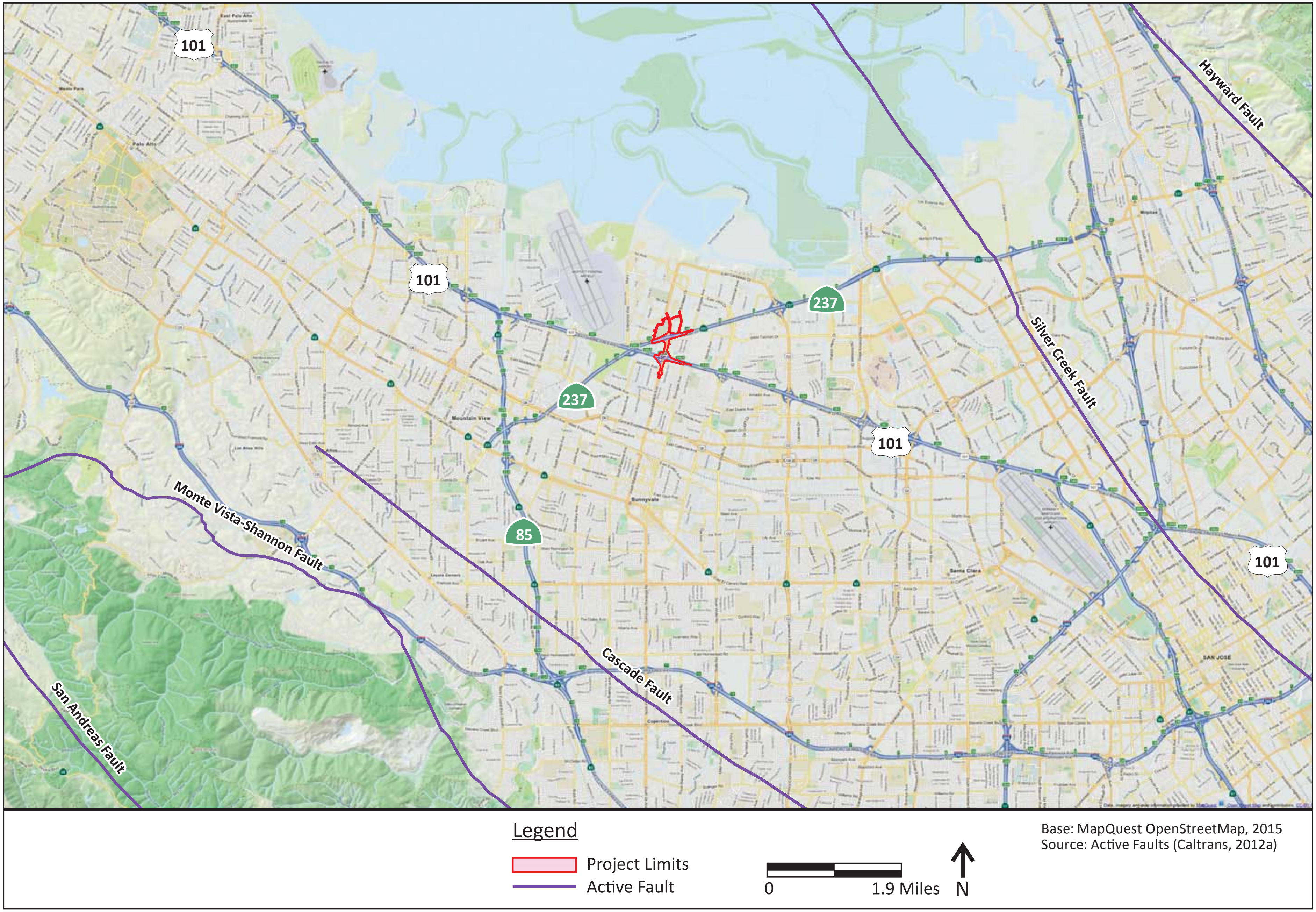

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Figure 2.6-1
Active Faults
Mathilda Avenue Improvements at SR 237 and US 101 Project

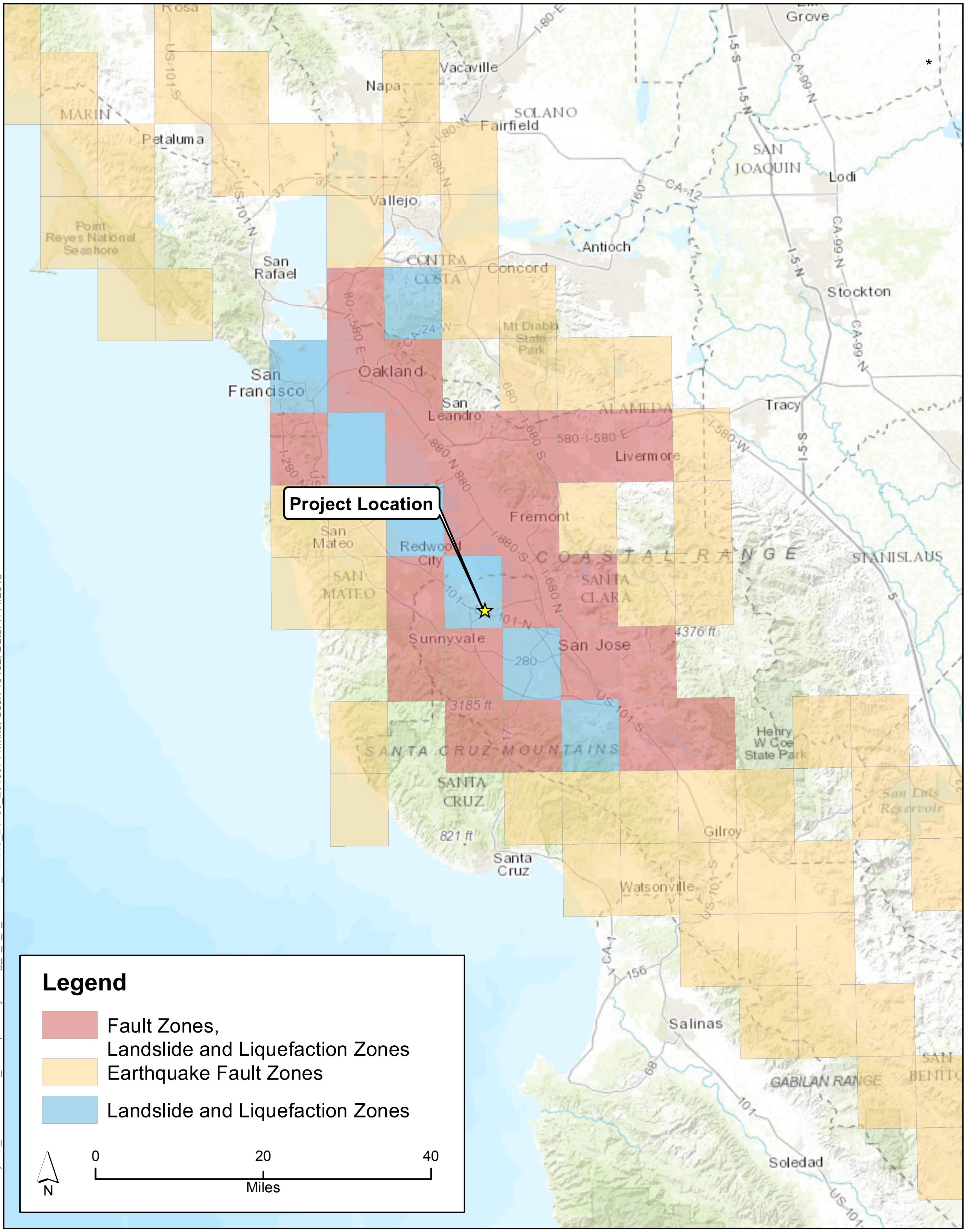

Figure 2.6-2
Seismic Hazard Zones
Mathilda Avenue Improvements at SR 237 and US 101 Project

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2.6.3.1 No-Build Alternative

There would be no modification to existing facilities or changes in the existing environment under the No-Build Alternative. No impacts related to geology, soils, and seismicity are anticipated.

2.6.3.2 Build Alternative

Design of the Project is subject to numerous standards, such as the *Caltrans Guidelines for Structures Foundation Manual* (Caltrans 2008, Revised 2015), *Caltrans Seismic Design Criteria* (Caltrans 2013), Caltrans *Highway Design Manual* (Caltrans 2015a), and Caltrans *Standard Environmental Reference* (Caltrans 2015b). Caltrans developed these standards to ensure the design and construction of new facilities meet all required safety standards.

Seismic Activity

The Project site is not located within a mapped Alquist-Priolo Earthquake Fault Zone and is not near an active fault trace (Caltrans 2012); therefore, impacts from surface fault rupture are not expected at the Project site. The Project site could experience severe to violent ground shaking exposing people and structures to potential substantial adverse effects given a maximum earthquake magnitude from nearby active faults. Strong ground shaking could crack and distort pavement, walls, and foundations, as well as rupture underground pipelines. However, implementation of the Project would be subject to numerous design standards and would not increase the risk of structural damage or damage to utilities due to ground shaking over existing conditions. Therefore, impacts would be less than significant.

Unstable Geologic Units

Potential liquefaction could result in surface impacts at the Project site. Such impacts could affect the structural integrity of roadways and bridges and damage underground utilities. Implementation of the Project would be subject to numerous design standards and would not increase the risk of structural damage to roadways and bridges, nor would it result in damage to underground utilities due to liquefaction over existing conditions.

The Project site is nearly level and not located within a Seismic Hazard Zone for seismically induced landslides (refer to Figure 2.6-2). The Project would not cause or exacerbate landslide hazards. Therefore, impacts would be less than significant.

Expansive and Corrosive Soils

Expansive soils at the Project site could impact Project structures and utilities. Project structures (e.g., retaining walls and underground utilities containing steel) could be impacted by corrosive soils. However, implementation of the Project would be subject to numerous design standards and would not increase the risk of structural damage or damage to utilities due to expansive and corrosive soils over existing conditions.

Therefore, potential hazards associated with seismic activity, unstable geological units, and expansive and corrosive soils, would be less than significant.

2.6.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.7 Greenhouse Gas Emissions

The information in this section is based on the *Air Quality Study Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This report was approved in May 2016. Please refer to this report for a detailed discussion of the information contained in this section.

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the Earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), HFC-23 (fluoroform), HFC-134a (1, 1, 1, 2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the United States, the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest source of GHG-emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change: *Greenhouse Gas Mitigation* and *Adaptation*. Greenhouse Gas Mitigation is a term for reducing GHG emissions to reduce or mitigate the impacts of climate change. Adaptation refers to the effort of planning for and adapting to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).[1]

There are four primary strategies for reducing GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity), (3) transitioning to lower GHG-emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective all four strategies should be pursued cooperatively.[2]

[1] http://climatechange.transportation.org/ghg_mitigation/

[2] http://www.fhwa.dot.gov/environment/climate_change/mitigation/

2.7.1 Regulatory Setting

2.7.1.1 State

With the passage of several pieces of legislation including state Senate and Assembly Bills and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate change.

- **Assembly Bill 1493 (AB 1493), Pavley, Vehicular Emissions: Greenhouse Gases, 2002:** This bill requires the California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.
- **Executive Order S-3-05 (EO) (June 1, 2005):** The goal of this EO is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by the 2020, and (3) 80 percent below the year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.
- **Assembly Bill 32 (AB 32), Núñez and Pavley, The Global Warming Solutions Act of 2006:** AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."
- **Executive Order S-20-06 (October 18, 2006):** This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.
- **Executive Order S-01-07 (January 18, 2007):** This order set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by the year 2020.
- **Senate Bill 97 (SB 97) Chapter 185, 2007, Greenhouse Gas Emissions**: SB 97 required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the State CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.
- **Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection**: This bill requires the ARB to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region must then develop a Sustainable Communities Strategy (SCS) that integrates transportation, land-use, and housing policies to plan for the achievement of the emissions target for their region.
- **Senate Bill 391 (SB 391) Chapter 585, 2009 California Transportation Plan:** This bill requires the state's long-range transportation plan to meet California's climate change goals under AB 32.

2.7.1.2 Federal

Although climate change and GHG reduction are a concern at the federal level, currently no regulations or legislation have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the United States Environmental Protection Agency (U.S. EPA) nor the Federal Highway Administration (FHWA) has issued explicit guidance or methods to conduct project-level GHG analysis.[3] FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making process, from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by FHWA to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change; these strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the "National Clean Car Program" and EO 13514 – *Federal Leadership in Environmental, Energy and Economic Performance*.

Executive Order 13514 (October 5, 2009) is focused on reducing greenhouse gases internally in federal agency missions, programs, and operations, but also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

The U.S. EPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, U.S. EPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six greenhouse gases constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and U.S. EPA's assessment of the scientific evidence that form the basis for U.S. EPA's regulatory actions. U.S. EPA in conjunction with the National Highway Traffic Safety Administration (NHTSA)

[3] To date, no national standards have been established regarding mobile source GHGs, nor has U.S. EPA established any ambient standards, criteria, or thresholds for GHGs resulting from mobile sources.

issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010.[4]

The U.S. EPA and NHTSA are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016).

On August 28, 2012, U.S. EPA and NHTSA issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model year 2017–2025 standards this program is projected to save approximately 4 billion barrels of oil and 2 billion metric tons of GHG emissions.

The complementary U.S. EPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut greenhouse gas emissions and domestic oil use significantly. This program responds to President Barack Obama’s 2010 request to jointly establish greenhouse gas emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model year 2014 to 2018 heavy duty vehicles.

2.7.2 Project Analysis

An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHG.[5] In assessing cumulative impacts, it must be determined if a project’s incremental effect is “cumulatively considerable” (State CEQA Guidelines Sections 15064(h)(1) and 15130). To make this determination the incremental impacts of the project must be compared with the effects of

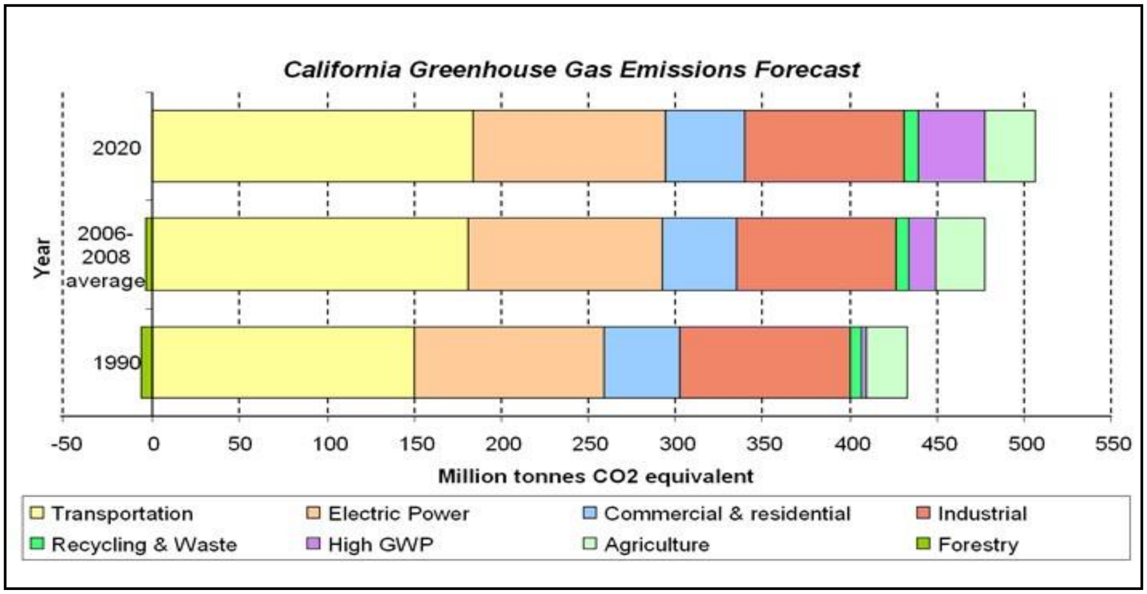
[4] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq

[5] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the U.S. Forest Service (*Climate Change Considerations in Project Level NEPA Analysis*, July 13, 2009).

past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

The AB 32 Scoping Plan mandated by AB 32 includes the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, the ARB released the GHG inventory for California (forecast last updated: October 28, 2010) (Figure 2.7-1). The forecast is an estimate of the emissions expected to occur in 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

Figure 2.7-1. California Greenhouse Gas Forecast



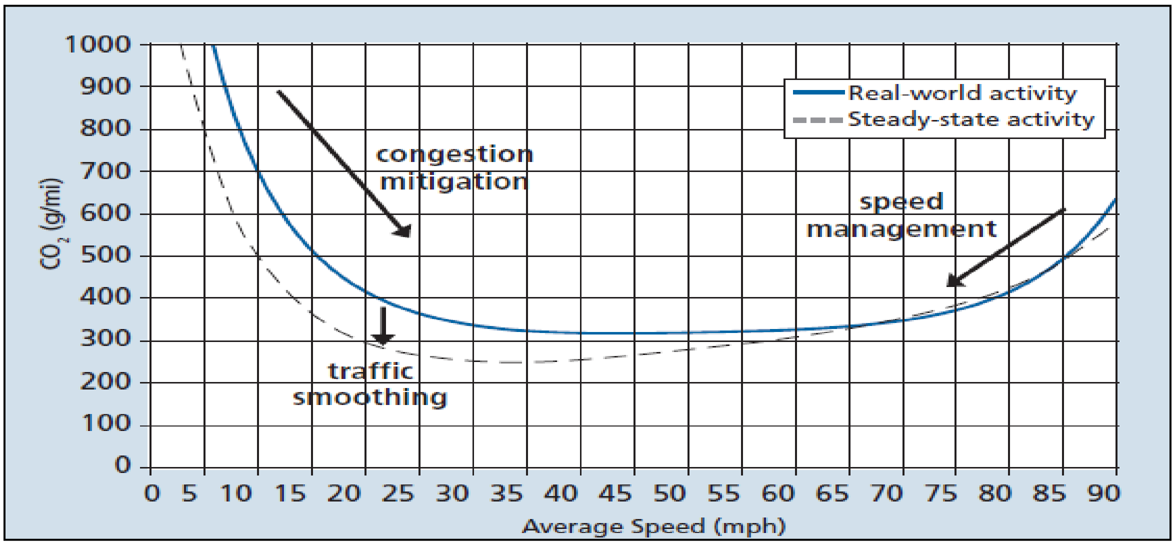
Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Caltrans and its parent agency, the Transportation Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human-made GHG emissions are from transportation, Caltrans has created and is implementing the Climate Action Program at Caltrans, which was published in December 2006.[6]

[6] Caltrans Climate Action Program is located at the following web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

One of the main strategies in Caltrans' Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of CO_2 from mobile sources such as automobiles occur at stop-and-go speeds (0–25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from 0–25 miles per hour (see Figure 2.7-2 below). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

Figure 2.7-2. Possible Effect of Traffic Operation Strategies in Reducing On-Road CO_2 Emission[7]



2.7.3 Impact Analysis

2.7.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to greenhouse gas emissions are anticipated.

2.7.3.2 Build Alternative

Operational Emissions

Caltrans' CT-EMFAC model was used to estimate CO_2 emissions for existing year (2013), opening year (2018), and design year (2040) conditions and evaluate potential emissions increases for the Build Alternative. Table 2.7-1 summarizes the modeled emissions by

[7] Barth, M., and K. Boriboonsomsin. 2010. Traffic Congestion and Greenhouse Gases. *TR News* 268, May–June 2010. Available: http://onlinepubs.trb.org/onlinepubs/trnews/trnews268.pdf.

scenario, and compares Build Alternative emissions with No-Build and existing conditions emissions. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions will be because CO_2 emissions are dependent on factors that are not part of the emissions model, such as the fuel mix,[8] rate of acceleration, and aerodynamics and efficiency of the vehicles.

Table 2.7-1. Estimated Greenhouse Gas Emissions from Operation of Mathilda Avenue Improvements Project (metric tons per year)

		Emissions		
Year	**Annual VMT**	**CO_2**	**Other[a]**	**CO_2e**
2013 Baseline	662,218,242	266,191	13,310	279,501
2018 No-Build Alternative	724,741,607	250,062	12,503	262,565
2018 Build Alternative	719,241,931	248,217	12,411	260,628
2040 No-Build Alternative	903,379,794	211,441	10,572	222,014
2040 Build Alternative	882,166,756	206,746	10,337	217,083
Comparison to Existing Conditions				
2018 No-Build Alternative	62,523,365	-16,129	-806	-16,936
2018 Build Alternative	57,023,689	-17,974	-899	-18,873
2040 No-Build Alternative	241,161,552	-54,750	-2,737	-57,487
2040 Build Alternative	219,948,514	-59,445	-2,972	-62,417
Comparison to the No-Build Alternative				
2018 Build Alternative	-5,499,676	-1,845	-92	-1,937
2040 Build Alternative	-21,213,037	-4,695	-235	-4,930

[a] Includes methane (CH_4), nitrous oxide (N_2O), and other trace GHGs emissions emitted by typical passenger vehicles (U.S. Environmental Protection Agency 2015).
CO_2e = carbon dioxide equivalent
VMT = vehicle miles traveled

As shown in Table 2.7-1, implementation of the Build Alternative would result in decreases in GHG emissions when compared to the future No-Build and existing conditions. These decreases are attributed to decreases in vehicle miles traveled (VMT) between the No-Build and Build Alternative conditions.

MTC's 2040 Regional Transportation Plan (RTP)/SCS, *Plan Bay Area*, is a state-mandated, integrated long-range transportation, land-use, and housing plan. *Plan Bay Area* sets forth a regional transportation policy and provides capital program planning for all regional, state, and federally funded projects. In addition, *Plan Bay Area* provides strategic investment recommendations to improve the performance of the regional transportation system over the next 25 years.

[8] EMFAC model emission rates are only for direct engine-out CO_2 emissions, not for full fuel cycle. In addition, fuel cycle emission rates can vary dramatically depending on the amount of additives, such as ethanol, and the source of the fuel components.

The RTP/SCS includes performance objectives to reduce per-capita delay while improving roadway safety. The RTP/SCS would help to reduce congestion by reducing vehicle hours of delay and increasing average network speed. If implemented, the Project would be consistent with the RTP/SCS in this regard, as it is anticipated to help to reduce congestion by reducing vehicle hours of delay and increasing average network speed. The Build Alternative also includes various measures, detailed below, that would reduce the Project's GHG emissions.

The EIR prepared for the RTP/SCS states that while increases in VMT over the planning period are contributing somewhat to the significant cumulative impact of global climate change, the Project's contribution would not be cumulatively considerable. MTC's RTP/SCS identifies four criteria related to the emissions of GHGs to determine if the RTP/SCS would have a potentially significant adverse impact.

1. Fail to reduce per capita passenger vehicle and light duty truck CO_2 emissions by 7 percent by 2020 and by 15 percent by 2035 as compared to 2005 baseline, per SB 375.
2. Result in a net increase in direct and indirect GHG emissions in 2040 when compared to existing conditions.
3. Substantially impede attainment of goals set forth in EO S-3-05 and EO B-16-2012.
4. Substantially conflict with any other applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

MTC, as part of their mitigation, commits to working with the Association of Bay Area Governments, the Bay Conservation and Development Commission, and the Bay Area Air Quality Management District (BAAQMD), through the Joint Policy Committee, to develop green construction policies and best management practices (BMPs) that will reduce impacts related to GHG emissions. Individual projects carried out as part of the RTP/SCS must consider adopting appropriate BMPs that would minimize or eliminate cumulatively considerable impacts related to climate change. BMPs may include using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet; using local building materials for at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials.

One of the main strategies in Caltrans' Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. Consistent with Caltrans requirements, a discussion of how the modal choice for the Project was made in the early planning phases and is included as part of this analysis. There were 18 initial interchange alternatives considered for reducing congestion and GHG emissions through increased efficiency of the local transportation system. Project alternatives were screened based on the ability of each to meet the Project's defined purpose and need, potential for environmental impacts, cost, and ability to provide adequate traffic operation improvements. Transportation Demand Management, Transportation System Management, and Mass Transit alternatives were considered but eliminated from further discussion because the Build Alternative already includes measures to improve accessibility for other modes of travel (bicycle and pedestrian facilities) and would improve traffic signal coordination. Furthermore, implementation of other measures typically included as part of Transportation Demand Management and Transportation System Management alternatives, as well as a stand-alone Mass Transit alternative, would not meet the Project purpose and need.

Construction Emissions

Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase, and their frequency and occurrence can be reduced through innovations in plans and specifications and better traffic management. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by the need for less maintenance and rehabilitation.

The Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model (Version 7.1.5.1) was used to estimate CO_2 emissions from construction activities. The Road Construction Emissions Model does not include emission factors for CH_4 or N_2O for off-road diesel equipment. Emissions of CH_4 and N_2O from diesel-powered equipment were determined by scaling the CO_2 emissions quantified by the ratio of CH_4/CO_2 (0.000056) and N_2O/CO_2 (0.000025) (Climate Registry 2015).

Table 2.7-2 summarizes estimated GHG emissions generated by onsite construction equipment over the 12-month construction period. Measures to reduce construction emissions include maintenance of construction equipment and vehicles, limiting of construction vehicle idling time, and scheduling and routing of construction traffic to reduce engine emissions.

Table 2.7-2. GHG Emissions from Construction of Project (metric tons per year)

CO_2	CH_4	N_2O	CO_2e
971.1	0.05	0.02	977.8
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent			

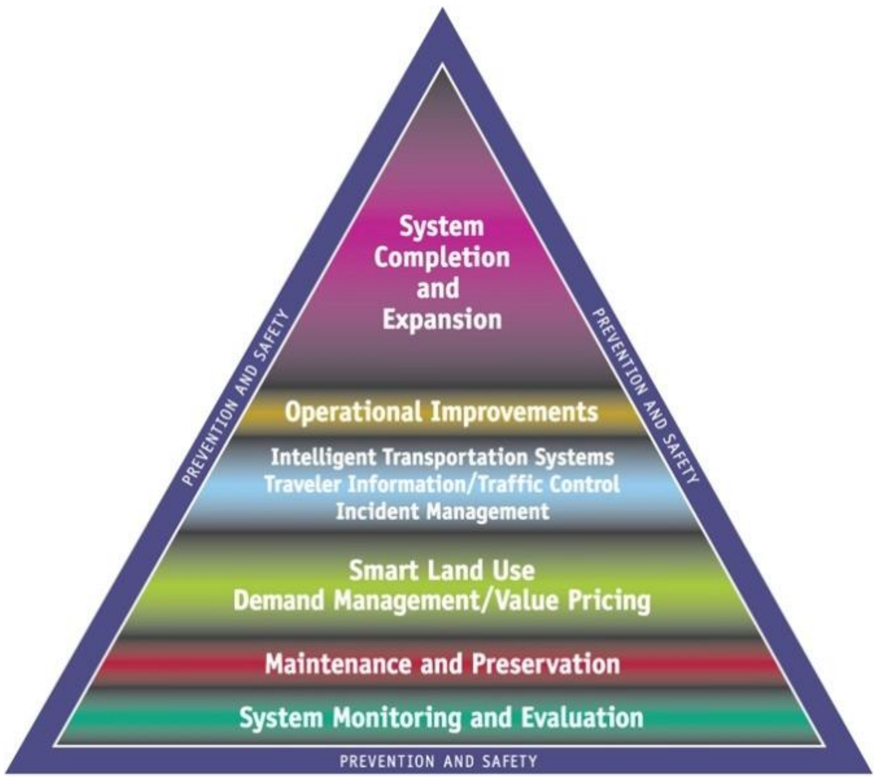
2.7.3.3 CEQA Conclusion

As discussed above, both the 2040 Build Alternative and No-Build Alternative scenarios show decreases in CO_2 emissions over existing levels. GHG emissions for the Build Alternative for both 2020 and 2040 are also lower than the future No-Build emissions (Table 2.7-1). While there are minor short-term construction-related GHG emissions, the operational analysis indicates the Project would result in a net decrease in GHG emissions (Table 2.7-2) that would ultimately offset these temporary increases in construction GHG emissions. It is

Caltrans' determination that in the absence of further regulatory or scientific information related to greenhouse gas emissions and CEQA significance, it is too speculative to make a determination regarding the significance of the Project's direct impact and its contribution on the cumulative scale to climate change. However, Caltrans is firmly committed to implementing measures to help reduce the potential effects of the Project. These measures are outlined in the following section.

2.7.4 Greenhouse Gas Reduction Strategies

Figure 2.7-3. Mobility Pyramid



Caltrans continues to be involved on the Governor's Climate Action Team as the ARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from Former Governor Arnold Schwarzenegger's Strategic Growth Plan for California, which targeted a significant decrease in traffic congestion below 2008 levels and a corresponding reduction in GHG emissions, while accommodating growth in population and the economy. The Strategic Growth Plan relies on a complete systems approach to attain CO_2 reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements, as shown in Figure 2.7-3, *Mobility Pyramid*.

Caltrans is supporting efforts to reduce VMT by planning and implementing smart land use strategies: job/housing proximity, transit-oriented communities, and high-density housing along transit corridors. Caltrans works closely with local jurisdictions on planning activities but does not have local land use planning authority. Caltrans also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, and light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by participating on the Climate Action Team. It is important to note, however, that control of fuel economy standards is held by the U.S. EPA and ARB.

Caltrans is also working towards enhancing the state's transportation planning process to respond to future challenges. Similar to requirements for RTPs under SB 375 (Steinberg 2008), SB 391 (Liu 2009) requires the state's long-range transportation plan to meet California's climate change goals under AB 32.

The California Transportation Plan is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The California Transportation Plan defines performance-based goals, policies, and strategies to achieve our collective vision for California's future, statewide, integrated, multimodal transportation system.

The purpose of the California Transportation Plan is to provide a common policy framework that will guide transportation investments and decisions by all levels of government, the private sector, and other transportation stakeholders. Through this policy framework, the California Transportation Plan 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs.

Table 2.7-3 summarizes Caltrans and other statewide efforts that it is implementing to reduce GHG emissions. More detailed information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Table 2.7-3. Climate Change/Carbon Dioxide Reduction Strategies

Strategy	Program	Partnership: Lead	Partnership: Agency	Method/Process	Estimated CO_2 Savings Million Metric Tons: 2010	Estimated CO_2 Savings Million Metric Tons: 2020
Smart Land Use	Intergovernmental Review	Caltrans	Local governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Transportation System Deployment	Strategic Growth Plan	Caltrans	Regions	State Intelligent Transportation System; Congestion Management Plan	0.07	2.17
Mainstream Energy & Greenhouse Gas into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, California Environmental Protection Agency, Programmatic Agreement, Air Resources Board (ARB), California Energy Commission		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement	0.0045	0.0065
				Biodiesel (B) 20		0.045
				B100		0.0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	0.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5% limestone cement mix	1.2	4.2
				25% fly ash cement mix > 50% fly ash/slag mix	0.36	3.6
Goods Movement	Office of Goods Movement	California Environmental Protection Agency, ARB, Business, Transportation and Housing Agency, Metropolitan Planning Organizations		Goods Movement Action Plan	Not Estimated	Not Estimated
				Total	**2.72**	**18.18**

Caltrans Director's Policy 30 Climate Change (June 22, 2012) is intended to establish a policy that will ensure coordinated efforts to incorporate climate change into Caltrans decisions and activities.

Caltrans Activities to Address Climate Change (April 2013)[9] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

The following measures will also be included in the Project to reduce the GHG emissions and potential climate change impacts from the Project.

1. Landscaping reduces surface warming and, through photosynthesis, decreases CO_2. The Project proposes replanting to the extent feasible where existing landscaping occurs. All areas of ground disturbance due to construction activities will receive permanent erosion control utilizing native seeds and plants. If trees cannot be replaced within the Project site, in-lieu fees will be paid to an appropriate fund so that trees can be planted elsewhere within City limits. These trees will help offset any potential CO_2 emissions increase.
2. According to Caltrans Standard Specifications, the contractor must comply with all local Air Pollution Control District's rules, ordinances, and regulations for air quality restrictions. BAAQMD recommends idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure, California Code of Regulations, Title 13, Section 2485). Clear signage shall be provided for construction workers at all access points.

2.7.5 Adaptation Strategies

Adaptation strategies refer to how Caltrans and others can plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increased storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts on the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration, released its interagency task force progress report on October 28, 2011,[10] outlining the federal government's progress in expanding and

[9] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml
[10] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation

strengthening the Nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including: building resilience in local communities, safeguarding critical natural resources such as freshwater, and providing accessible climate information and tools to help decision-makers manage climate risks.

Climate change adaptation must also involve the natural environment as well. Efforts are underway on a statewide level to develop strategies to cope with impacts on habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, then-Governor Arnold Schwarzenegger signed EO S-13-08 which directed a number of state agencies to address California's vulnerability to sea level rise caused by climate change. This EO set in motion several agencies and actions to address the concern of sea level rise.

In addition to addressing projected sea level rise, the California Natural Resources Agency was directed to coordinate with local, regional, state, and federal public and private entities to develop the California Climate Adaptation Strategy (December 2009),[11] which summarizes the best-known science on climate change impacts on California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across state agencies to promote resiliency.

The strategy outline is in direct response to EO S-13-08, which specifically asked the California Natural Resources Agency to identify how state agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. Numerous other state agencies were involved in the creation of the Adaptation Strategy document, including the California Environmental Protection Agency; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include: Public Health, Biodiversity and Habitat, Ocean and Coastal Resources, Water Management, Agriculture, Forestry, and Transportation and Energy Infrastructure. As data continues to be developed and collected, the state's adaptation strategy will be updated to reflect current findings.

The National Academy of Science was directed to prepare a Sea Level Rise Assessment Report[12] to recommend how California should plan for future sea level rise. The report was released in June 2012 and included the following.

- Relative sea level rise projections for California, Oregon, and Washington, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates.

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[11] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

[12] *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts on state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea level rise.

In 2010, interim guidance was released by The Coastal Ocean Climate Action Team as well as Caltrans as a method to initiate action and discussion of potential risks to the state's infrastructure due to projected sea level rise. Subsequently, the Coastal Ocean Climate Action Team updated the Sea Level Rise guidance to include information presented in the National Academies Study.

All state agencies that are planning to construct projects in areas vulnerable to future sea level rise are directed to consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. Sea level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data

All projects that have filed a Notice of Preparation as of the date of the EO S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines. The Project is outside the coastal zone and direct impacts on transportation facilities due to projected sea-level rise are not expected.

EO S-13-08 also directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level rise affecting safety, maintenance and operational improvements of the system, and economy of the state. Caltrans continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change effects, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able review its current design standards to determine what changes, if any, may be needed to protect the transportation system from sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted in response to EO S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

2.8 Hazardous Waste/Materials

The information in this section is based on the *Initial Site Assessment for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This assessment was approved in January 2016. Please refer to this assessment for a detailed discussion of the information contained in this section.

2.8.1 Regulatory Setting

Hazardous materials including hazardous substances and wastes are regulated by many state and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA). The purpose of CERCLA, often referred to as "Superfund," is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. The RCRA provides for "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include the following.

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order (EO) 12088, Federal Compliance with Pollution Control Standards, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires clean up of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and clean-up of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is found, disturbed, or generated during project construction.

2.8.2 Existing Conditions

The presence and extent of hazardous materials at the Project site was determined by reviewing and evaluating the current physical setting, historical land uses, environmental records, and previous environmental investigations, as well as conducting a site reconnaissance survey. Hazardous materials considered for this analysis include the following.

- Aerially Deposited Lead
- Hazardous Materials Release Sites
- Agricultural Pesticides
- Naturally Occurring Asbestos
- Lead-Based Paint and Asbestos-Containing Material
- Drainage Swales and Catch Basins
- Yellow Thermoplastic/Paint Striping and Markings
- Asphalt and Portland-Cement Concrete Grindings

2.8.2.1 Aerially Deposited Lead

Lead was gradually phased out of use as a gasoline additive beginning in 1973, and by the mid-1980s, leaded gasoline was much less prevalent. Before the 1970s, vehicles emitted approximately 75 percent of the lead consumed in leaded gasoline as particulate matter in exhaust. As a result, shallow soils within approximately 30 feet of the edge of pavement in highway corridors have the potential to be contaminated with aerially deposited lead from historical car emissions prior to the elimination of lead in gasoline.

Based on a review of historical aerial photographs, the intersections of US 101 and SR 237 with Mathilda Avenue were constructed in the late 1960s, before the full phase-out of lead in gasoline. Therefore, exposed shallow soils on the Project site within approximately 30 feet of the edge of pavement may have elevated levels of aerially deposited lead.

2.8.2.2 Hazardous Materials Release Sites

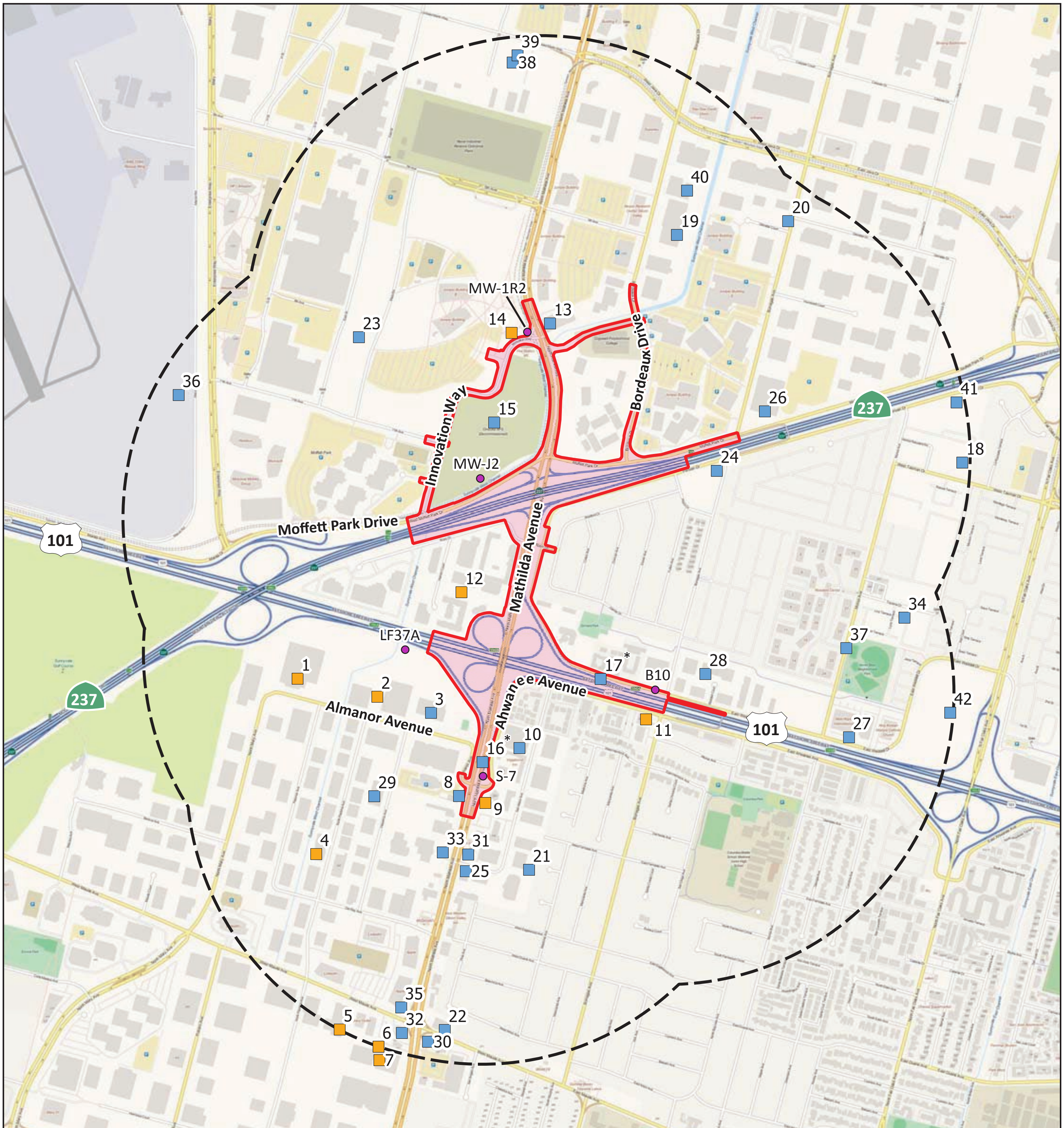
In accordance with ASTM 1527-13, the Initial Site Assessment for the Project reviewed environmental records to identify hazardous materials release sites within 1 mile of the Project. The environmental record sources reviewed were derived from the United States Coast Guard's *National Response Center database*, United States Environmental Protection Agency's *RCRAInfo* database, State Water Resources Control Board's *GeoTracker* database, and Department of Toxic Substances Control's *EnviroStor* database. Site information from each environmental record was imported into a Geographic Information System program to spatially analyze sites within the minimum search distances defined by ASTM E1527-13 relative to the boundary of the Project site.

The spatial analysis identified 42 hazardous materials release sites within 1 mile of the Project site; however, further review of site-specific information indicated that only 10 of the 42 hazardous materials release sites are adjacent to or hydrologically upgradient (south-southwest) of the Project site and may have contaminated groundwater that could potentially impact the Project. None of the 10 release sites of concern are located on parcels that would be acquired by the Project site. Six of the release sites are associated with a regional chlorinated solvent plume, three sites involve leaking underground storage tanks (LUST); and one site involves a release of solvents and metals. The 10 hazardous materials release sites of concern are summarized in Table 2.8-1 and shown on Figure 2.8-1.

Table 2.8-1. Summary of Environmental Records for Hazardous Materials Release Sites with Potential to Impact the Project

Site Name	Address	Type of Release	Status	Environmental Record Source	Corresponding ID Number on Figure 2.8-1
California Microwave	985 Almanor Ave, Sunnyvale	Regional chlorinated solvent plume	Open – Inactive	Cleanup Program Site	1
645/675 Almanor, et al.	645/675 Almanor Ave, Sunnyvale	Regional chlorinated solvent plume	Open – Verification Monitoring	Cleanup Program Site	2
Siemens Microelectronics Inc.	639 North Pastoria Ave, Sunnyvale	Regional chlorinated solvent plume	Open – Remediation	Cleanup Program Site	4
Eaton & Signetics	680 West Maude Ave, Sunnyvale	Regional chlorinated solvent plume	Open – Remediation	Cleanup Program Site	5
Zymos[a]	477 Mathilda Ave N, Sunnyvale	Regional chlorinated solvent plume	Open – Inactive; Needs Evaluation	Cleanup Program Site	6
Maxim Integrated Products Inc.[a]	477 N Mathilda Ave, Sunnyvale	Regional chlorinated solvent plume	Inactive – Needs Evaluation	Corrective Action	7
Shell	776 N Mathilda Ave, Sunnyvale	LUST	Completed – Case Closed	LUST Cleanup Site	9
Wolco Oil Co. (Borregas)	883 Borregas Ave, Sunnyvale	LUST	Completed – Case Closed	LUST Cleanup Site	11
Moffett Park Auto Center	1135 N Mathilda Ave, Sunnyvale	LUST	Completed – Case Closed	LUST Cleanup Site	14
Circo Inc.	940 Hamlin Court, Sunnyvale	Solvents and metals	Inactive – Needs Evaluation	Corrective Action	12

Source: BASELINE Environmental Consulting 2015
Notes:
Site name, address, and status information (including spellings) are taken directly from the regulatory databases.
[a] Maxim Integrated Products Inc. is a former RCRA generator that is listed as an inactive Corrective Action site requiring investigation of potential hazardous materials releases. However, the site is also referred to as "Zymos," which is currently being regulated by the San Francisco Bay Regional Water Quality Control Board. Therefore, Maxim Integrated Products and Zymos are considered the same site.



Legend

Project Limits
0.5-mile Buffer
Release Site with Potential Impact
Release Site with No Impact
Monitoring Well

N

0 750 1500
FEET

*The location of Sites 16 and 17 are approximate.

Base: MapQuest OpenStreetMap, 2015

Source: Release Sites (SWRCB, 2015; DTSC, 2015; and Center for Effective Government, 2015)

Graphics ... 00522.13 (7/19/16)

Figure 2.8-1
Hazardous Materials Release Sites
Mathilda Avenue Improvements at SR 237 and US 101 Project

A co-mingled chlorinated solvent plume originating from the California Microwave, 645/675 Almanor, et al., Litton Applied Technology, Siemens Microelectronics Inc., Eaton & Signetics, Zymos, and Maxim Integrated Products Inc. is located near the Project site. The primary contaminants of concern are tetrachloroethylene, trichloroethylene, and cis-1,2-dichloroethene. The San Francisco Bay Regional Water Quality Control Board is currently overseeing groundwater investigation and cleanup activities at these sites. Depth to groundwater is approximately 7 to 15 feet below ground surface, and groundwater generally flows to the north-northeast. The full extent of the plume(s) has not been defined; therefore, it could potentially extend beneath the Project site at concentrations exceeding groundwater Environmental Screening Levels (ESLs).

Petroleum hydrocarbon releases from three LUSTs (Shell, Wolco Oil Co. [Borregos], and Moffett Park Auto Center) are adjacent to the Project site. The primary contaminants at all three sites include gasoline, benzene, toluene, ethylbenzene, total xylenes, and methyl tert-butyl ether. The Borregos site also includes diesel contamination from diesel fuel. The County of Santa Clara Department of Environmental Health issued closure letters for the Shell and Borregos sites in 2004 and the Moffett Park Auto Center in 2000. However, residual petroleum hydrocarbon contamination remained beneath each site, any of which could potentially extend beneath the Project site at concentrations exceeding groundwater ESLs.

In 1983, at the Circo Inc. site, concentrations of methylene chloride, trichloroethylene, zinc, and trans-1,2-dichloroethene were reported in a groundwater sample at levels exceeding groundwater ESLs. Analytical results suggest that a hazardous materials release occurred on the property, but based on review of the Department of Toxic Substances Control (2015) EnviroStor Database, no additional investigations have been conducted to determine the source and extent of groundwater contamination. Groundwater contaminated by the solvents and metals (if any) could potentially extend beneath the Project site at concentrations exceeding groundwater ESLs.

2.8.2.3 Agricultural Pesticides

Before 1950, inorganic pesticides that contained elevated concentrations of inorganic toxins such as arsenic were commonly used in California agriculture. After 1950, organochlorine pesticides were commonly used in California agriculture until their ban in 1972. Arsenic from inorganic pesticides and residues from organochlorine pesticides from past uses have the potential to persist for many decades in shallow soils and can affect human health and the environment.

Because the Project site was used for agriculture as early as 1939, shallow soils beneath the Project site may be contaminated with arsenic and/or organochlorine pesticides. However, the mixing of soils during excavation and grading activities for construction of the existing roadway and highway alignments through the Project site in the late 1960s may have reduced the concentration of residual pesticides in soils (if any).

2.8.2.4 Naturally Occurring Asbestos

Naturally occurring asbestos occurs in ultramafic rock in California (California Department of Conservation 2015). Geologic mapping from the U.S. Geological Survey does not show any areas likely to contain ultramafic rock on the Project site. Based on U.S. Geological Survey mapping, naturally occurring asbestos in bedrock at the Project site is not a potential hazard during implementation of the Project. However, previous Caltrans projects in Santa Clara County have identified naturally occurring asbestos in soil imported for embankment fill. Therefore, asbestos could potentially be present in embankment fill materials on the Project site.

2.8.2.5 Lead-Based Paint and Asbestos-containing Materials

The US 101 overpass structure at the Project site may be coated with lead-based paint and/or asbestos-containing materials. Lead and asbestos are state-recognized carcinogens, and lead is a reproductive toxicant. Modification of the bridge barriers and sign structure on US 101 for the Project could pose a risk of releasing lead particles and asbestos fibers into the environment if present.

2.8.2.6 Thermoplastic/Paint Striping

Lead chromate has been used in yellow thermoplastic and yellow paint for traffic striping and pavement markers for many years and as recently as 1996 in Caltrans District 4 (where the Project is located). The residue that may be produced from yellow thermoplastic and yellow paint during road improvement activities may contain lead and chromium concentrations that could produce toxic fumes when heated. The debris produced during the removal of yellow thermoplastic and yellow paint may need to be disposed of as a California and/or federal hazardous waste if the concentrations of lead or chromium exceed applicable hazardous waste thresholds for total or soluble concentrations of those metals.

2.8.2.7 Asphalt Cement and Portland Cement Grindings

Grindings of asphalt concrete and Portland-cement concrete are alkaline with a relatively high pH and may contain metals and petroleum hydrocarbons that can impact storm water runoff and threaten surface water bodies.

2.8.2.8 Drainage Swales and Catch Basins

Metals deposited on roadways surfaces from automobile exhaust, tire wear, and brake pad wear can accumulate in storm water catch basins and drainage swales over time. Accordingly, sediments in catch basins and exposed soils in drainage swales on the Project site could contain elevated concentrations of metals and pose a risk to the environment, if disturbed.

2.8.3 Impact Analysis

2.8.3.1 No-Build Alternative

There would be no modification to existing facilities or changes in the existing environment under the No-Build Alternative. No impacts related to hazardous wastes and materials are anticipated.

2.8.3.2 Build Alternative

No operation-period impacts related to hazardous waste or materials are anticipated. Project construction activities could disturb existing hazardous materials in soil, groundwater, and/or roadway structures. Construction impacts related to hazardous wastes and materials would be less than significant with implementation of Avoidance and Minimization Measure HAZ-1, *Prepare Preliminary Site Investigation* and HAZ-2, *Prepare Construction Risk Management Plan*. The hazardous materials concerns applicable to the Project are listed in Table 2.8-2.

Table 2.8-2. Summary of Hazardous Materials Concerns for the Project

Hazardous Materials Concern	Media Affected	Primary Contaminants of Concern
Aerially Deposited Lead	Soil	Lead
Hazardous Materials Release Sites	Groundwater	Petroleum Hydrocarbons, Chlorinated Solvents, Methylene Chloride, and/or Metals
Agricultural Pesticides	Soil	Arsenic and Organochlorine Pesticides
Naturally Occurring Asbestos	Soil	Asbestos
Lead-Based Paint and Asbestos-Containing Material	Construction Material	Lead and Asbestos
Yellow Thermoplastic/Paint Striping and Markings	Roadway Structures	Lead and Chromium
Asphalt and Portland-Cement Concrete Grindings	Roadway Structures	Petroleum Hydrocarbons and Metals
Drainage Swales and Catch Basins	Soil	Metals

Aerially Deposited Lead

Exposed shallow soils on the Project site within approximately 30 feet of the edge of pavement may have elevated levels of aerially deposited lead. Construction activities such as excavation and grading could exacerbate the existing conditions, causing a health risk to the environment and construction workers.

Hazardous Materials Release Sites

Hazardous materials release sites are located within 0.5 mile of the Project site and could potentially extend beneath the Project site at concentrations exceeding groundwater ESLs. The depth to groundwater at the Project site ranges between 7 and 15 feet below ground surface. Excavations for lighting, signals, utility relocations, smaller street signage, and the roadbed would be shallow and are not anticipated to displace potentially contaminated groundwater. Excavations for new overhead signs would require excavations up to 25 feet for the foundations. However, the pile foundations for the signs would be constructed using a cast-in-drill-hole method of construction, which would not require removal or disposal of groundwater. Nevertheless, in the unforeseen event that groundwater is disturbed, contaminants could be released into the environment.

Agricultural Pesticides

Both inorganic pesticides and organochlorine pesticides were likely to have been used at the Project site. Arsenic and residues from organochlorine pesticides are likely to remain as contaminants in the soil. Construction activities such as excavation and grading could exacerbate the existing conditions, causing a health risk to the environment and to construction workers.

Naturally Occurring Asbestos

Consistent with the description of natural occurring asbestos in Section 2.3, *Air Quality*, the disturbance of naturally occurring asbestos in embankment fill during construction activities (e.g., excavation, grading, soil stockpiling) could generate asbestos-containing dust and pose an inhalation hazard for construction workers and the public.

Lead-Based Paint and Asbestos-Containing Materials, Thermoplastic/Paint Striping, and Asphalt Cement and Portland Cement Grindings

The Project includes demolition of roadway structures. Lead-based paint, asbestos-containing material, yellow thermoplastic/paint striping, asphalt and Portland cement grindings, and other hazardous materials could potentially be present in roadway structures that would be demolished.

Drainage Swales and Catch Basins

Catch basins and drainage swales at the Project site could contain elevated levels of metals. The Project would involve excavation, grading, and relocation of these structures, causing a potential health risk to the environment and construction workers.

2.8.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures will be incorporated into the Project during final design and construction, as applicable, to reduce the effects of the impacts discussed above in Section 2.8.3 *Impact Analysis*.

Avoidance and Minimization Measure HAZ-1: Prepare Preliminary Site Investigation

A Preliminary Site Investigation will be conducted prior to construction to investigate hazardous materials concerns related to soil, groundwater, and construction materials on the Project site. Additional investigation may be required to evaluate potential hazardous materials issues if concerns are identified during the Preliminary Site Investigation. All environmental investigations for the Project will be performed in accordance with a Workplan approved by Caltrans. The Workplan will include procedures for collecting and analyzing representative samples from the following areas on the Project site that could be disturbed during construction.

- Shallow exposed soils potentially impacted by aerially deposited lead within 30 feet of Mathilda Avenue and the SR 237 and US 101 on- and off-ramps.
- Groundwater potentially impacted by hazardous materials release sites.
- Shallow soils along the entire Project alignment potentially impacted by arsenic and organochlorine pesticides from former agriculture.
- Soil embankments near bridges and ramps potentially impacted by naturally occurring asbestos.
- Lead-based paint and asbestos-containing materials on the US 101 overpass structure.
- Yellow traffic stripes and pavement markings potentially containing lead and chromium.
- Shallow sediments in drainage swales and catch basins potentially impacted by metals from storm water runoff.

All environmental investigations for the Project will be provided to the construction contractor and any applicable subcontractors to incorporate into their Health and Safety and Hazard Communication programs.

Avoidance and Minimization Measure HAZ-2: Prepare Construction Risk Management Plan

Construction of the Project will be conducted under a project-specific Construction Risk Management Plan (CRMP) to protect construction workers, the general public, and the environment from hazardous materials identified in the Preliminary Site Investigation and/or undocumented sources. The CRMP will incorporate the soil and groundwater analytical data from the Preliminary Site Investigation to ensure that soil and groundwater are stored, managed, and disposed of in a manner protective of human health and the environment, and in accordance with applicable laws and regulations. To address potential groundwater contamination concerns, the CRMP will require all groundwater from dewatering of excavations, if any, to be stored in a tank(s) during construction activities and characterized prior to disposal or recycling. This would be in addition to the pre-characterization of groundwater quality during the Preliminary Site Investigation.

The CRMP will also address the possibility of encountering undocumented sources of contamination in the subsurface by including measures for identifying, testing, and managing soil and groundwater suspected of containing hazardous materials that have not previously been identified at the Project site. The CRMP will describe required worker health and safety provisions for all workers potentially exposed to hazardous materials in accordance with state and federal worker safety regulations and designate personnel responsible for implementation of the CRMP.

In accordance with Caltrans Standard Special Provision 14-11.08, the CRMP will include a Lead Compliance Plan for managing soil with hazardous waste concentrations of aerially deposited lead (if any) based on the findings of the Preliminary Site Investigation. In accordance with Caltrans Standard Special Provision 14-11.12, the Lead Compliance Plan will also describe procedures for managing yellow paint striping and markings on existing roadways with either assumed or known hazardous waste concentrations of lead and/or chromium. The CRMP will also describe procedures for reusing asphalt concrete and Portland-cement concrete grindings on site in accordance with the Regional Water Quality Control Board's guidelines for Caltrans' projects or transporting off site for recycling or disposal.

The costs for special handling and disposal of potentially hazardous materials is estimated to be $56,250. Sampling, testing, and analysis will be conducted during the final design phase and is estimated to have a duration of 2 months. Disposal of hazardous materials will be undertaken as part of Project construction and, depending on the amount of such materials present, will have an estimated duration ranging from several days to several weeks.

2.9 Hydrology and Water Quality

The information in this section is based on the *Water Quality Assessment Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project* and a *Summary of Floodplain Encroachment Technical Memorandum*. The report was approved in February 2016 and the memorandum was approved in December 2015. Please refer to this report for a detailed discussion of the information contained in this section.

2.9.1 Regulatory Setting

2.9.1.1 Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States from any point source[1] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections.

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the United States. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and municipal separate storm sewer systems (MS4).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers.

The goal of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

[1] A point source is any discrete conveyance such as a pipe or a human-made ditch.

2.9.1.2 National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water dischargers, including MS4s. The U.S. Environmental Protection Agency (U.S. EPA) defines an MS4 as any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that are designed or used for collecting or conveying storm water. The State Water Resources Control Board (SWRCB) has identified Caltrans as an owner/operator of an MS4. Prior to 1999, individual NPDES permits were issued by the RWQCBs. On July 15, 1999, SWRCB issued a statewide permit (Order No. 99-06-DWQ) to regulate all discharges from Caltrans MS4s, maintenance facilities, and construction activities (State Water Resources Control Board 2016). This permit covers all Caltrans rights-of-way, properties, facilities, and activities. The SWRCB or the RWQCB issues NPDES permits for 5 years, and permit requirements remain active until a new permit has been adopted. On September 19, 2012, the permit was re-issued (Order No. 2012-0011-DWQ) and has been amended by 2014-0006-EXEC, 2014-0077-DWQ, and 2015-0036-EXEC. The permit contains three basic requirements.

- Caltrans must comply with the requirements of the Construction General Permit (see Section 2.9.1.3).
- Caltrans must implement a year-round program in all parts of the state to effectively control storm water and non-storm water discharges.
- Caltrans’ storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) best management plans (BMPs) to the maximum extent practicable, and other measures as the SWRCB determines to be necessary to meet water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing storm water management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The Project would follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

2.9.1.3 Construction General Permit

The Construction General Permit (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ) was adopted on November 16, 2010, and became effective on February 14, 2011. The permit regulates storm water discharges from construction sites that result in a Disturbed Soil Area of 1 acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1 acre must comply with the provisions of the Construction General Permit. Construction activity that results in soil disturbances of less than 1 acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop storm water pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the permit, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP). In accordance with *Caltrans Standard Specifications*, a Water Pollution Control Plan is necessary for projects with Disturbed Soil Area less than 1 acre.

2.9.1.4 San Francisco Bay Municipal Regional Permit

The MS4 Phase I San Francisco Bay Region Municipal Regional Storm Water NPDES Permit No. CAS612008 (Order No. R2-2015-0049-DWQ) (San Francisco Bay MS4 or MRP), issued on November 19, 2015, became effective on January 1, 2016. Runoff from the Project would discharge to Caltrans' and the City's drainage systems, which are under the Caltrans' MS4 Permit and Urban Phase I MS4 Permit, respectively.

Provision C.3 of the San Francisco Bay MS4 Permit is for new development and redevelopment projects. It requires authorities to include appropriate source control, site design, and storm water treatment measures in new development and redevelopment projects to address both soluble and insoluble storm water runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. Based on project size and/or location, requirements include post-construction storm water treatment measures for most projects with 10,000 square feet or more of impervious surface and post-construction storm water quantity (flow-peak, volume, and duration) controls for projects in certain locations with 1 acre or more of impervious surface.

The Project, considered a Regulated Project under the Municipal Regional Permit, falls within the "Other Redevelopment Projects" category of Provision C.3, which is defined as "any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred." These projects include those that create or replace 10,000 square feet or more of impervious surface.

2.9.1.5 San Francisco Bay RWQCB Basin Plan

The Project is under the jurisdiction of the San Francisco Bay RWQCB. The RWQCB implements the San Francisco Bay Basin Water Quality Control Plan (2015) to regulate surface and groundwater quality in the region. The Plan lists beneficial uses and water quality objectives to protect those uses.

2.9.2 Existing Conditions

2.9.2.1 Local Setting

Surface Water

The Project area is located within the Coyote Watershed (hydrologic unit code 18050003) and within the alluvial plain of the Sunnyvale West Watershed of the Santa Clara Basin (see Figure 2-9.1). No naturally occurring aquatic resources, such as wetlands or non-wetland waters, are present in the Project area. A concrete-lined flood control channel, the Sunnyvale West Channel, is culverted underneath SR 237 at approximately Post Mile 2.80 near Innovation Way and again at Mathilda Avenue about 100 feet south of Innovation Way, where it intersects with the Project area and eventually drains to Guadalupe Slough approximately 2 miles northeast of the Project area. Figure 2.9-1 shows waterways near the Project.

Runoff from the Project is expected to be collected by Caltrans' and the City's drainage systems, which eventually drain to the Sunnyvale West Channel. The channel is approximately 3 miles in length and originates at Maude Avenue as a concrete pipe culvert and becomes an earth-excavated channel downstream of Almanor Avenue to Mathilda Avenue. The channel flows northeast to Guadalupe Slough via Moffett Channel and ultimately drains to San Francisco Bay.

The general water quality objectives established for surface waters within the San Francisco Bay region include bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material, oil and grease, population and community ecology, pH, radioactivity, salinity, sediment, settleable material, suspended material, sulfide, taste and odors, temperature, toxicity, turbidity, and un-ionized ammonia. All urban creeks in the region are subject to a water quality attainment strategy and total maximum daily load for diazinon and pesticide-related toxicity. See the *Water Quality Assessment Report* for the Project for additional information.

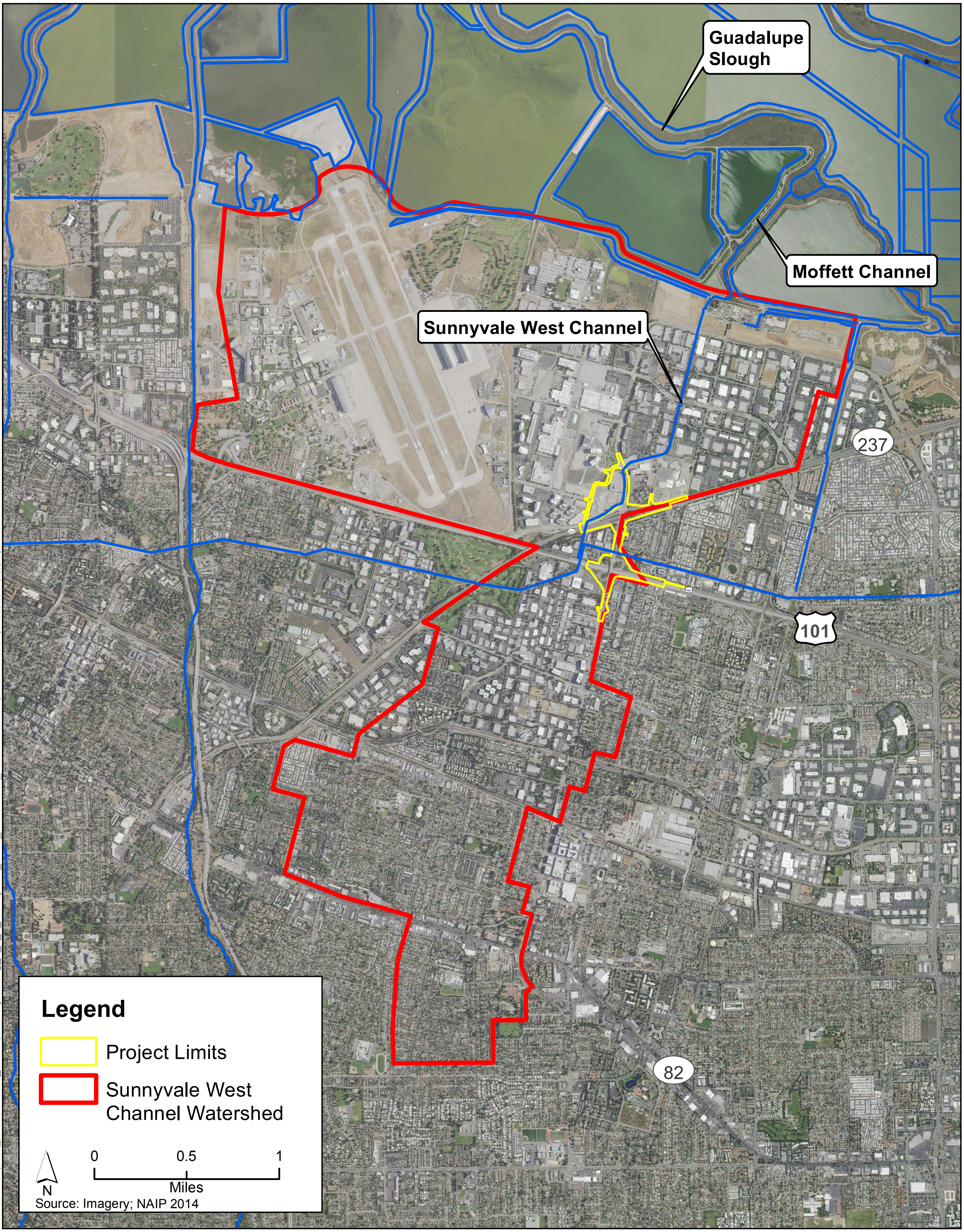


Figure 2.9-1
Sunnyvale West Watershed
Mathilda Avenue Improvements at SR 237 and US 101 Project

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There are no impaired waters listed on the CWA 303(d) list within the Project limits.

Groundwater

The Project area is located within the Santa Clara Valley subbasin (also known as the Coyote Valley Basin) of the larger Santa Clara Valley groundwater basin (Department of Water Resources Basin Number 2-9.02).

The water supply system in Santa Clara County includes groundwater found in aquifers and surface sources such as reservoirs and creeks. The City obtains its drinking water from eight local groundwater wells and from imported water. However, there are no drinking water reservoirs or recharge facilities within the Project limits (WRECO 2016a, 2016b). Based on regional topography and previously measured groundwater levels, groundwater is expected to flow north-northeast across the Project site (WRECO 2016a).

According to GeoTracker, an SWRCB database that tracks discharges of waste to land or unauthorized releases of hazardous substances, there are no leaking underground storage tank cleanup sites, and no history of soil contamination, within the Project site (State Water Resources Control Board 2016). See Section 2.8, *Hazardous Wastes/Materials*, for more information.

The “maintenance of existing high quality of groundwater” is the primary groundwater objective. General water quality objectives established for groundwater within the San Francisco Bay region include bacteria, organic and inorganic chemical constituents, radioactivity, and taste and odors. Additional objectives are established for municipal and agricultural supply.

The Santa Clara Groundwater Sub-basin has the following existing beneficial uses (San Francisco Bay RWQCB 2015).

- Existing municipal and domestic water supply (MUN)
- Potential industrial process water supply (PROC)
- Potential industrial service water supply (IND)
- Existing agricultural water supply (AGR)

Refer to the *Water Quality Assessment Report* for a detailed discussion of groundwater quality objectives.

Flooding

As shown in Figure 2.9-2, the majority of the Project, including SR 237, US 101, and Mathilda Avenue within the Project limits, is not within the Federal Emergency Management Agency (FEMA) 100-year floodplain, but within the 500-year flood-hazard area (Zone X [Shaded]). However, the Sunnyvale West Channel is within the FEMA 100-year floodplain and is subject to tidal flooding from the Bay (Zone AE; Federal Emergency Management Agency 2009). The northern limit of the Project would extend into Zone AE; however, only minor improvements are expected and no major construction is anticipated to occur in the area. Areas within Zone X (Shaded), the FEMA 100- to 500-year floodplain, are areas of moderate flood hazard. Areas within the 500-year flood-hazard area are subject to a 500-year flood, which means that the risk of flooding in any given year is 0.2 percent. Areas within the 100-year flood-hazard area (Zone AE) are subject to a 100-year flood, which means that the risk of flooding in any given year in the designated area is 1 percent.

The Santa Clara Valley Water District maintains the Sunnyvale West flood control channel as well as other flood control creeks and channels in the area. The Sunnyvale West Channel was built to contain a 1 percent annual chance flood. These channels, coupled with the City's storm drains, take the majority of surface run-off to the San Francisco Bay (City of Sunnyvale 2011).

2.9.3 Impact Analysis

Project elements were compared with baseline conditions during construction and/or operations of the Project. Analysis focused on issues related to surface hydrology, flood hazards, groundwater supply, and surface and groundwater quality. Key construction-related impacts were identified and evaluated qualitatively based on the physical characteristics of the Project site and the magnitude, intensity, location, and duration of activities.

2.9.3.1 No-Build Alternative

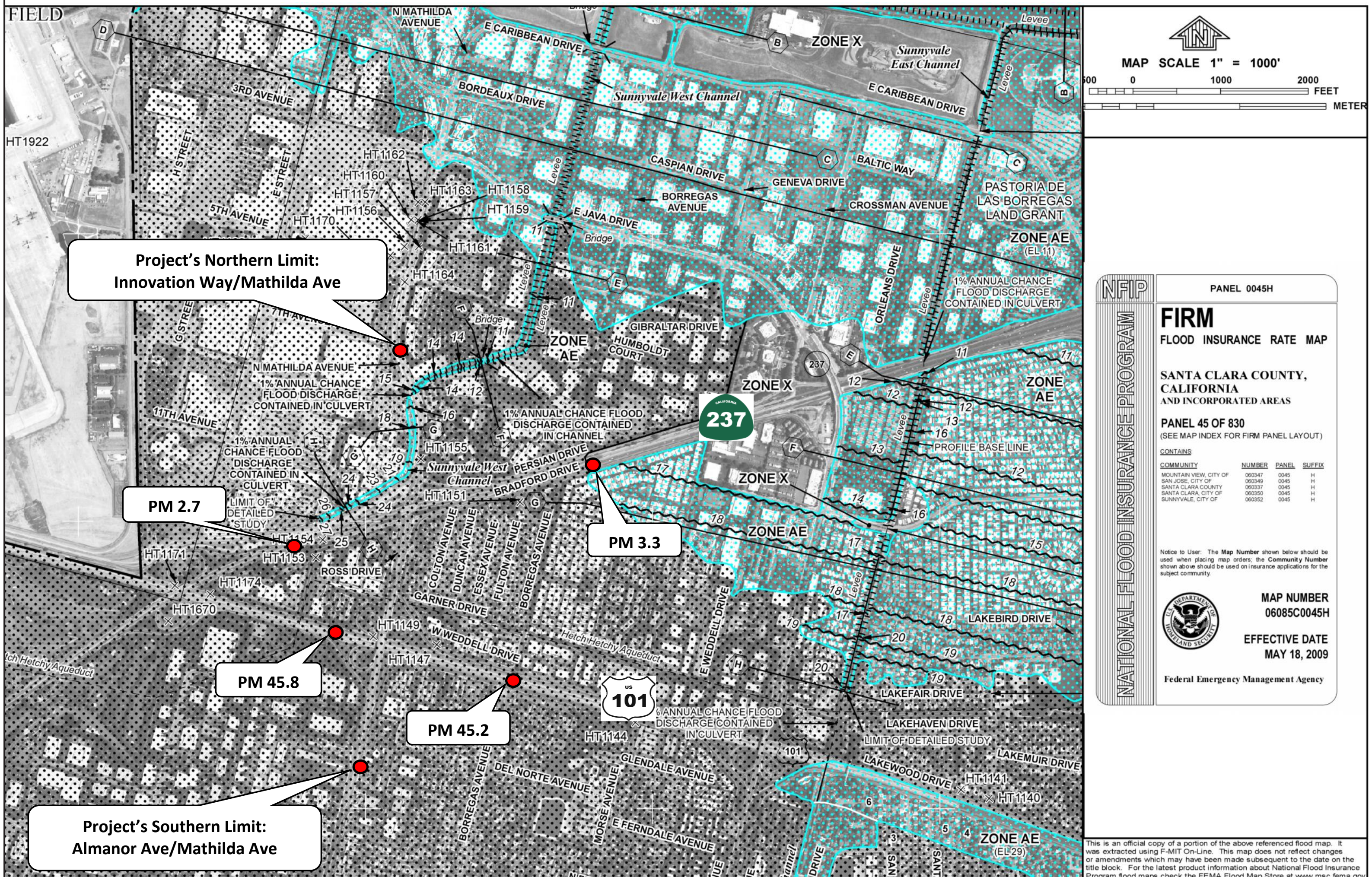
Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to hydrology or water quality are anticipated.

2.9.3.2 Build Alternative

Water Quality and Waste Discharge Requirements

Operation

Operation of new facilities would increase existing levels of pollutants (e.g., trash, oil, grease, pesticides) and introduce additional quantities to storm drains. Operation and maintenance activities of the Project would be similar to existing operation and maintenance activities, such as vehicle use and landscape maintenance. The Project would be required to comply with applicable City and Caltrans regulations, and the Municipal Regional Permit SCVURPPP C.3 Stormwater Technical Guidance. Table 2.9-1 shows that a total of 6.01 acres (261,796 square feet) of impervious cover would be added and reworked for the Build Alternative (WRECO 2016a). However, the Project's impacts related to water quality standards and/or compliance with waste discharge requirements would be less than significant with implementation of pollution prevention BMPs included in Avoidance and Minimization Measure WQ-1, *Implement Best Management Practices*. The Project would not impact any beneficial uses of local water bodies.



LEGEND

Zone AE Base Flood Elevations Determined

Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

Zone X Other Flood Areas

Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

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Figure 2.9-2
FIRM for Santa Clara County, California, and Incorporated Areas
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Table 2.9-1. Disturbed Soil, Existing and Added Impervious, and Reworked Areas

Right-of-Way	Disturbed Soil Area (acre)	Existing Impervious Area (acre)	Added Impervious Area (acre)	Reworked Impervious Area (acre)	Added and Reworked Impervious Area (acre)
Build Alternative					
Caltrans	20	45.5	2	4	6
City of Sunnyvale	0.011	4.5	0.01	0.001	0.011
Total	20.011	50	2.01	4.001	6.011
Source: WRECO 2016a					

Construction

Land-disturbing activities during construction and the placement of stockpiles within proximity to storm drain inlets would result in a temporary increase in sediment loads to Guadalupe Slough and ultimately South San Francisco Bay. All Project construction activities would be subject to existing regulatory requirements. Construction-related impacts on water quality would be less than significant with implementation of BMPs included in Avoidance and Minimization Measure WQ-1, *Implement Best Management Practices*.

Water Supply and Groundwater Recharge

Operation

The Project would not substantially deplete groundwater supplies or substantially interfere with groundwater recharge because it would not increase groundwater demand or decrease groundwater recharge. Compared to the total watershed area (147,267 acres), the increase in impervious surface area would be minimal. As such, the Project's operations-related impact on groundwater supplies and recharge would be less than significant.

Construction

Although dewatering may be necessary during Project construction, the groundwater beneath the Project site is not used for municipal water supply purposes. However, utilities installations and cross culvert extensions or modifications may require dewatering. Should dewatering occur, it would be conducted on a one-time or temporary basis during construction and would not result in a loss of quantity of water that would deplete groundwater supplies. Impacts on groundwater supplies from construction activities would be less than significant.

Drainage, Runoff, and Flooding

Operation

As shown in Table 2.9-1, the Project would result in the creation of 6.01 acres of additional and reworked impervious area for the Build Alternative. As a result, runoff over unpaved surfaces would increase, which would result in the direct discharge of sediments and other pollutants from the roadway to receiving waters. The Project would ultimately reduce the risk of flooding through the incorporation of storm water treatment facilities such as biofiltration strips and bioretention basins, protection of existing vegetation, and storm water infrastructure modifications. Impacts related to erosion, siltation, or flooding on or off site would be less than significant through adherence to the SWPPP and with implementation of BMPs included in Avoidance and Minimization Measure WQ-1, *Implement Best Management Practices*.

Potential short-term water quality impacts from storm water runoff from the Project site during construction may include the transport of pollutants to the Sunnyvale West Channel. Any storm water impacts would be minimized through proper implementation of BMPs, as discussed under Avoidance and Minimization Measure WQ-1, *Implement Best Management Practices*. As such, impacts related to creation or contribution of runoff water that exceeds the capacity of storm water drainage systems would be less than significant.

Construction

Project construction activities would temporarily alter existing drainage patterns and would result in local (on site) and temporary erosion and siltation during the removal or modification of existing storm drains. However, if a storm drain is closed during construction, existing flows would be temporarily re-routed to another nearby storm drain. The temporary facilities would be designed to mimic existing drainage patterns. As previously described, the Project would implement a SWPPP to minimize the potential for erosion and sedimentation in nearby storm drains during construction. Construction impacts related to erosion, siltation, and flooding on and off site would be less than significant with implementation of BMPs included in Avoidance and Minimization Measure WQ-1, *Implement Best Management Practices*.

Flood Hazards

As shown in Figure 2.9-2, the Project is within a 100- to 500-year floodplain, an area of moderate flood hazard, and is not subject to tidal flooding (Flood Zone X [Shaded]). However, the Sunnyvale West Channel is within the FEMA 100-year floodplain and subject to tidal flooding from the Bay (Zone AE). The northern limit of the Project would extend into Zone AE; however, only minor improvements are expected, and no roadway improvements or major construction are anticipated to occur in the 100-year floodplain. Impacts related to flood hazards would be less than significant.

2.9.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance, minimization, and/or mitigation measures will be incorporated into the Project during construction, as applicable, to reduce the effects of the impacts discussed in Section 2.9.3, *Impact Analysis*.

Avoidance and Minimization Measure WQ-1: Implement Best Management Practices

The Project would implement standard Caltrans-approved BMPs to avoid and minimize temporary construction impacts and permanent operational impacts. Any storm water impacts would be addressed through proper implementation of approved design, pollution prevention, and permanent treatment BMPs. Minimum temporary control BMPs that would be necessary for the Project include soil stabilization, sediment controls such as temporary silt fence, and non-storm water management.

As required by the Construction General Permit, a SWPPP will be prepared and implemented prior to construction. The SWPPP is intended to address construction impacts, and must include elements related to erosion and sediment control, non-storm water management, post-construction storm water management, waste management, and disposal and other elements.

Permanent pollution prevention measures include both design pollution prevention BMPs and treatment BMPs. The following design pollution prevention BMPs would be incorporated into the Project design.

- Conserve natural areas, to the extent feasible, including existing trees, stream buffer areas, vegetation, and soils.
- Minimize the impervious footprint of the Project.
- Minimize disturbances to natural drainages.
- Design and construct pervious areas to effectively receive runoff from impervious areas, taking into consideration the pervious areas' soil conditions, slope, and other pertinent factors.
- Implement landscape and soil-based BMPs such as compost-amended soils and vegetated strips and swales.
- Use climate-appropriate landscaping that minimizes irrigation and runoff, promotes surface infiltration, and minimizes the use of pesticides and fertilizers.
- Design all landscapes to comply with state, local, and Caltrans requirements.

In addition to avoidance and minimization measures and BMPs, regulatory requirements and compliance with NPDES and MS4 permits will ensure the Project design and engineering avoids potential impacts on hydrology, water quality, groundwater, and floodplains.

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2.10 Land Use and Recreation

The information in this section is based on the *Community Impact Assessment for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This assessment was approved in May 2016. Please refer to this assessment for a detailed discussion of the information contained in this section.

2.10.1 Existing Conditions

2.10.1.1 Land Use

Existing Land Use

Within the City of Sunnyvale, Mathilda Avenue is a six-lane divided roadway between US 101 and SR 237. Mathilda Avenue is a moderately developed arterial roadway with commercial and industrial uses primarily west of the Project area and residential development primarily east of the Project area (refer to Figure 2.10-1). North of SR 237 and west of Mathilda Avenue is the former Onizuka Air Force Station (currently under development). Farther west of the Project area and adjacent to the SR 237/US 101 interchange is the Moffett Federal Airfield. North of SR 273 and east of Mathilda Avenue is the Moffett Place redevelopment area and the Sheraton Sunnyvale Hotel. South of the Project area are primarily commercial uses. The Project area is served by two VTA light rail train stations, Moffett Park and Lockheed Martin, which are located within the Project area and serve the business district north of SR 237. In addition, VTA operates a local bus service with four bus stops on Mathilda Avenue. Refer to Figure 2.10-2 for existing land uses within the Project area.

Future Land Use

The *City of Sunnyvale General Plan* (General Plan) was updated in July 2011 and guides the City's growth and change through 2025. Specifically, the purpose of the General Plan is to provide guiding goals, policies, and direction for physical development in the City so that the City continues to develop as a vibrant, innovative, and attractive community in which both residents and businesses can thrive. The General Plan designates a large portion of the Project area as Low Density Residential, High Density Residential, Industry, and Industrial Intensification. The General Plan designates the Project area as a potential growth area, including office, industrial, and mixed uses. Enhancements envisioned as part of the General Plan include gateway improvements at SR 237, US 101, and Mathilda Avenue at US 101. This may include distinctive landscaping, artwork, and unique signage to highlight boundaries and gateways.

The City prepared the *Moffett Park Specific Plan* in 2013. It includes a portion of the Project area, located north of SR 237 (City of Sunnyvale 2013). The purpose of this Specific Plan is to maximize Moffett Park development with corporate headquarters, office, and research/development facilities of high technology companies that will represent the next wave of economic growth in Silicon Valley. The Specific Plan also identifies three sub-districts that the City plans to enhance: MP-TOD (parcels within 0.25 mile of an existing light rail train station), MP-I (industrial areas beyond 0.25 mile of an existing transit station), and MP-C (support for commercial services). The Project area is within each of the sub-districts. Enhancements envisioned as part of the Specific Plan include additional arterial connections to the Specific Plan area, localized roadway improvements, and intersection improvements.

Table 2.10-1 and Figure 2.10-3 show current and planned development projects in the Project area. The predominant type of development currently taking place in the City is industrial/office campus development. In addition, several hotel projects are planned.

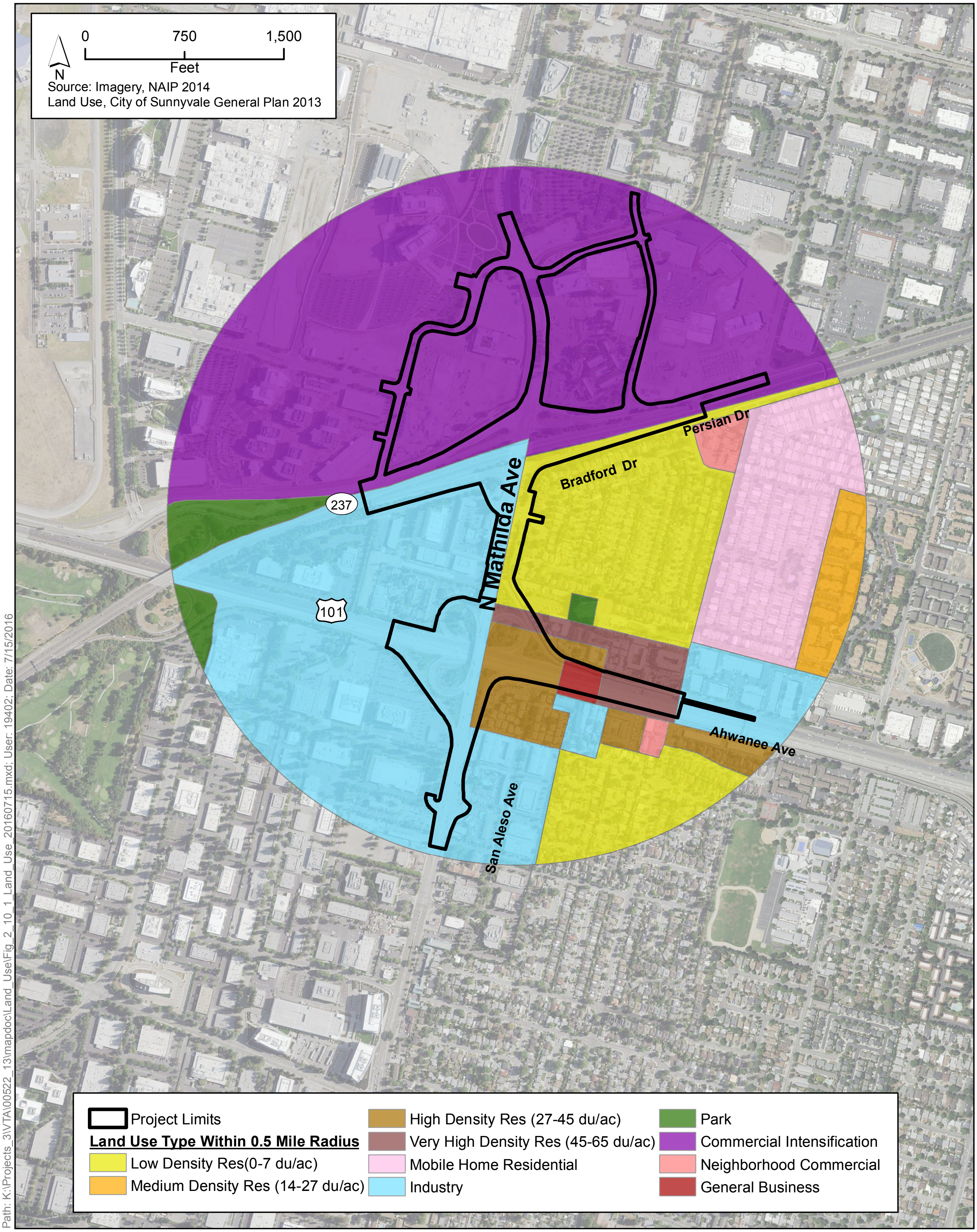

Figure 2.10-1
Study Area Land Uses
Mathilda Avenue Improvements at SR 237 and US 101 Project

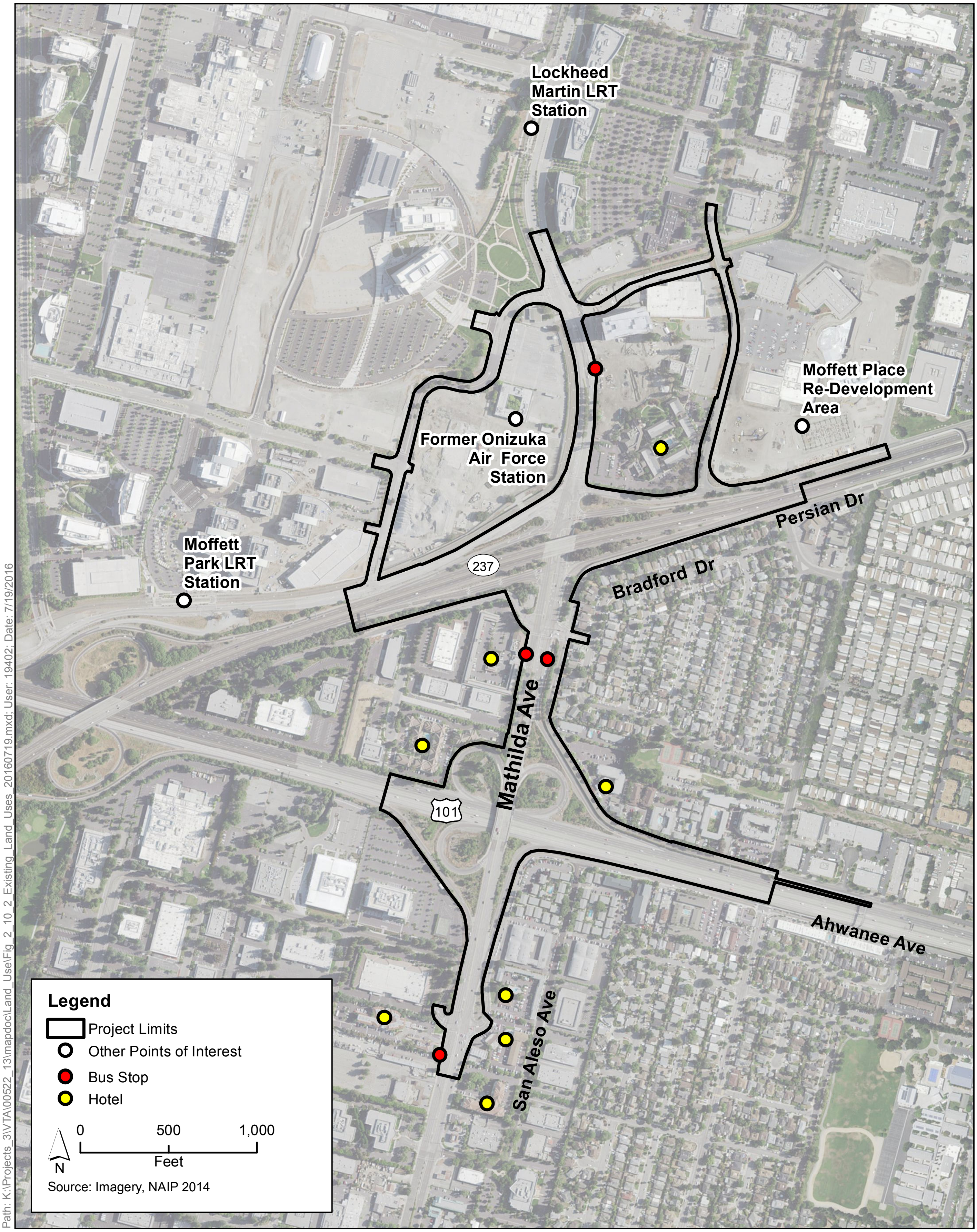

Figure 2.10-2
Existing Land Uses
Mathilda Avenue Improvements at SR 237 and US 101 Project

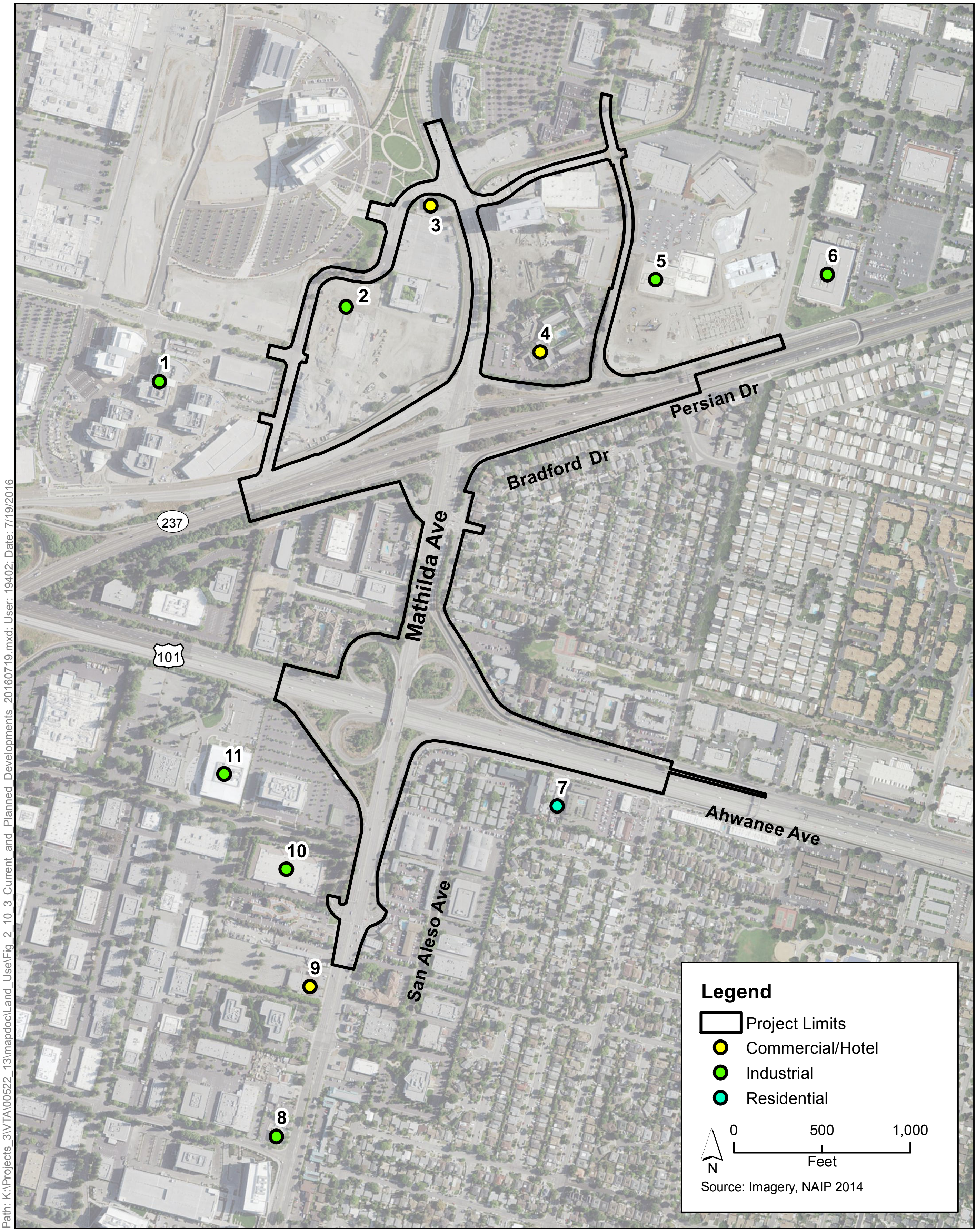

Figure 2-10.3
Current and Planned Development Projects
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Table 2.10-1. Current and Planned Development Projects as of March 2016

Name of Project	Project Status	Project Location	Type of Project	Corresponding ID Number on Figure 2.10-3
Sheraton Sunnyvale Hotel Expansion	Approved	1100 N. Mathilda Avenue	Commercial/Hotel: 139 net new rooms	4
Moffett Towers II	Approved	215 Moffett Park Drive	Industrial: 248,460 square feet	6
Moffett Place	Under Construction	1152 Bordeaux Drive	Industrial: 1.77 million square feet	5
Google Ariba Campus Expansion	Under Construction	807 Eleventh Avenue	Industrial: 200,000 square feet	1
St. Jude Medical Expansion	Approved	645 Almanor Avenue	Industrial: 172,675 square feet	11
520 Almanor Avenue	Under Review	520 Almanor Avenue	Industrial: 207,200 square feet office; 4,000 square feet retail	10
210 W. Ahwanee Avenue	Under Review	210 W. Ahwanee Avenue	Residential: General Plan Amendment—change land use designation from Industrial to Medium Density Residential	7
Foothill De Anza Community College District at Onizuka	Under Construction	1070 Innovation Way	Industrial: 50,000 square feet	2
New Hotel/Former Fire Station Site	Under Review	1120 Innovation Way	Commercial/Hotel: 217 new rooms; 6,300 square feet retail	3
Hilton Garden Inn (Paladium Site)	Under Review	767 N. Mathilda Avenue	Commercial/Hotel: 238 new rooms	9
615 N. Mathilda Avenue; Two Office Buildings	Under Review	615 N. Mathilda Avenue	Industrial: 329,892 square feet	8
Source: City of Sunnyvale 2016				

2.10.1.2 Recreation

The City of Sunnyvale Neighborhood Parks and Open Space Management Program maintains 23 parks comprising over 476 acres, including 25 acres of athletic fields, 177 acres of parkland at Baylands Park, the Sunnyvale Golf Course, Sunken Gardens Nine-Hole Course, Baylands Park Wetlands, and the closed landfill property. It also has formal agreements for use and maintenance of 118 acres of school open space, primarily school athletic fields. Also included in the total open space acreage are 49 acres of public grounds, which include sites such as the orchards and open space surrounding the Community Center and Civic Center campuses (City of Sunnyvale 2015a).

There are a number of parks and recreational resources within 0.25 mile of the Project area, as identified in Table 2.10-2 and on Figure 2.10-4. All other parks within the City are located more than 0.25 mile from the Project site and are not anticipated to be affected by the Project. In addition, although the City of Sunnyvale Bicycle Map does not identify any portion of the Project as a dedicated bike lane, the portion of Mathilda Avenue in the Project area is identified as an advanced bicycle route, and bicycles do utilize the roadway (City of Sunnyvale 2005).

Table 2.10-2. Project Area Parks and Recreational Resources

Park/Recreation Facility	Distance from Project Area (miles)[a]	Corresponding Identification Number on Figure 2.10-4
John W. Christian Greenbelt	0.05	2
Orchard Gardens Park	0.10	1
Columbia Park	0.15	5
Seven Seas Park	0.20	3
Columbia Neighborhood Center	0.20	4

Source: Google Earth Pro 2016
[a] As measured from the nearest Project boundary.

- John W. Christian Greenbelt is an 80-foot-wide, 2.7-mile-long greenbelt above the Hetch Hetchy Aqueduct. The greenbelt extends generally east-west and links Orchard Gardens Park to the east of the Project area and Fairwood Park on the Santa Clara border in Sunnyvale.
- Orchard Gardens Park is a 2-acre park with amenities including tennis courts, a full basketball court, children’s play area, toddler play area, restrooms barbecue pit, bicycle path, fitness equipment, and building rental opportunities (City of Sunnyvale 2015a).
- Columbia Park is a 15-acre park with a swimming pool, children’s play area, restrooms, lighted tennis courts, shuffleboard, and a volleyball court. The adjacent school property contains basketball courts, a par course, and a reservable multi-use field.
- Seven Seas Park was designed as a neighborhood park according to council-approved design guidelines and is intended to primarily serve the local community that is within

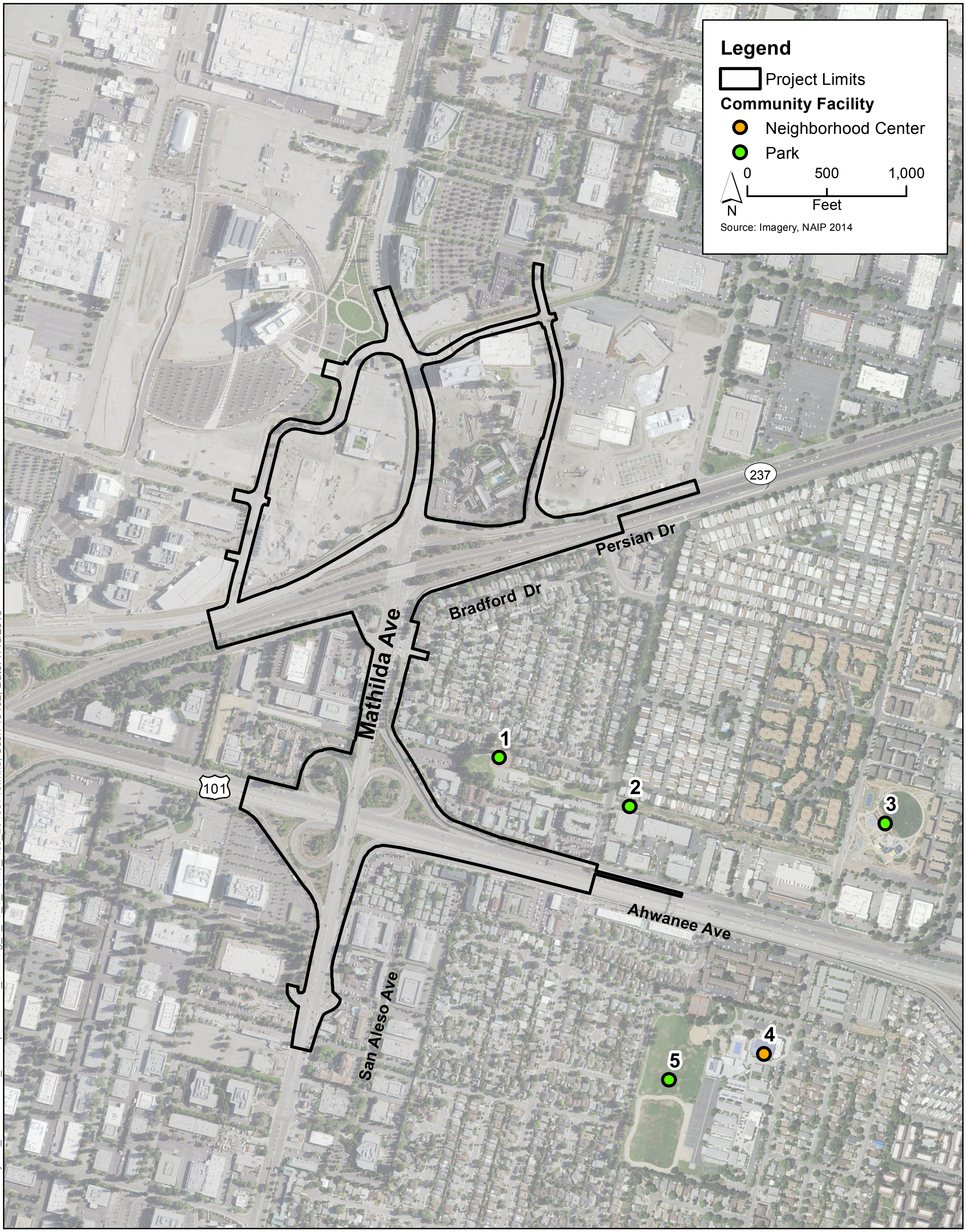

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Figure 2.10-4
Project Area Parks and Recreational Resources
Mathilda Avenue Improvements at SR 237 and US 101 Project

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walking or bicycle distance (City of Sunnyvale 2015a). The park features include a fenced dog park, two playgrounds, half basketball court, tennis court, spray pool, multi-use field, picnic tables, two barbecues, and restrooms.

- The Columbia Neighborhood Center provides social, recreational, and educational services on 25 acres for Sunnyvale residents. The Columbia Neighborhood Center includes a sport and service center building, Columbia Middle School, and the Sunnyvale Preschool Center. The Columbia Neighborhood Center is open to all community residents year round, 7 days a week, including evenings (City of Sunnyvale 2015b).

2.10.2 Consistency with Federal, State, Regional, and Local Plans and Programs

The following discussion provides a list of plans and programs that are applicable to the Project. Refer to Table 2.10-3 for a consistency analysis between the Build Alternative and the No-Build Alternative for each plan or program.

2.10.2.1 Federal Statewide Transportation Improvement Program

The Office of Federal Transportation Management Program is responsible for preparing and managing the Federal Statewide Transportation Improvement Program (FSTIP). The FSTIP is a 4-year statewide intermodal program of transportation projects that is consistent with the statewide transportation plan and planning processes, the metropolitan plans, and the Federal Transportation Improvements Programs. The FSTIP is prepared by Caltrans in cooperation with the Metropolitan Planning Organizations and the Regional Transportation Planning Agencies. The Project is included in the 2015 FSTIP (ID No. SCL130001) and is therefore consistent with the FSTIP.

2.10.2.2 Regional Transportation Plan

The Metropolitan Transportation Commission (MTC) is the agency responsible for planning, coordinating, and financing transportation in the nine-county San Francisco Bay Area. The MTC is responsible for developing a program of projects for the Regional Transportation Plan (RTP), a master strategy for rail and bus transit expansion in the Bay Area.

Plan Bay Area (adopted July 18, 2013) serves as the 2040 RTP for the Bay Area region, as well as the region’s Sustainable Communities Strategy as required under Senate Bill (SB) 375 (Association of Bay Area Governments and Metropolitan Transportation Commission 2013). The Sustainable Communities Strategy is by definition a combined land use and transportation plan. *Plan Bay Area* represents a transportation and land use blueprint of how the Bay Area addresses its transportation mobility and accessibility needs, land development, and greenhouse gas emissions reduction requirements through the year 2040. *Plan Bay Area* presents its purpose and goals, tracks trends, evaluates project performance, details financial assumptions and expenditures, profiles key investments, and sets forth actions for the region to advocate and pursue over the next several years. The Project is included within *Plan Bay Area* (Project No. 240554) and is therefore consistent with the RTP.

2.10.2.3 Valley Transportation Plan

As the Congestion Management Agency for Santa Clara County, VTA developed *Valley Transportation Plan 2040*, a countywide transportation plan that includes policies and programs for roadways, transit, Intelligent Transportation Systems, bicycle and pedestrian facilities, and land use (Santa Clara Valley Transportation Authority 2009). The goal of the *Valley Transportation Plan* is to "provide transportation facilities and services that support and enhance the county's continued success by fostering a high quality of life for Santa Clara County's residents and continued health of Santa Clara County's economy." The Project is identified in the VTA's Valley Transportation Plan 2040 under ID H43, and is therefore consistent with the Valley Transportation Plan.

2.10.2.4 Santa Clara Countywide Bicycle Plan

The *Santa Clara Countywide Bicycle Plan* was adopted by VTA in 2008 and serves to guide the development of major bicycling facilities and improvements within Santa Clara County. The purpose of the Cross County Bicycle Corridor network is to provide continuous connections between Santa Clara County and adjacent counties, and to serve the major regional attractions in Santa Clara County. Bicycle and pedestrian improvements in the Project area would be consistent with the *Santa Clara Countywide Bicycle Plan*.

2.10.2.5 Countywide Trails Master Plan

The Santa Clara County *Countywide Trails Master Plan Update* (Santa Clara County 1995) was developed by the Santa Clara County Parks and Recreation Department with the goal of directing the County's trail implementation efforts. The plan proposed approximately 535 miles of off-street countywide trail routes and 120 miles of on-street bicycle routes within Santa Clara County. The Cross County Bicycle Corridor (*Santa Clara Countywide Bicycle Plan*) network incorporates all regional and subregional trails from the Countywide Trails Master Plan. Bicycle and pedestrian improvements in the Project area would be consistent with the *Countywide Trails Master Plan*.

2.10.2.6 Moffett Federal Airfield Comprehensive Land Use Plan

The *Moffett Federal Airfield Comprehensive Land Use Plan* (Santa Clara County 2012) was developed and adopted by the Airport Land Use Commission and Santa Clara County to ensure that land uses surrounding Moffett Federal Airfield do not affect the airfield's continued operation.

2.10.2.7 City of Sunnyvale General Plan

The following goals and policies from the *City of Sunnyvale General Plan, Land Use and Transportation Element* (City of Sunnyvale 2011) are applicable to the Project.

Goal CC-12: **Maximum access to recreation services, facilities, and amenities.** The City strives to maximize access to all of its services, facilities, and amenities.

Policy LT-1.9: Support flexible and appropriate alternative transportation modes and transportation system management measures that reduce reliance on the automobile and serve changing regional and citywide land use and transportation needs.

Goal LT-4: **Quality neighborhoods and districts.** Preserve and enhance the quality and character of the City's industrial, commercial, and residential neighborhoods by promoting land use patterns and related transportation opportunities that are supportive of the neighborhood concept.

Policy LT-4.5: Support a roadway system that protects internal residential areas from citywide and regional traffic.

Policy LT-4.10: Provide appropriate site access to commercial and office uses while preserving available road capacity.

Goal LT-5. **Effective, safe, pleasant, and convenient transportation.** Attain a transportation system that is effective, safe, pleasant, and convenient.

Policy LT-5.5: Support a variety of transportation modes.

Policy LT-5.8: Provide a safe and comfortable system of pedestrian and bicycle pathways.

Policy LT-5.9: Appropriate accommodations for motor vehicles, bicycles, and pedestrians shall be determined for city streets to increase the use of bicycles for transportation and to enhance the safety and efficiency of the overall street network for bicyclists, pedestrians, and motor vehicles.

Policy LT-5.10: All modes of transportation shall have safe access to city streets.

Policy LT-5.20: If street configurations do not meet minimum design and safety standards for all users, than standardization for all users shall be priority.

Policy LT-5.21: Safety considerations of all modes shall take priority over capacity considerations of any one mode.

The Project is included in the City's *Capital Improvement Program for Fiscal Year 2013/2014* as Project No. 826890, and is therefore consistent with the City's General Plan.

2.10.2.8 City of Sunnyvale Bicycle Plan

The City adopted the *Sunnyvale Bicycle Plan* in 2006 in order to continue the development of bike infrastructure, practices, and policies intended to provide a convenient transportation alternative to motor vehicles. The goals of the program include continued build-out of the bikeway network to facilitate commute and recreational trips, support of bicycle-friendly environments for City government and workplaces, and continuation of effective law enforcement.

The following goals and policies from the *Sunnyvale Bicycle Plan* (City of Sunnyvale 2006) are applicable to the Project.

Policy BP.A1: Facilitate safe, efficient, and convenient access of bicyclists to transit.

Policy BP.A2: Facilitate safe, efficient, and convenient access of student bicyclists to schools.

Policy BP.A5: Facilitate bicycling to workplaces.

Policy BP.B4: Ensure that the City’s new and existing bikeways conform to the latest county, regional, state, and federal design standards and guidance.

Bicycle and pedestrian improvements in the Project area would be consistent with the *City of Sunnyvale Bicycle Plan*.

2.10.2.9 Moffett Park Specific Plan

The City adopted the *Moffett Park Specific Plan* (MPSP) in April 2004 and amended it in 2013 to facilitate and encourage development within the Moffett Park area. The MPSP sets forth goals and objectives for future development, provides community and design guidelines, specifies necessary infrastructure improvements, and establishes development standards. The MPSP encourages development such as corporate headquarters, office uses, and high technology research/development facilities.

The following Guiding Principles of the MPSP's Development Plan are applicable to the Project.

Guiding Principle 7.0: Enhance pedestrian accessibility.

Guiding Principle 8.0: Increase utilization of public transit through coordinated land use, transportation, and infrastructure planning.

The following land use objective of the MPSP's Development Plan is applicable to the Project.

Objective LU-1: Coordinate land use planning within Moffett Park with transportation planning.

The following circulation and transportation objectives of the MPSP's Development Plan are applicable to the Project.

Objective CIR-2: Provide for improved pedestrian and bicyclist mobility within the MPSP area.

Objective CIR-4: Ensure future Level of Service standards within the MPSP area do not exceed adopted citywide standards.

Objective CIR-6: Provide consistency with the citywide Transportation Strategic Program.

The Project is consistent with the guiding principles and objectives in the MPSP.

Table 2.10-3. Consistency with State, Regional, and Local Plans and Programs

Policy	Build Alternative	No-Project Alternative
Plan Bay Area		
	Consistent. The Project is included in *Plan Bay Area*, and provides necessary infrastructure improvements for planned and expected community growth.	**Not consistent.** The Project is included in *Plan Bay Area*; therefore, the No-Build Alternative would not be consistent.
Valley Transportation Plan		
	Consistent. The Project is included in *Valley Transportation Plan*, and provides necessary infrastructure improvements for planned and expected community growth.	**Not consistent.** The Project is included in *Valley Transportation Plan*; therefore the No-Build Alternative would not be consistent.
Santa Clara Countywide Bicycle Plan		
	Consistent. Improvements to bicycle infrastructure included in the Project would be consistent with *Santa Clara Countywide Bicycle Plan*.	**Not consistent.** The No-Build Alternative would not facilitate safe bicycle travel through the area of the Proposed Project. Currently, the City advises that only experienced cyclists use Mathilda Avenue.
Countywide Trails Master Plan		
	Consistent. Bicycle and pedestrian improvements included as part of the Project would be consistent with the *Countywide Trails Master Plan*.	**Consistent.** The No-Build Alternative would not significantly affect the amount of on-street bicycle routes within Santa Clara County, and would thus be consistent.

Policy	Build Alternative	No-Project Alternative
Moffett Federal Airfield Comprehensive Land Use Plan		
	Consistent. The Project would not affect the airfield's continued operation, and would therefore be consistent.	**Consistent.** The No-Project Alternative would not affect the airfield's continued operation.
City of Sunnyvale General Plan		
Goal CC-12: Maximum access to recreation services, facilities, and amenities.	**Consistent.** The Project would provide increased accessibility al all local destinations.	**Not consistent.** The No-Build Alternative would not increase accessibility to the areas surrounding the Project.
P*olicy LT-1.9: Support flexible and appropriate alternative transportation modes and transportation system management measures that reduce reliance on the automobile and serve changing regional and citywide land use and transportation needs.*	**Consistent.** Improvements and additions to bicycle and pedestrian infrastructure would reduce reliance on automobiles.	**Not consistent.** The No-Build Alternative would not provide improvements or additions to bicycle and pedestrian infrastructure. The No-Build Alternative would not reduce reliance on automobiles.
Goal LT-4: Quality neighborhoods and districts. Preserve and enhance the quality and character of the City's industrial, commercial, and residential neighborhoods by promoting land use patterns and related transportation opportunities that are supportive of the neighborhood concept. *Policy LT-4.5: Support a roadway system that protects internal residential areas from citywide and regional traffic.*	**Consistent.** The Project would preserve and enhance the quality and character of the surrounding Project area. The Project would provide roadway system improvements that would alleviate and protect internal residential areas from citywide or regional traffic.	**Not consistent.** The No-Build Alternative would preserve but would not enhance the quality and character of the surrounding Project area. The No-Build Alternative would not provide roadway system improvements that would protect internal residential areas from citywide or regional traffic.

Policy	Build Alternative	No-Project Alternative
Policy LT-4.10: Provide appropriate site access to commercial and office uses while preserving available road capacity. *Goal LT-5. Effective, safe, pleasant, and convenient transportation. Attain a transportation system that is effective, safe, pleasant, and convenient.* *Policy LT-5.5: Support a variety of transportation modes.* *Policy LT-5.8: Provide a safe and comfortable system of pedestrian and bicycle pathways.* *Policy LT-5.9: Appropriate accommodations for motor vehicles, bicycles, and pedestrians shall be determined for city streets to increase the use of bicycles for transportation and to enhance the safety and efficiency of the overall street network for bicyclists, pedestrians, and motor vehicles.* *Policy LT-5.10: All modes of transportation shall have safe access to city streets.*	**Consistent.** Roadway improvements associated with the Project would enhance transportation for vehicles, bicycles, and pedestrians. Pedestrians and cyclists would benefit from increased safety. The Project would provide enhanced access to commercial and office uses.	**Not consistent.** The No-Build Alternative would not provide roadway improvements that would enhance transportation for vehicles, bicycles, and pedestrians. Therefore, pedestrians and cyclists would not benefit from increased safety. The No-Build Alternative would not provide enhanced access to commercial and office uses.
Policy LT-5.20: If street configurations do not meet minimum design and safety standards for all users, than standardization for all users shall be priority. *Policy LT-5.21: Safety considerations of all modes shall take priority over capacity considerations of any one mode.*	**Consistent.** All street configurations would meet minimum design and safety standards. The Project would enhance safety for all users.	**Not consistent.** Currently, pedestrian and bicycle facilities through the Project area are discontinuous. The No-Build Alternative would continue to provide unsafe conditions for pedestrians and cyclists.
Moffett Park Specific Plan		
Guiding Principle 7.0: Enhance pedestrian accessibility. *Objective CIR-2: Provide for improved pedestrian and bicyclist mobility within the MPSP area.*	**Consistent.** Improvements to pedestrian and bicycle facilities would enhance mobility and accessibility to all local destinations.	**Not consistent.** The No-Build Alternative would not enhance pedestrian accessibility around the Project area.
Guiding Principle 8.0: Increase utilization of public transit through coordinated land use, transportation, and infrastructure planning. *Objective LU-1: Coordinate land use planning within Moffett Park with transportation planning.*	**Consistent.** The Project would provide coordinated transportation planning for vehicles, pedestrians, bicycles, and transit. Increased access to transit for bicycles and pedestrians would benefit transit utilization.	**Not consistent.** The No-Build Alternative would not provide coordinated transportation planning for vehicles, pedestrians, bicycles, and transit.

Policy	Build Alternative	No-Project Alternative
Objective CIR-4: Ensure future Level of Service standards within the MPSP area do not exceed adopted citywide standards.	**Consistent.** The Project would improve Level of Service throughout the MPSP area.	**Not consistent.** Under the No-Build Alternative, Level of Service would continue to deteriorate as populations grow.
Objective CIR-6: Provide consistency with the citywide Transportation Strategic Program.	**Consistent.** The Project is included in the Transportation Strategic Program, therefore the Project would be consistent.	**Not consistent.** The Project is included in the Transportation Strategic Program; therefore, the No-Build Alternative would not be consistent.
City of Sunnyvale Bicycle Plan		
Policy BP.A1: Facilitate safe, efficient, and convenient access of bicyclists to transit. *Policy BP.A2: Facilitate safe, efficient, and convenient access of student bicyclists to schools.* *Policy BP.A5: Facilitate bicycling to workplaces.* *Policy BP.B4: Ensure that the City's new and existing bikeways conform to the latest county, regional, state, and federal design standards and guidance.*	**Consistent.** Enhancements to bicycle infrastructure, provided by the Project, would increase cyclist safety and decrease travel times by providing more direct routes.	**Not consistent.** The No-Build Alternative would not facilitate safe bicycle travel through the area of the Proposed Project. Currently, the City advises that only experienced cyclists use Mathilda Avenue.

2.10.2.10 Relocation and Real Property Acquisition

Caltrans' Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, et seq.).

2.10.3 Impact Analysis

This section evaluates the potential impacts on land use and recreational facilities associated with both construction and operation of the Project. As discussed in Section 2.4, *Biological Resources*, there are no adopted habitat conservation plans or natural community conservation plans applicable to the Project site. Therefore, the Project would not conflict with an applicable habitat conservation plan or natural community conservation plan and this topic is not discussed further.

The *Community Impact Assessment* (ICF International 2016) followed the guidance provided in the Caltrans *Environmental Standard Environmental Reference* (Caltrans 2014) and the

Caltrans *Community Impact Assessment Standard Environmental Reference: Environmental Handbook Volume 4* (Caltrans 2011). Methods to determine impacts included review of local land use plans, existing and planned land uses and zoning, current development trends, past development trends, and state and local government plans and policies on land use.

2.10.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to land use and recreation are anticipated. However, in comparison to the Build Alternative, the No-Build Alternative would not support development and enhancement of transportation improvements in the Project area, including provision of bicycle/pedestrian facilities, safety, and accessibility to all travel modes.

2.10.3.2 Build Alternative

Division of an Established Community

The Project would improve access and mobility along the SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchanges. The Project does not include any features that would divide the existing community (such as construction of a barrier or roadway closure). As such, implementation of the Project would improve the existing community cohesion within the Project area. The Project includes implementation of a Traffic Management Plan (refer to Section 2.14, *Traffic/Transportation* and TRF-1: *Prepare a Transportation Management Plan*), to manage construction-related disruptions related to the operation of construction equipment in the Project area, partial and/or complete lane and ramp closures, and construction work conducted along sidewalks and pedestrian crossings. As such, implementation of the Project would have no impacts related to division of an established community.

Consistency with State, Regional, and Local Plans and Programs

As described above in Section 2.10.2, *Consistency with Federal, State, Regional, and Local Plans and Programs*, the Project would be consistent with all applicable land use plans and policies relevant to the Project.

Relocation and Real Property Acquisition

Under the Build-Alternative, the Project would require temporary construction easements of six properties, public access easements of two properties, partial acquisition of one property, and ownership transfer of three properties. The descriptions and locations of each property are found in Table 2.10-4. Any acquired property would be purchased at fair market value. Businesses would receive relocation assistance in accordance with Caltrans' RAP. This information is presented in this document in accordance with §15131 of the CEQA Guidelines.

Table 2.10-4. Proposed Right-of-Way Acquisitions

Assessor Parcel Number (APN)	Property Owner	Temporary Construction Easement (TCE)[a]	Public Access Easement[b]	Partial Acquisition	Ownership Transfer[c]
204-01-013	PSS Enterprises Inc. (Shell Station) 776 N. Mathilda Ave. Sunnyvale, CA 94085	1,600 square feet (sf)/ 0.036 acre (ac)	-	-	-
165-43-019	Burger King 773 N. Mathilda Ave. Sunnyvale, CA 94085	370 sf/0.008 ac	-	-	-
110-08-025	Pappas, Louis G and Effie 502 Ross Dr. Sunnyvale, CA 94089	324 sf/ 0.007 ac	-	-	-
110-27-025	W2005 New Century Hotel Portfolio LP (Sheraton Sunnyvale Hotel) 1108 N. Mathilda Ave. Sunnyvale, CA 94089	11,293 sf/ 0.259 ac	-	2,383 sf/ 0.055 ac	-
N/A Moffett Park Dr. East of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave. Sunnyvale, CA 94086	-	-	-	43,774 sf/ 1.005 ac
N/A Innovation Way	Foothill-De Anza Community College 12345 El Monte Road Los Altos Hills, CA 94022	170,875 sf/ 3.923 ac	170,875 sf/ 3.923 ac	-	-
N/A Innovation Way	Moffett Place LLC 1183 Borregas Ave. Sunnyvale, CA 94089	41,226 sf/ 0.946 ac	41,226 sf/ 0.946 ac	-	
N/A Moffett Park Dr. West of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave. Sunnyvale, CA 94086	-	-	-	4,798 sf/ 0.11 ac
N/A W. Weddell Dr. East of Mathilda Ave.	City of Sunnyvale 456 W. Olive Ave. Sunnyvale, CA 94086	-	-	-	1,322 sf/0.030 ac

[a] Square footages are subject to change during subsequent engineering phases.

[b] A public access easement allows the general public to use a street that passes through private property.

[c] A transfer of ownership of street or highway between the City and a state agency, pursuant to Section 83 of the California Streets and Highway Code.

Source: VTA Real Estate 2016.

2.10.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.11 Noise and Vibration

The information in this section is based on the *Noise Study Report for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This report was approved in April 2016. Please refer to this report for a detailed discussion of the information contained in this section.

Noise is measured in decibels (dB), which is a numerical expression of sound levels on a logarithmic scale. An A-weighted decibel (dBA) is the unit used to measure sound levels for a typical human ear. Thus, traffic noise impact analyses commonly use A-weighted decibels. Caltrans uses the 1-hour A-weighted equivalent sound level (L_{eq}) to measure traffic noise, which is an average of A-weighted sound energy over a 1-hour period.

With regard to traffic-generated noise, noise levels rise as vehicle speeds, overall traffic volumes, and truck volumes increase. In general, a doubling of traffic results in a 3 dBA increase in noise at a nearby receptor, assuming a relatively homogeneous traffic composition (i.e., mainly passenger cars). The peak noise hour is typically not the peak commute hour due to lower operating speeds during the latter. The combination of volumes and speeds that produces the peak noise hour is that which is associated with level of service (LOS) C/D[1] (refer to Section 2.14, *Transportation/Traffic*, for a comprehensive description of LOS).

2.11.1 Regulatory Setting

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. For reader reference, Table 2.11-1 summarizes typical A-weighted sound levels associated with common activities. A sound change of less than 3 dB is just barely perceptible, and then only in the absence of other sounds.

[1] Level of service or LOS is a qualitative measure of operating conditions within a traffic stream, and the perception by motorists and/or travelers. LOS C/D describes a traffic condition of vehicular congestion and delay (resulting in higher noise conditions compared to free-flowing traffic conditions).

Table 2.11-1. Typical A-Weighted Sound Levels

Common Outdoor Noise Source	Sound Level (dBA)	Common Indoor Noise Source
	— 110 —	Rock band
Jet flying at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower at 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher in next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing
Source: Caltrans 2013a.		

2.11.1.1 Operation

In accordance with Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol) (Caltrans 2011), a noise impact occurs when the design year noise level with the project results in a substantial increase in noise level. Based on the State CEQA Guidelines, Caltrans identifies significant noise impacts if a substantial permanent increase in noise levels is predicted in the project vicinity above levels existing without the project.

2.11.1.2 Construction

The 2011 Protocol specifies the policies, procedures, and practices to be used for a noise analysis under CEQA. Key considerations include the uniqueness of the setting, the sensitive nature of the noise receptors, the magnitude of the noise increase between existing conditions and project conditions, the number of residences affected, and the absolute noise level.

2.11.2 Existing Conditions

Land uses within the Project area consist of a mix of single- and multi-family residential uses, hotels, recreational areas, and commercial uses (including restaurants and offices). Single-family residences are located east of Mathilda Avenue, along West Weddell Drive and Persian Drive.

This existing conditions analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences and hotels, outdoor recreational areas, or restaurant outdoor dining areas. Commercial buildings with no outdoor areas that are used frequently by tenants are not included. The locations of existing sound walls in the Project area are shown on Figure 2.11-1. Existing sound walls range from approximately 8 to 14 feet in height, and are constructed of concrete blocks or brick.

The primary source of noise that currently affects land uses in the Project area is traffic on the SR 237 and US 101 freeways, as well as traffic on Mathilda Avenue. Secondary sources of noise include traffic on other local residential streets, operations at commercial properties in the area (e.g., parking lot activities), day-to-day neighborhood noise such as landscaping activities, and distant aircraft flyovers.

In order to document the existing noise environment, short- and long-term noise measurements were conducted between December 8 and December 9, 2015. Noise measurements were taken in order to evaluate existing noise levels, assess potential Project-related noise impacts on the surrounding area, and identify the diurnal traffic noise patterns throughout a typical day/night cycle.

2.11.2.1 Short-Term Noise Measurements

Existing short-term noise levels were measured between 11:14 a.m. and 2:57 p.m. on Tuesday, December 8, 2015; and between 10:31 a.m. and 11:35 a.m. on Wednesday, December 9, 2015.

Short-term measurements were taken at nine sites: ST-1 through ST-9, as depicted on Figure 2.11-1. Measurements ST-2 and ST-6 were taken directly at areas of frequent human use. All other measurements were taken adjacent to areas of frequent human use associated with single- and multi-family residences, hotels, and a park. All measurements were taken at a height of 5 feet. At each location, one measurement of 15 minutes in duration was obtained.

The L_{eq} values collected during each measurement period (15 minutes in length) were automatically recorded with a digital integrating sound level meter and subsequently logged manually on field data sheets for each measurement location. Dominant noise sources observed and other relevant measurement conditions were also identified and logged manually on the field data sheets. In all cases, traffic noise was the dominant contributor to the measured noise levels. The results of the short-term noise measurements are provided in Table 2.11-2. As shown, measured noise levels varied from approximately 62 dBA L_{eq} at ST-6 to 69 dBA L_{eq} at ST-1 (when rounded to the nearest whole number).

Table 2.11-2. Short-Term Sound Level Measurement Results

Location Number, Address, Description	Date, Time	Measured L_{eq}, dBA
ST-1: 736 N. Mathilda Avenue; near hotel parking lot entrance	12/08/2015, 11:14 a.m.–11:29 a.m.	68.7
ST-2: 505 Almanor Avenue; at basketball court	12/08/2015, 11:14 a.m.–11:29 p.m.	64.3
ST-3: 900 Hamlin Court; in hotel parking lot	12/08/2015, 11:48 a.m.–12:03 p.m.	67.2
ST-4: 504 Ross Drive; in hotel parking lot	12/09/2015, 10:31 a.m.–10:46 a.m.	62.6
ST-5: 1039 Bradford Drive; along West Weddell Drive (behind residence)	12/08/2015, 1:57 p.m.–2:13 p.m.	64.0
ST-6: 1067 Bradford Drive; backyard of residence	12/08/2015, 1:57 p.m.–2:12 p.m.	61.5
ST-7: 297 Bradford Drive; along Persian Drive (behind residence)	12/08/2015, 2:57 p.m.–3:12 p.m.	65.1
ST-8: 1100 N. Mathilda Avenue; near hotel parking lot	12/08/2015, 2:57 p.m.–3:12 p.m.	64.3
ST-9: 1130 N. Mathilda Avenue; near parking lot	12/09/2015, 11:20 a.m.–11:35 a.m.	66.1

2.11.2.2 Long-Term Noise Measurements

Long-term measurements (i.e., measurements taken at 5-minute intervals for approximately 36 hours) were taken at two locations: LT-1 and LT-2 (shown in Figure 2.11-1). The LT-1 monitor was affixed to a telephone pole near the property line on the northwest corner of the 869 San Aleso Avenue apartment complex, approximately 200 feet south of the US 101 mainline. The LT-2 monitor was affixed to a telephone pole near the property line of the residence at 1087 Bradford Drive along Persian Drive, approximately 300 feet south of the SR 237 mainline. These locations were chosen for the following reasons: (1) they are located in areas of the alignment that would be most directly affected by the Project; (2) they were accessible without requiring access to private property; and (3) they were obscured from public view, which helped to minimize the risk of theft or tampering. The results of the long-term noise measurements are provided in Table 2.11-3.

Table 2.11-3. Long-Term Sound Level Measurement Results

Location Number, Description	Date, Time	Measured Noise Levels, dBA
		L_{eq} Range[a]
LT-1: Near apartment complex at 893 San Aleso Avenue	12/08/2015, 12:00 a.m.–12/09/2015, 12:00 p.m.	Daytime: 66.4–71.3 Evening: 67.7–68.6 Nighttime: 59.2–69.9
LT-2: Along Persian Drive, behind residence at 1087 Bradford Drive	12/08/2015, 12:00 a.m.–12/09/2015, 12:00 p.m.	Daytime: 63.9–67.1 Evening: 62.8–65.3 Nighttime: 54.9–64.3

[a] Daytime indicates the range of hourly noise levels measured between 7:00 a.m. and 6:59 p.m. Evening indicates the range of hourly noise levels measured between 7:00 p.m. and 9:59 p.m. Nighttime indicates the range of hourly noise levels measured between 10:00 p.m. and 6:59 a.m.

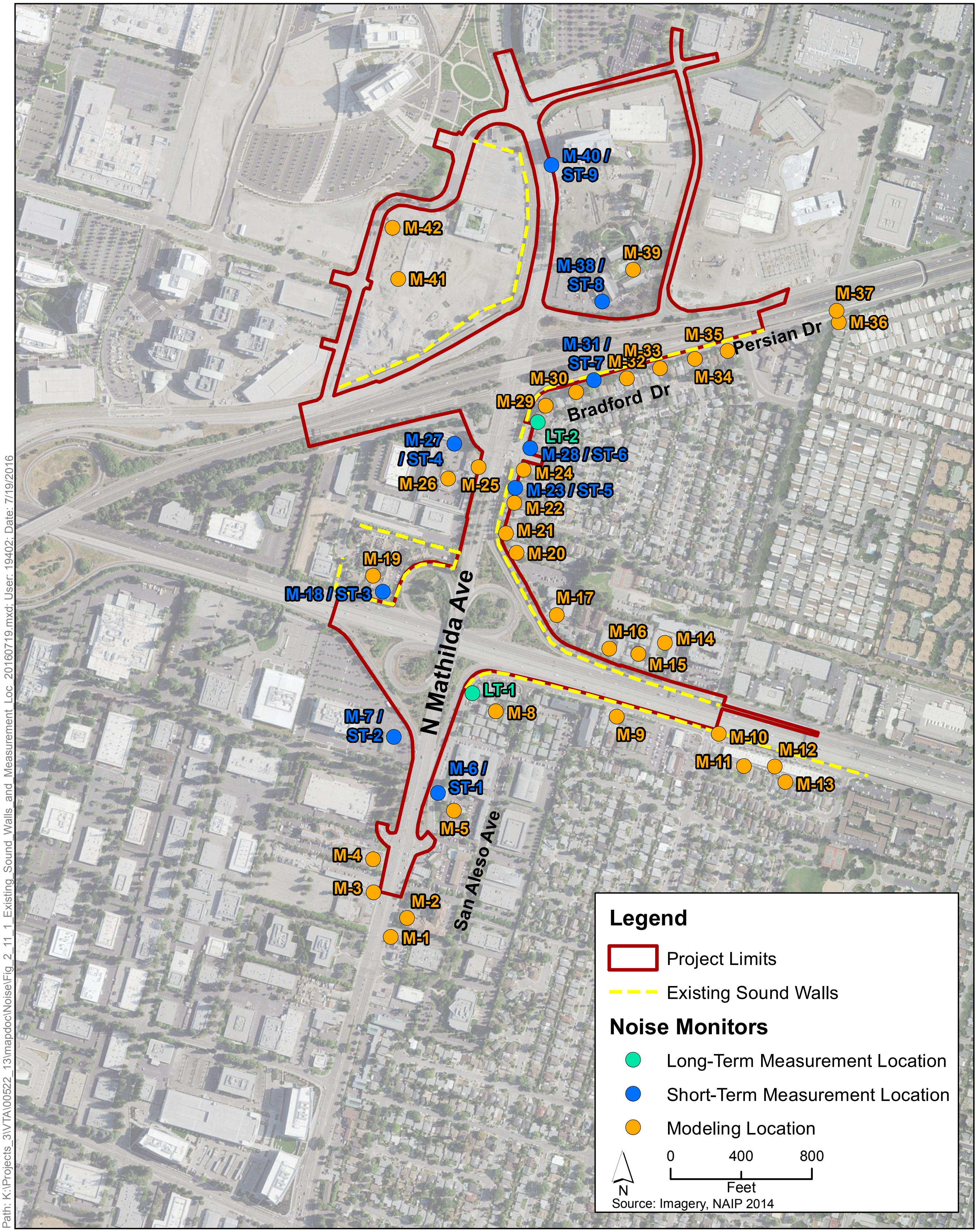

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Figure 2.11-1
Existing Sound Walls and Measurement/Monitoring Locations
Mathilda Avenue Improvements at SR 237 and US 101 Project

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2.11.3 Impact Analysis

2.11.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to noise and vibration are anticipated.

2.11.3.2 Build Alternative

Operation

Potential noise impacts associated with operational traffic were evaluated using the Federal Highway Administration's Traffic Noise Model, Version 2.5 (TNM 2.5) (Federal Highway Administration 2004). Key inputs for the traffic noise model were the locations of roadways, shielding features (e.g., topography and buildings), noise barriers, sensitive receivers, traffic volumes, traffic speeds, and traffic mix (i.e., percentage of automobiles, medium trucks, and heavy trucks).

In addition to the 9 short-term measurement locations, 21 additional modeled-only receiver locations were evaluated at various noise-sensitive land uses in the Project area, for a total of 30 modeled locations, under the following traffic conditions.

- Existing Year (2013)[2]
- Design Year (2040) No-Build
- Design Year (2040) Build

The primary source of traffic volumes used in the modeling was the Project-specific *Travel Demand Forecasting Memorandum* (Fehr & Peers 2016a). The traffic memorandum indicates that overall traffic volumes throughout the study area were generally higher during the AM peak hour (8:00 a.m.) than during the PM peak hour (5:00 p.m.). Therefore, all modeling of existing and Design Year (2040) traffic noise was based on AM peak hour traffic volumes. The traffic memorandum does not include vehicle mix information. Vehicle mix information for the US 101 and SR 237 mainlines and ramps was derived from annual average daily truck vehicle mix information provided in the Annual Average Daily Truck Traffic on the California State Highway System (Caltrans 2014). A vehicle mix of 96 percent automobiles, 2 percent medium trucks, and 2 percent heavy trucks was used for the US 101 mainline and ramps. A vehicle mix of 96 percent automobiles, 1 percent medium trucks (trucks with two axles), and 3 percent heavy trucks (trucks with three or more axles) was used for the SR 237 mainline and ramps. The Project traffic engineer provided a vehicle mix of 98 percent automobiles, 1 percent medium trucks, and 1 percent heavy trucks to be used for all local roadways (Fehr & Peers 2016b).

[2] 2013 peak-hour traffic volumes were used for the Existing Year condition in order to be consistent with the Project-specific *Travel Demand Forecasting Memorandum* (Fehr & Peers 2016a).

In order to analyze impacts of the Project, traffic scenarios based on existing conditions or Project alternative/year of operation were modeled in TNM 2.5. Using the results of these analyses, it is possible to determine the effects of the Project by comparing (1) the existing noise levels to the Build Alternative noise levels and (2) the No-Build Alternative noise levels to the Build Alternative noise levels. The results of the TNM 2.5 modeling are included in Table 2.11-4. Modeling results are rounded to the nearest decibel before comparisons are made. An example would be a comparison between calculated sound levels of 64.4 and 64.5 dBA. The difference between these two values is 0.1 dB. However, after rounding, the difference is reported as 1 dB.

In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3 dB increase in sound would generally be perceived as barely detectable.

The increase in noise levels at noise-sensitive locations, relative to existing conditions, is predicted to be in the range of 0 to 2 dB under Build Alternative conditions. The increase in noise levels, relative to No-Build conditions, is predicted to be in the range of -1 dB (i.e., a 1 dB decrease) to 1 dB. This range represents a minimal (barely perceptible) increase, and therefore, no impact due to operational noise is anticipated.

Table 2.11-4. Comparison of Measured and Modeled Sound Levels in the TNM 2.5 Model

Receiver I.D.	Measurement Location	Land Use / Location of Measurement or Modeling Point	Address	Existing Noise Level $L_{eq(h)}$, dBA	Design Year (2040) Noise Level without Project, $L_{eq(h)}$, dBA	Design Year (2040) Noise Level with Project (Build Alternative), $L_{eq(h)}$, dBA	Design Year (2040) (Build Alternative) Noise Level with Project minus No Project Conditions $L_{eq(h)}$, dBA	Design Year (2040) (Build Alternative) Noise Level with Project minus Existing Conditions $L_{eq(h)}$, dBA	Design Year (2040) Noise Level without Project minus Existing Conditions $L_{eq(h)}$, dBA
M-1	--	Commercial / Outdoor Seating Area	736 N. Mathilda Avenue	73	74	74	0	1	1
M-2	--	Hotel / Pool Area	748 N. Mathilda Avenue	66	67	67	0	1	1
M-3	--	Commercial / Outdoor Seating Area	769 N. Mathilda Avenue	63	64	64	0	1	1
M-4	--	Commercial / Outdoor Seating Area	773 N. Mathilda Avenue	67	69	69	0	2	2
M-5	--	Hotel / Pool Area	814 W. Ahwanee Avenue	63	64	64	0	1	1
M-6[3]	ST-1	Hotel / Parking Lot Entrance	814 W. Ahwanee Avenue	71	73	72	-1	1	2
M-7	ST-2	Recreation / Basketball Court	505 Almanor Avenue	66	68	68	0	2	2
M-8	--	Multi-Family Residential / Pool Area	869 San Aleso Avenue	59	60	60	0	1	1
M-9[4]	--	Proposed Future Residential Land Use	210 Ahwanee Avenue	66	66	66	0	0	0
M-10	--	Southern Edge of US 101 Pedestrian Overcrossing	--	68	69	69	0	1	1
M-11	--	Residential/Backyard	231 Alturas Avenue	62	63	63	0	1	1
M-12	--	Multi-Family Residential / Pool Area	874 Borregas Avenue	63	64	64	0	1	0
M-13	--	Residential / Backyard	255 Alturas Avenue	61	62	62	0	1	1
M-14	--	Multi-Family Residential / Pool Area	181 W. Weddell Drive	56	57	57	0	1	1
M-15	--	Multi-Family Residential / Pool Area	205 W. Weddell Drive	58	59	59	0	1	1
M-16	--	Multi-Family Residential / Pool Area	245 W. Weddell Drive	57	58	58	0	1	1
M-17	--	Hotel / Pool Area	940 W. Weddell Drive	60	61	61	0	1	1
M-18[4]	ST-3	Hotel / Parking Lot	900 Hamlin Court	68	69	69	0	1	1
M-19	--	Hotel / Outdoor Recreation Area	900 Hamlin Court	60	61	61	0	1	1
M-20	--	Residential / Patio	962 W. Weddell Drive	60	61	61	0	1	1
M-21	--	Residential / Backyard	970 W. Weddell Drive	63	64	64	0	1	1
M-22	--	Residential / Backyard	1015 Bradford Drive	62	64	64	0	2	2
M-23	ST-5	Residential / Sidewalk Along W. Weddell Drive (Behind Residence)	1039 Bradford Drive	64	65	65	0	1	1
M-24	--	Residential / Backyard	1055 Bradford Drive	63	64	64	0	1	1
M-25	--	Commercial / Outdoor Seating Area	502 Ross Drive	67	68	68	0	1	1
M-26	--	Hotel / Pool Area	504 Ross Drive	59	61	61	0	2	2
M-27[4]	ST-4	Hotel / Parking Lot	504 Ross Drive	65	66	66	0	1	1
M-28	ST-6	Residential / Backyard	1067 Bradford Drive	64	65	66	1	2	1
M-29	--	Residential / Backyard	1099 Bradford Drive	68	69	69	0	1	1
M-30	--	Residential / Backyard	333 Bradford Drive	65	67	67	0	2	2
M-31[4]	ST-7	Residential / Along Persian Drive (Behind Residence)	297 Bradford Drive	66	67	67	0	1	1
M-32	--	Residential / Backyard	267 Bradford Drive	66	68	68	0	2	2
M-33	--	Residential / Backyard	227 Bradford Drive	65	66	66	0	1	1

[3] Modeling location is not representative of a noise-sensitive land use.
[4] Modeling location represents future noise-sensitive land use.

Receiver I.D.	Measurement Location	Land Use / Location of Measurement or Modeling Point	Address	Existing Noise Level $L_{eq(h)}$, dBA	Design Year (2040) Noise Level without Project, $L_{eq(h)}$, dBA	Design Year (2040) Noise Level with Project (Build Alternative), $L_{eq(h)}$, dBA	Design Year (2040) (Build Alternative) Noise Level with Project minus No Project Conditions $L_{eq(h)}$, dBA	Design Year (2040) (Build Alternative) Noise Level with Project minus Existing Conditions $L_{eq(h)}$, dBA	Design Year (2040) Noise Level without Project minus Existing Conditions $L_{eq(h)}$, dBA
M-34	--	Residential / Backyard	199 Bradford Drive	65	66	66	0	1	1
M-35	--	Residential / Backyard	145 Bradford Drive	65	66	66	0	1	1
M-36	--	Residential / Backyard	At corner of Persian Drive and Borregas Avenue	60	61	61	0	1	1
M-37	--	Southern edge of SR 237 Pedestrian Overcrossing	--	66	68	68	0	2	2
M-38[4]	ST-8	Hotel / Parking Lot	1100 N. Mathilda Avenue	68	69	69	0	1	1
M-39	--	Hotel / Pool Area	1100 N. Mathilda Avenue	61	62	62	0	1	1
M-40[4]	ST-9	Commercial / Parking Lot	1130 N. Mathilda Avenue	68	70	70	0	2	2
M-41[5]	--	Future Site of Foothill College Sunnyvale Center / Future Outdoor Seating Area	1070 Innovation Way	61	62	62	0	1	1
M-42	--	Future Site of Foothill College Sunnyvale Center / Potential Future Outdoor Seating or Recreation Area	1070 Innovation Way	59	61	61	0	2	2

Construction

Noise

Noise associated with construction is considered to result in a significant impact if it conflicts with the Caltrans Standard Specification Section 14-8.02, *Noise Control*, which requires the following.

- Do not exceed 86 dBA L_{max} at 50 feet from the job site activities from 9 p.m. to 6 a.m.
- Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

Construction activities are expected to begin in early 2018 and last approximately 12 months. Table 2.11-5 summarizes noise levels produced by typical construction equipment that is likely to be used for the Project. The metric used to assess construction noise is the maximum noise level (L_{max}), which describes the highest 1-second noise level. Therefore, the maximum noise level experienced at a receptor is typically dominated by the single noisiest piece of construction equipment being used. The resulting noise levels at nearby receptors will vary depending on the distance between the location of the noise source and the location of the receptor. Construction equipment is expected to generate noise levels ranging from 77 to 90 dBA at a distance of 50 feet, and noise produced by construction equipment would be reduced at a rate of about 6 dB per doubling of distance.

Table 2.11-5. Construction Equipment Noise

Equipment	L_{max} at 50 feet (dBA, slow)
Crawler Tractor	84
Mounted Impact Hammer (Hoe Ram)	90
Excavator	81
Grader	85
Roller	80
Rubber Tired Loader	79
Scraper	84
Backhoe	78
Generator	81
Air Compressor	78
Plate Compactor	83
Pump	81
Paver	77
Source: Federal Highway Administration 2006.	

During construction of the Project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. As indicated in Table 2.11-5, construction noise levels could exceed Caltrans' standard of 86 dBA L_{max} at 50 feet from the job site when occurring between 9 p.m. and 6 a.m. Therefore, noise from construction activities may cause a significant impact. Avoidance and Minimization Measure NV-1, *Implement Noise-Reducing Construction Practices*, would reduce this impact to a less-than-significant level.

Vibration

Caltrans provides vibration guidelines in its publication *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013b). The manual defines two different types of potential vibration impacts: (1) building damage potential and (2) annoyance potential.

Construction-related vibration was analyzed using data and modeling methodologies provided by Caltrans' *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013b), which provides typical vibration source levels for various types of construction equipment, as well as methods for estimating the increase in groundborne vibration over distance. Table 2.11-6 provides the peak particle velocity (PPV)[5] levels of worst-case construction equipment expected to be used by the Project; the levels are provided for a reference distance of 25 feet. Vibration from typical heavy construction equipment operation that would be used during Project construction ranges from 0.089 to 0.24 inches per second PPV at 25 feet from the source of activity. The attenuation[6] equations from the guidance manual were used to estimate the change in PPV levels over distance.

Table 2.11-6. Construction Equipment Vibration Levels

Equipment Item	Reference PPV at 25 feet, inches/second[a]
Hydraulic breaker	0.24
Vibratory roller	0.21
Large bulldozer[b]	0.089

[a] Obtained from Caltrans 2013b.
[b] Considered representative of other heavy earthmoving equipment such as excavators, graders, and backhoes.
PPV = peak particle velocity

Heavy construction equipment has the potential to produce groundborne vibration levels that may be distinctly perceptible to people in the surrounding area, or may cause structural damage to nearby structures.

Using the reference vibration data presented in Table 2.11-6 and attenuation from the Caltrans' *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013b), the minimum distance that different types of construction equipment will need to be from applicable land uses in order for vibration impacts to be less than significant was calculated. This information is provided in Table 2.11-7.

[5] The rate or velocity (in inches per second) at which particles move is the commonly accepted descriptor of vibration amplitude, referred to as peak particle velocity (PPV).

[6] Attenuation is the decrease in energy of sound levels through a medium.

Table 2.11-7. Minimum Required Distance for Vibratory Construction Equipment

	Minimum distance construction equipment must be from a given land use in order to be below threshold… (feet)		
Equipment Type	**...for structural damage to older residential structures (0.3 PPV, inches/second)**	**...for structural damage to commercial structures (0.5 PPV, inches/second)**	**...for annoyance at existing residences (0.1 PPV, inches/second)**
Hydraulic Breaker	22	15	50
Vibratory Roller	20	13	45
Large Bulldozer[a]	10	<10	23

[a] Considered representative of other heavy earthmoving equipment such as excavators, graders, backhoes, etc.
PPV = peak particle velocity

Because residences and other structures could be located within 50 feet of active construction areas this impact is considered to be significant. Implementation of Avoidance and Minimization Measure NV-2*, Implement Vibration-Reducing Construction Measures to Limit Groundborne Vibration at Nearby Structures and Residences*, would reduce this impact to a less-than-significant level.

2.11.4 Avoidance, Minimization, and/or Mitigation Measures

The following avoidance and minimization measures would be incorporated into the Project during construction, as applicable, to reduce the effects of the impacts discussed above in Section 2.11.3, *Impact Analysis*.

Avoidance and Minimization Measure NV-1: Implement Noise-Reducing Construction Practices

The contractor will implement the following measures during construction.

- Noise-generating construction activities will be limited to the hours of 6 a.m. to 9 p.m., where feasible. In the event that noise-generating construction activity is required to occur outside of these time restrictions, noise from construction activities will not exceed 86 dBA L_{max} at 50 feet from the job site.
- All construction equipment and vehicles using internal combustion engines will be equipped with manufacturer-recommended mufflers, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification.
- All mobile or fixed construction equipment used on the Project that is regulated for noise output by a local, state, or federal agency will comply with such regulation while in the course of Project activity.
- All construction equipment will be properly maintained. (Poor maintenance of equipment may cause excessive noise levels.)

- All construction equipment will be operated only when necessary and will be switched off when not in use.
- Construction employees will be trained in the proper operation and use of the equipment. (Careless or improper operation or inappropriate use of equipment can increase noise levels. Poor loading, unloading, excavation, and hauling techniques are examples of how a lack of adequate guidance and training may lead to increased noise levels.)
- Electrically powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas will be located as far as practicable from noise-sensitive receptors.
- Construction site speed limits will be established and enforced during the construction period.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, will be for safety warning purposes only.
- To minimize potential public objections to unavoidable noise, the contractor will maintain good communication with the surrounding community regarding the schedule, duration, and progress of the construction. Notification will be provided advising that there will be loud noise associated with the construction and providing a telephone contact number for affected parties to ask questions and report any unexpected noise levels. The onsite construction supervisor will have the responsibility and authority to receive and resolve noise complaints.

Avoidance and Minimization Measure NV-2: Implement Vibration-Reducing Construction Measures to Limit Groundborne Vibration at Nearby Structures and Residences

The contractor will implement vibration-reducing measures to limit groundborne vibration from construction activity. To reduce the potential for damage, vibration at commercial structures will be limited to 0.5 inches/second PPV. To reduce the potential for annoyance, vibration at occupied residential buildings will be limited to 0.1 inches/second PPV. Measures that can be implemented to limit vibration include, but are not limited to, the following.

- Locating vibration-generating equipment as far as feasible from nearby buildings.
- Using lower energy settings on equipment where feasible.
- Employing alternative equipment or methods to limit groundborne vibration. This could include the use of expansive demolition agents[7] in place of pavement breakers or smaller equipment.

[7] Construction methods that are an alternative to impact pavement breaker/explosive techniques, that break apart roadways with reduced noise, ground vibration, and dust. Typically, it is a powder that when mixed with water is poured into drilled holes to create cracks.

Prior to initiation of construction the contractor will prepare a vibration control plan that will summarize equipment to be used on the Project site and the methods that will be used to ensure the vibration does not exceed the specified limits. The plan will also include a description of the methods that will be used to monitor groundborne vibration to ensure that vibration limits are not exceeded.

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2.12 Population and Housing

The information in this section is based on the *Community Impact Assessment for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This report was approved in May 2016. Please refer to this report for a detailed discussion of the information contained in this section.

2.12.1 Regulatory Setting

There are no relevant federal or state regulations applicable to population and housing. The following local regulations and plans are relevant to the Project.

The following goal and policies from the *City of Sunnyvale General Plan, Housing Element* (City of Sunnyvale 2014) are applicable to the Project. For a discussion of General Plan goals and policies relevant to land use and recreation, refer to Section 2.10, *Land Use and Recreation*.

Goal F. Maintain sustainable neighborhoods with quality housing, infrastructure, and open space that fosters neighborhood character and the health of residents.

Policy F.2. Promote neighborhood vitality by providing adequate community facilities, infrastructure, landscaping and open space, parking, and public health and safety within new and existing neighborhoods.

Policy F.3. Continue a high quality of maintenance for public streets, rights-of-way, and recreational areas, and provide safe and accessible pedestrian, bike, and transit linkages (accessibility) between jobs, residences, transportation hubs, and goods and services.

2.12.2 Existing Conditions

2.12.2.1 Population

The City was incorporated in 1912. The 2014 population of the City was 145,921, and the 2014 population of Santa Clara County (County) was 1,841,569 (American Community Survey 2014). According to Association of Bay Area Governments projections for the 20-year period from 2020 to 2040, the City's population is expected to increase by 34.5 percent to 194,300 with an average growth of 5.6 percent every 5 years. Table 2.12-1 presents the anticipated growth for both the City and County.

Table 2.12-1. Sunnyvale and Santa Clara County Population Growth Projections 2010–2040

Year	City of Sunnyvale Population	Percent Change		Santa Clara County Population	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	140,081	--	--	1,781,642	--	--
2015[a]	148,400	5.9%	5.9%	1,877,700	5.4%	5.4%
2020	156,800	5.7%	11.9%	1,977,900	5.3%	11.0%
2025	165,500	5.5%	18.1%	2,080,600	5.2%	16.8%
2030	174,700	5.6%	24.7%	2,188,500	5.2%	22.8%
2035	184,300	5.5%	31.6%	2,303,500	5.3%	29.3%
2040	194,300	5.4%	38.7%	2,423,500	5.2%	36.0%

Source: Association of Bay Area Governments 2013

[a] 2015 population figures cited here are projections from Association of Bay Area Governments. The latest population data available through the U.S. Census Bureau, American Community Survey is for 2014 and is 145,921 for the City of Sunnyvale and 1,841,569 for Santa Clara County.

2.12.2.2 Housing

In 2014, there were 56,620 housing units in the City (Table 2.12-2). This is an approximately 6.1 percent increase from 2010. Approximately 95.8 percent of these housing units were occupied in 2014, compared with 98.4 percent in 2010. In the County, there were 640,439 housing units in 2014 and 631,920 housing units in 2010. Approximately 95.9 percent of these housing units were occupied in 2014, compared to 95.6 percent in 2010.

Table 2.12-2. Sunnyvale and Santa Clara County Housing Units 2010, 2014

	2010	2014
City of Sunnyvale		
Total Housing Units	53,384	56,620
Increase in Housing Units	--	6.1%
Occupied Housing Units	52,539	54,267
Change in Occupied Housing Units	-	+3.3%
Percent Occupied	98.4%	95.8%
Santa Clara County		
Total Housing Units	631,920	640,439
Increase in Housing Units	--	1.3%
Occupied Housing Units	604,204	614,714
Change in Occupied Housing Units	--	+1.7%
Percent Occupied	95.6%	95.9%

Source: U.S. Census Bureau 2010; American Community Survey 2014

In 2015, there were an estimated 56,560 households in the City (Association of Bay Area Governments 2013). The number of households in the City increased by approximately 5.9 percent between 2010 and 2015. The number of households in the County increased by approximately 5.8 percent between 2010 and 2015. As shown in Table 2.12-3, the Association of Bay Area Governments projects that the number of households in the City will increase by approximately 36.4 percent by 2040, with an average increase of approximately 5.3 percent every 5 years.

The average household size in the City was 2.62 people in 2010 and 2015. The household size in the City is projected to stay at 2.62 persons per household through 2020. The average household size in the County was 2.95 people in 2010 and 2.94 people in 2015. The average household size for the County is projected to decrease to 2.93 persons per household by 2020 (Association of Bay Area Governments 2013).

Table 2.12-3. Sunnyvale and Santa Clara County Household Growth Projections 2010–2040

Year	City of Sunnyvale[a] Households	Percent Change[b]		Santa Clara County Households	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	53,384	--	--	604,204	--	--
2015	56,560	5.9%	5.9%	639,160	5.8%	5.8%
2020	59,840	5.8%	12.0%	675,670	5.7%	11.8%
2025	62,970	5.2%	18.0%	710,610	5.2%	17.6%
2030	66,290	5.3%	24.2%	747,070	5.1%	23.6%
2035	69,490	4.8%	30.2%	782,120	4.7%	29.4%
2040	72,800	4.8%	36.4%	818,400	4.6%	35.5%

Source: Association of Bay Area Governments 2013.

[a] Association of Bay Area Government's household growth projections include the City of Sunnyvale's sphere of influence, which consists of a portion of Moffett Federal Airfield. The sphere of influence is used to account for household growth outside of the City's jurisdictional boundary.

[b] Incremental percent change values are based on the difference in the number of households for each subsequent year. Therefore, between 2020 and 2025, the projected number of households in the City of Sunnyvale shows an increase of 3,130 households, or a 5.2 percent incremental percent change. Cumulative percent change values are based on the difference between the projected number of households in a projection year and the number of households in year 2010. Therefore, in 2025, the projected number of households in the City of Sunnyvale shows an increase of 9,586 households compared to 2010, or an approximately 18 percent cumulative percent change. All calculations are rounded to the nearest tenth of a point.

Note: The latest available U.S. Census Bureau data for households is for 2010.

2.12.2.3 Employment

The Association of Bay Area Governments estimates that the number of jobs in the County will grow from 926,270 jobs in 2010 to 1,229,520 jobs in 2040, an increase of approximately 32.7 percent. The number of jobs in the City is projected to increase by approximately 26.5 percent, from 74,840 jobs in 2010 to 101,390 jobs in 2040. Table 2.12-4 summarizes the projected 5-year incremental increases in jobs in the City and County from 2010 to 2040. Approximately 8 percent of the jobs in the County are located in the City. This trend is projected to continue until 2040.

Since 2010, the City has had more jobs than employed residents (Table 2.12-4), which means that some employees working in the City live elsewhere and are commuting to the City. The County also has more jobs than employed residents. This trend is expected to continue through 2040. By 2020, the City is projected to have 89,490 jobs and 83,000 employed residents, a ratio of 1.08 jobs for every employed resident. This ratio is expected to remain between 1.03 and 1.08 until 2040.

Table 2.12-4. Sunnyvale and Santa Clara County Jobs and Employed Resident Projections 2010–2040

	2010	2015	2020	2025	2030	2035	2040
City of Sunnyvale[a]							
Total Jobs	74,840	81,880	89,490	91,720	94,210	97,630	101,390
Employed Residents	68,300	75,360	83,000	86,150	89,450	93,650	97,980
Jobs per Employed Resident	1.09	1.09	1.08	1.06	1.05	1.04	1.03
Santa Clara County							
Total Jobs	926,270	1,003,780	1,091,270	1,118,320	1,147,020	1,187,010	1,229,520
Employed Residents	802,030	881,770	968,790	1,003,550	1,039,330	1,085,880	1,133,950
Jobs per Employed Resident	1.15	1.14	1.13	1.11	1.10	1.09	1.08

Source: Association of Bay Area Governments 2013

[a] Association of Bay Area Governments employment projections include the City of Sunnyvale's sphere of influence, which consists of a portion of Moffett Federal Airfield. The sphere of influence is used to account for employment outside of the City's jurisdictional boundary.

2.12.3 Impact Analysis

Methods used to determine impacts on population and housing included researching existing and estimated population and housing trends within the City and County.

2.12.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. No impacts related to population and housing are anticipated.

2.12.3.2 Build Alternative

The Project involves improvements to portions of Mathilda Avenue primarily within existing public rights-of-way and would not result in the displacement of any existing people, housing, or businesses. Access to any housing or businesses in the Project area would be maintained at all times throughout the construction and operation of the Project. As no new homes or businesses would be constructed as part of the Project, it would not *directly* induce population growth. Construction-related employment can *indirectly* induce population growth by bringing new workers to an area. However, construction employment opportunities for the Project would be temporary (1 year), and would likely be filled by construction workers already residing in the City or neighboring areas. As such, no impacts related to population and housing are anticipated.

2.12.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

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2.13 Public Services and Utilities

The information in this section is based on the *Community Impact Assessment for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This assessment was approved in May 2016. Please refer to this assessment for a detailed discussion of the information contained in this section.

2.13.1 Regulatory Setting

There are no federal or state regulations or plans applicable to public services and utilities.

2.13.1.1 City of Sunnyvale General Plan

The following goals and policies from the *City of Sunnyvale's General Plan* (City of Sunnyvale 2011a) are applicable to the Project.

Public Services

Policy SN-3.5: Facilitate the safe movement of pedestrians, bicyclists, and vehicles.

Utilities

Goal EM-2: Water Conservation**.** Promote more efficient use of the City's water resources to reduce the demands placed on the City's water supplies.

Policy EM-2.1: Lower overall water demand through the effective use of water conservation programs in the residential, commercial, industrial, and landscaping arenas.

2.13.1.2 Urban Water Management Plan

In March 1989, in response to a third year of a continuing drought, the Santa Clara Valley Water District announced a supply reduction of 25 percent. All water retailers and cities in Santa Clara County were asked to implement plans to achieve the 25 percent reduction for the remainder of 1989. Thus, the City developed a water shortage contingency plan that includes mandatory (and voluntary) water use restrictions, rate block adjustment, and approaches for enforcement associated with each stage of anticipated reduction. These plans apply mandatory prohibitions to potable water usage at City golf courses, City parks, City streetscape trees and landscaping, and public safety. The water shortage contingency plan is included in the City's *2010 Urban Water Management Plan* (City of Sunnyvale 2011b), which addresses supply and demand projections for the next 25 years within the City.

2.13.2 Existing Conditions

2.13.2.1 Public Services

The following information on existing public services is drawn from the *Moffett Park Specific Plan* (City of Sunnyvale 2013) as it is applicable to this Project. Figure 2.13-1 identifies the location of the public services described.

Public Safety

The Sunnyvale Department of Public Safety provides fully integrated public safety services including Police, Fire, and Emergency Medical Services. Public Safety Officers are assigned to a specific bureau (Police or Fire), but can be called upon to provide cross-bureau services on a daily basis. As such, all officers are required to be fully trained in all three disciplines. The cross-functional service model extends into the Communications Center, where dispatchers are trained in all three disciplines; this allows for a single point of contact and immediate assistance upon receipt of a 911 call. In addition, the Sunnyvale Department of Public Safety provides other services such as Fire Prevention, Animal Control, Vehicle Abatement, Crime Prevention, Neighborhood Resource Program, Records Unit, and Neighborhood Preservation. All of these services are provided through a professional staff of over 283 full-time employees and volunteers (City of Sunnyvale 2015).

Fire Protection Services

The Sunnyvale Department of Public Safety Fire Services provides fire protection services to the Project area. There are three fire stations (of the six fire stations within the City of Sunnyvale) that would serve the Project area. Currently, Station 5 would provide the primary fire protection service to the Project area, with Stations 1 and 6 providing auxiliary support when needed. Station 5 is located at 1210 Bordeaux Drive, approximately 0.15 mile north of the northern Project boundary on Bordeaux Drive. The station is equipped with one fire engine (Engine 45), one 100-foot ladder truck, a Mobile Emergency Operations Center, a tactical firing range, and a training classroom. The station is staffed with one Lieutenant and five Public Safety Officers (Kilpatrick 2016). Other than Sunnyvale Fire Station #5, there are no emergency service provider facilities located within 0.5 mile of the Project area. Table 2.13-1 lists the City’s emergency service providers and their proximity to the Project area.

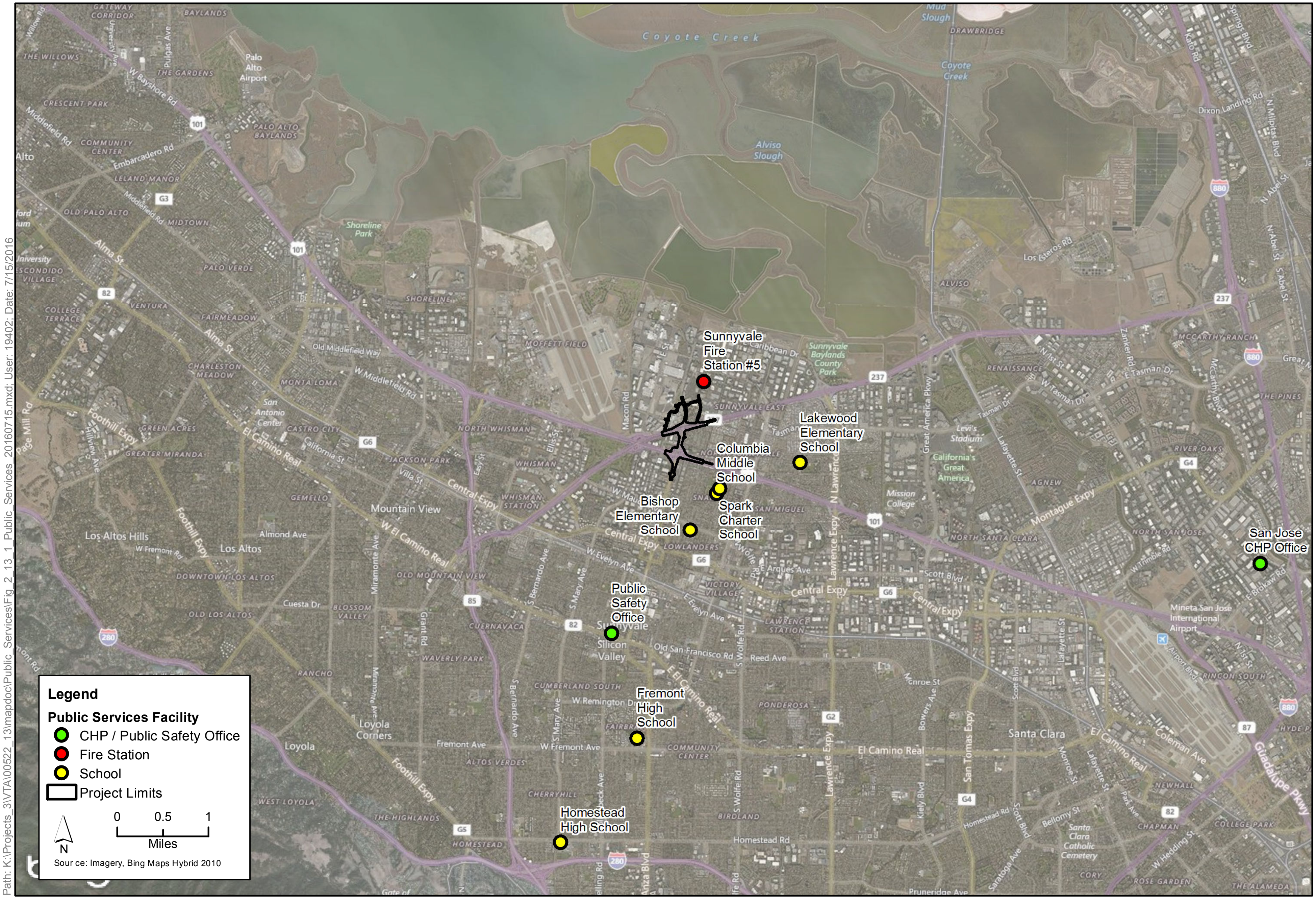

Figure 2.13-1
Public Services
Mathilda Avenue Improvements at SR 237 and US 101 Project

Table 2.13-1. Emergency Service Facilities

Facility Name	Address	Distance from the Project Area
Police		
Department of Public Safety – Sunnyvale Police Department	700 All American Way	1.6 miles
Fire		
Sunnyvale Fire Station #1	171 N. Mathilda Avenue	1.0 mile
Sunnyvale Fire Station #2	795 E. Arques Avenue	1.3 miles
Sunnyvale Fire Station #3	910 Ticonderoga Drive	3.0 miles
Sunnyvale Fire Station #4	996 S. Wolfe Road	2.8 miles
Sunnyvale Fire Station #5	1210 Bordeaux Drive	0.15 mile
Sunnyvale Fire Station #6	1282 N. Lawrence Station Road	1.7 miles
Source: City of Sunnyvale 2015a.		

The Department of Public Safety has the following response time goals.

1. Emergency Events will be responded to within 5 minutes, 42 seconds or less from dispatch to on-scene arrival for 92 percent of emergency events.
2. Fire Events will be responded to within 6 minutes, 14 seconds or less from dispatch to on-scene arrival by fire apparatus for 86 percent of emergency events.
3. EMS Events will be responded to within 5 minutes, 42 seconds or less from dispatch to on-scene arrival for 92 percent of EMS emergency events.

Law Enforcement Services

Public Safety services for the Project site include police protection by the City of Sunnyvale Police and Technical Services Bureau. The Police Department serves approximately 24 square miles and a population of approximately 148,000 residents (City of Sunnyvale 2015a). The location of the Public Safety office that would serve the Project area is 700 All America Way, approximately 2 miles away from the Project, near Mathilda Avenue and El Camino Real. The Police Department has 88 sworn officers and lieutenants who provide patrol services to the City (City of Sunnyvale 2015b). The average response times to 911 calls within the City are recorded by “emergency” or “urgent.” The average response time for emergency calls is 4 minutes, 41 seconds. The average response time for urgent calls is 5 minutes, 54 seconds.

The California Highway Patrol has jurisdiction over US 101 and SR 237 for matters involving both traffic and emergency services. The San Jose California Highway Patrol office, located at 2020 Junction Avenue, San Jose, California, serves the Project site.

2.13.2.2 Public Utilities

This section describes the existing utilities within the Project area. The Project area contains a number of utility lines that serve the surrounding residents and businesses. These utilities include electric and gas lines, telephone service lines, internet service lines, and cable television lines.

Water Service

Water service in the Project area is provided by the Santa Clara Valley Water District and the City of Sunnyvale Public Works Department (a City water line is located within the Project site). The main sources of water for the City include: groundwater and local surface water from eight operating wells, the City of San Francisco's Public Utility Commission's Hetch Hetchy Aqueduct system, Sunol Valley water supply, and recycled water. The County also receives water from the State Water Project and the Central Valley Project from the United States Bureau of Reclamation, including water from the Sacramento River Delta, Anderson Lake, and San Luis Reservoir. This water is conveyed through a series of aqueducts to the Rinconada Water Treatment Plant in Los Gatos, then to the Sunnyvale area through their West Valley transmission main (City of Sunnyvale 2015c).

Wastewater Facilities and Service

The Project area is located within the City of Sunnyvale Environmental Services Department wastewater service area which serves a population of approximately 140,000 over 25 square miles. The sewer system consists of 283 miles of gravity sewers, five sewer lift (pump) stations, and over 2 miles of sewer force mains. The sewer mains range in size from 6 to 42 inches in diameter. Service is provided to all Sunnyvale residents, and to a portion of the City of Cupertino (Rancho Rinconada area).

The Donald M. Somers Water Pollution Control Plant provides wastewater treatment for the City of Sunnyvale. The plant is designed to treat an average of 29.5 million gallons of wastewater per day. Currently, the plant treats an average dry weather effluent flow of approximately 14.5 million gallons of wastewater per day, well within the plant capacity.

The existing sewer mains on the Project site are maintained by the City. There is an existing City 8-inch recycled water line along the current alignment of Moffett Park Drive, east of Mathilda Avenue.

Electricity and Natural Gas

The Project area contains overhead electric and communications lines and underground electric, gas, communications, and fiber optic lines. Natural gas and electric power are supplied to the Project area through Pacific Gas & Electric (PG&E). A 21-kilovolt overhead electrical line, a 12-kilovolt underground electrical line, and a 6-inch underground gas line all pass through the Project area. Additionally, a major PG&E gas transmission line passes through the Project area along SR 237.

Communications Systems

Telephone and data transmission (cable and internet) within the Project area is provided by American Telephone and Telegraph (AT&T), Verizon telecommunication service, Level 3 Communications, and Comcast cable and internet service.

2.13.3 Impact Analysis

The *Community Impact Assessment* prepared for the Project follows guidance in the Caltrans *Community Impact Assessment Standard Environmental Reference: Environmental Handbook Volume 4* (Caltrans 2011). Methods to determine impacts included identifying utilities and public services in the Project area through review of information on websites related to local planning agencies, public works departments, utility companies, public service providers, and police and fire departments.

2.13.3.1 No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment. In comparison to congestion and queuing conditions under the Build Alternative, anticipated changes in response times for fire, police, and emergency services under the No-Build Alternative would be negligible. As such, no impacts related to public services or utilities are anticipated.

2.13.3.2 Build Alternative

Public Services

Fire, police, and emergency services would indirectly benefit from the Project in that, by reducing peak commute period congestion, vehicle response times would be reduced. The Project would not sever or alter traffic patterns in the vicinity of Sunnyvale Fire Station #5. All existing access between local streets and freeways would be maintained and improved.

Further, to the extent that the Project would reduce congestion and queuing, both peak hour travel times and emergency response times may improve. The Project would implement a Transportation Management Plan (TMP) (see Section 2.14, *Traffic/Transportation*, TRF-1: *Prepare a Transportation Management Plan*) during construction that would inform community agencies, such as the fire department, of the times and locations of upcoming construction, signage in and approaching the Project area, and incident management for traffic control in the vicinity of construction activities. All construction activities would be coordinated with the Sunnyvale Public Safety Department to ensure that police, fire, and emergency services would be unaffected. As such, there would be no impacts related to public services.

Public Utilities

The Project would include utility relocations, as necessary, to construct roadway improvements. The Project would require the relocation of Verizon telecommunication lines and a City 8-inch recycled water line along the current alignment of Moffett Park Drive east of Mathilda Avenue. The Project would also require adjustments to three PG&E electrical pole wires to accommodate ramp modifications at the US 101/Mathilda Avenue interchange. Utility covers, such as manhole covers, would be adjusted to grade in areas of pavement rehabilitation.

Utility work would not result in the disruption of utility services in the Project area because existing lines would not be disconnected prior to the relocated utility lines being in place. Relocated utility lines would be located as close as possible to existing conditions and would not be located closer to any residences, schools, or other sensitive receptors. As such, there would be no construction impacts related to public utilities.

2.13.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.14 Transportation/Traffic

The information in this section is based on the *Traffic Operation Analysis Report* (TOAR) *for the Mathilda Avenue Improvements at SR 237 and US 101 Project*. This assessment was approved in June 2016. Please refer to this report for a detailed discussion of the information contained in this section.

2.14.1 Regulatory Setting

Caltrans, as assigned by the Federal Highway Administration (FHWA), directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 Code of Federal Regulations [CFR] 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the U.S. Department of Transportation (USDOT) issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by the USDOT regulations (49 CFR Part 27) implementing Section 504 of the Rehabilitation Act (29 United States Code [U.S.C.] 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to federal-aid projects, including Transportation Enhancement Activities.

VTA and Caltrans are committed to carrying out the ADA by building transportation facilities that provide equal access for all persons such that the same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

2.14.2 Methodology

2.14.2.1 Current and Forecast Traffic Analysis

Traffic forecasts were based on applications of the Santa Clara VTA Travel Demand Model and validated within the Project area. The VTA Travel Demand Model is an analysis tool that is used to develop forecasts of future traffic volumes on freeways and local streets within Santa Clara County based on planned future land growth in the region. Use of a countywide travel demand model to develop future traffic forecasts is consistent with the analysis approach used for other Caltrans projects in the Bay Area. The VTA model includes Year

2013, 2018, and 2040 scenarios consistent with the land use projections in *Plan Bay Area* and regional roadway improvements included in the Valley Transportation Plan (VTP) 2040.

The land use assumptions in the VTA model include Association of Bay Area Governments regional growth projections under 2020 and 2040.

Local street, ramp, and freeway mainline traffic counts were collected between 2013 and 2015. Based on the data collected, local street AM and PM peak hours are between 8:00 – 9:00 a.m. and 5:00 – 6:00 p.m., respectively.

2.14.2.2 Corridor Measures of Effectiveness and Level of Service

The system-wide performance was evaluated using the following Measures of Effectiveness (MOEs):

- **Vehicle Miles of Travel** – is a measure of the total vehicle throughput of the corridor. This measure takes into consideration the actual volume served versus the demand and the trip lengths of those vehicles and travelers.
- **Average Travel Time** – is a measure of the time it takes (on average) to travel from one end of a corridor to the other during the peak period. The travel time calculation considers the average delay throughout the corridor, vehicle queues, and friction caused by merging vehicles.
- **Average Travel Speed** – is directly related to average travel time and the corridor length.
- **Vehicle Hours of Delay** – is the total amount of delay incurred for all vehicles during the peak period because of congestion and demand exceeding the capacity of the freeway.
- **Maximum Individual Vehicle Delay** – is the maximum delay in minutes experienced by an individual driver during the peak hour relative to driving the corridor under free-flow conditions. In addition to system-wide performance.

Level of Service (LOS) was used as a qualitative measure of traffic operations for intersections and freeway segments. LOS generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, comfort and convenience, and safety. See Table 2.14-1 for an overview of the LOS definitions for signalized and unsignalized intersections and Table 2.14-2 for freeway segments. Study intersections and freeway segments were evaluated for AM and PM peak hours.

Table 2.14-1. Intersection Level of Service Definitions

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)[a]	Unsignalized Intersection Control Delay (seconds/vehicle)[a]	General Description
A	0–10.0	0–10.0	Little to no congestion or delays.
B	10.1–20.0	10.1–15.0	Limited congestion. Short delays.
C	20.1–35.0	15.1–25.0	Some congestion with average delays.
D	35.1–55.0	25.1–35.0	Significant congestion and delays.
E	55.1–80.0	35.1–50.0	Severe congestion and delays. Operate at capacity.
F	> 80.0	> 50.0	Total breakdown with extreme delays.

Source: 2010 Highway Capacity Model, Transportation Research Board 2010.
[a] Control delay includes initial deceleration delay, queue move-up time, stopped delay, and acceleration delay.

Table 2.14-2. Freeway Level of Service Definitions

Level of Service	Description	Basic Mainline Segment Density Criteria[a]
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	< 11.0
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	> 11.0–18.0
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.	> 18.0–26.0
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	> 26.0–35.0
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing.	> 35.0–45.0
F	Represents a breakdown in flow.	> 45.0

Source: 2010 Highway Capacity Manual.
[a] Density in passenger cars per mile per lane.

2.14.3 Existing Conditions

This section describes the existing conditions related to traffic and transportation in the Project area.

The TOAR study area was developed in consultation with VTA, City of Sunnyvale, and Caltrans staff and is intended to capture the local and regional traffic effects of the Project. The TOAR study area includes Mathilda Avenue between Almanor-Ahwanee Avenue and Fifth Avenue, including the interchanges at SR 237 and US 101. Figure 2.14-1 illustrates the TOAR study area, which is generally locally bounded by Fifth Avenue to the north and

Almanor-Ahwanee Avenue to the south, and regionally bounded between Fair Oaks Avenue to the east, and Ellis Street and Maude Avenue to the west.

2.14.3.1 Existing Roadway Network

Mathilda Avenue is primarily a north-south six-lane divided arterial serving the downtown Sunnyvale area and Caltrain to the south and an expanding high-tech business community to the north. Within the Project area, Mathilda Avenue serves as the main access to the residential communities on the east side of Mathilda Avenue and the only access to the landlocked area contained within the US 101/SR 237/Mathilda Avenue triangle with access through Ross Drive. Within the Project area, sidewalks are located along the entire east side of Mathilda Avenue and on the west side of Mathilda Avenue north of Moffett Park Drive. There are no bicycle facilities on Mathilda Avenue within the Project area.

SR 237 is an east-west freeway/highway that connects the City of Mountain View with the City of Milpitas. Within the Project area, the SR 237 freeway provides two mixed-flow lanes in each direction and one additional auxiliary lane in each direction between US 101 and Mathilda Avenue. In addition, a High Occupancy Vehicle (HOV) lane is provided east of Mathilda Avenue in the eastbound direction and turns into an Express Lane to the east of the Zanker Road overpass.

US 101 is primarily a north-south freeway that regionally connects San Francisco to San Jose. Within the Project area, US 101 provides three mixed-flow lane plus one HOV lane in each direction, while an auxiliary lane is also provided in the southbound direction between SR 237 and Mathilda Avenue.

Innovation Way is a north-south road serving the development in the northwest area of the Mathilda Avenue/SR 237 interchange. It connects Mathilda Avenue with West Moffett Park Drive and has two lanes in each direction. Bicycle facilities are not provided on Innovation Way. Sidewalks are provided for pedestrians along both sides of Innovation Way at the Mathilda Avenue intersection.

Moffett Park Drive runs parallel to SR 237 on the north side of the freeway. West of Mathilda Avenue, Moffett Park Drive has two lanes in each direction and runs parallel to the VTA light rail transit (LRT) tracks. Moffett Park Drive has one lane in each direction east of Mathilda Avenue. There are generally no bicycle or pedestrian facilities on Moffett Park Drive throughout the Project area; however, Class II bicycle lanes are present on Moffett Park Drive east of Bordeaux Drive.

Ross Drive is a two-lane, undivided local street that provides the only access to businesses that lie within the US 101/SR 237/Mathilda Avenue triangle. On the east side of Mathilda Avenue, Ross Drive provides access to a large residential area where there are buffered sidewalks throughout the development and crosswalks at stop-controlled intersections. There are no existing bicycle facilities on the east side of Ross Drive. The west side of Ross Drive does not provide any pedestrian or bicycle facilities.

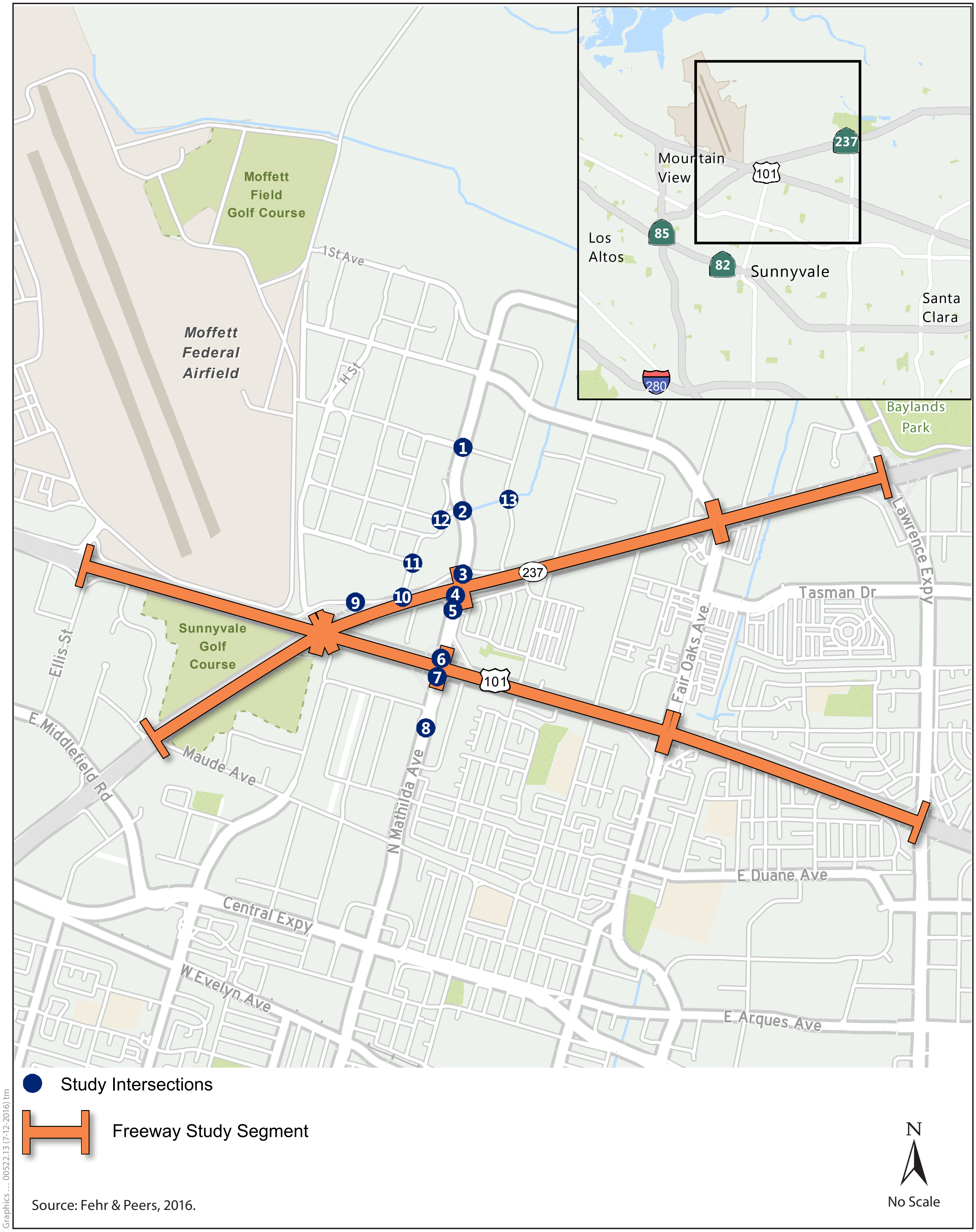

Figure 2.14-1
Traffic Study Area
Mathilda Avenue Improvements at SR 237 and US 101 Project

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Almanor Avenue is a two-lane street that runs parallel to US 101 connecting Mathilda Avenue to North Mary Avenue. There are no bicycle facilities along Almanor Avenue, and pedestrian facilities are limited to the west/south side of the roadway.

Ahwanee Avenue is two-lane arterial that runs parallel to US 101 connecting Mathilda Avenue to Fair Oaks Avenue. There are no bicycle facilities along Ahwanee Avenue, and pedestrian facilities are limited to the east/south side of the roadway.

Bordeaux Drive is a two-lane, undivided local street that provides connection between Moffett Park Drive and Mathilda Avenue. A two-way left-turn lane is provided between Moffett Park Drive and West Java Drive. There are no pedestrian facilities along Bordeaux Drive. While there is a shoulder that can accommodate bicyclists, it is not defined as a Class II bicycle facility.

2.14.3.2 Existing Transit Service and Facilities

A number of transit services operate within the Project area, including LRT service, bus service, Caltrain, and shuttle services. Transit facilities include the Lockheed Martin and the Moffett Park LRT stations, which are on the Mountain View to Winchester Avenue LRT line (Line 902) operated by VTA. Figure 2.14-2 shows the existing transit service near the Project site, which is described in the TOAR.

2.14.3.3 Existing and Planned Bicycle and Pedestrian Facilities

The Project area includes bicycle (lanes and paths) and pedestrian facilities (sidewalks, crosswalks, and pedestrian signals) on Mathilda Avenue, Moffett Park Drive, and intersecting streets.

Bicycle Facilities

Figure 2.14-3 shows the location of existing bicycle facilities within the Project area. Two Borregas Avenue Pedestrian Overcrossings (POCs) are located approximately 0.3 mile east of Mathilda Avenue and cross SR 237 and US 101. The POCs allow bicycle and pedestrian travel in the north-south direction and are part of the Wolfe Road/Borregas Avenue Corridor (Cross County Bicycle Corridor [CCBC] No. 09).

Bicyclists are permitted to ride on all local streets in the City of Sunnyvale. There are no bicycle facilities on Mathilda Avenue within the Project limits, and bicyclists must share the road with vehicles. The City of Sunnyvale recommends Mathilda Avenue be used by advanced bicyclists who are capable of riding on major roadways with high traffic volumes.

Just north of the Project site, a signed on-street bicycle route is designated on Mathilda Avenue between Innovation Way and Bordeaux Drive. Bicycle routes are designated by signs or pavement markings for shared use with pedestrians or motor vehicles, but have no separated bike right-of-way or lane striping. Bicycle routes serve either to provide continuity to other bicycle facilities or designate preferred routes through high demand corridors.

Moffett Park Drive is an important east-west regional bicycle route (CCBC No. 6). Bicycle lanes are provided in both directions east of Bordeaux Drive and west of Innovation Way. Bicycle lanes will be installed on Innovation Way between Moffett Park Drive and Bordeaux Drive as part of the De Anza Community College development on the east side of Innovation Way. Bicycle lanes are lanes for bicyclists generally adjacent to the outer vehicle travel lanes. These lanes are generally 5 to 6 feet wide and have special lane markings, pavement legends, and signage.

Santa Clara Valley Water District is constructing a new trail system along the north side of the Sunnyvale West Channel beginning just north of the Mathilda Avenue/Innovation Way intersection and continuing downstream toward the Bay as part of the Sunnyvale West Channel Flood Control Project. Construction is scheduled to begin in Summer 2016.

Pedestrian Facilities

Existing pedestrian facilities include sidewalks, crosswalks, curb ramps, and pedestrian signals. There is a continuous sidewalk with crosswalks at each roadway crossing along the east side of Mathilda Avenue within the Project limits. The sidewalk is discontinuous at several locations along the west side of Mathilda Avenue; that is, there are no sidewalk and crosswalks between Almanor Avenue and the southbound US 101 loop on-ramp and between the northbound US 101 loop off-ramp and Moffett Park Drive. Narrow sidewalks are provided on both sides of the US 101 overcrossing and separated from traffic by a concrete barrier.

There are sidewalks along both sides of Innovation Way between Moffett Park Drive and 11th Avenue and between the Juniper Networks Driveway and Mathilda Avenue. There also are sidewalks along the east side of Innovation Way between 11th Avenue and the Juniper Networks Driveway. There is no sidewalk on Moffett Park Drive west of Bordeaux Drive and on Ross Drive west of Mathilda Avenue.

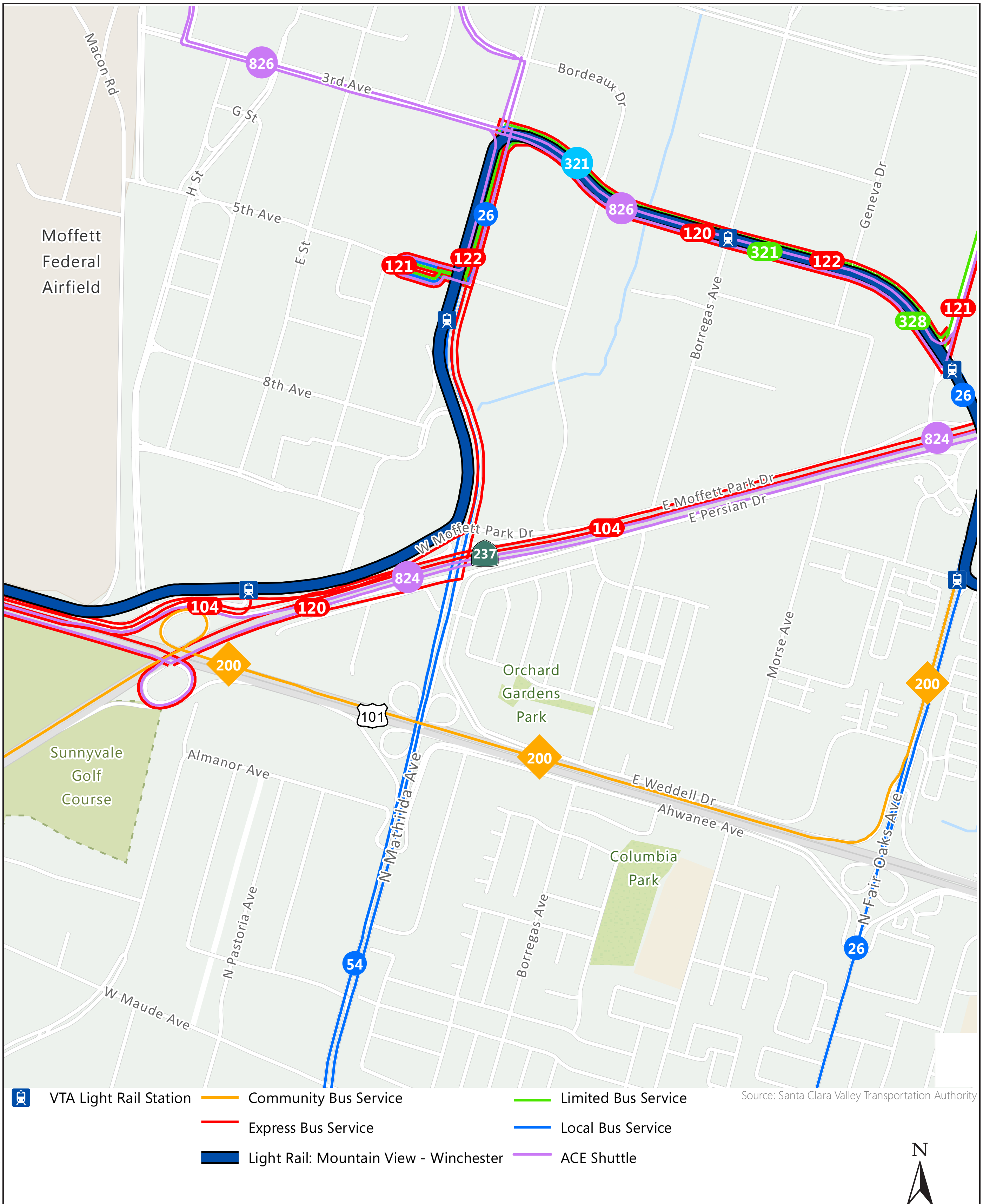
2.14.3.4 Existing Traffic Conditions

Existing 2013 AM and PM peak hour volumes, intersection controls, and lane configurations for the study intersections are shown in Table 2.14-3 and Figure 2.14-4. US 101 existing mainline and ramp peak period demand forecast volumes are shown on Figures 2.14-5 and 2.14-6 for AM and PM peak hours, respectively. SR 237 mainline and ramp peak period demand volumes are shown on Figures 2.14-7 and 2.14-8 for AM and PM peak hours, respectively. Existing traffic conditions, described in Tables 2.14-3 through 2.14-7 have been combined with 2018 and 2040 Build scenarios (discussed in Section 2.14.4, *Impacts Analysis*) for comparison purposes.

Local Roadways and Ramp Termini

Existing intersection traffic operations were evaluated for the 13 study intersections shown in Figure 2.14-1 and Table 2.14-3. As shown in the Table 2.14-3, the following intersection operations on Mathilda Avenue are currently performing at LOS F during the peak hours in the Existing (2013) condition:

- Mathilda Avenue/Fifth Avenue – in the PM peak hour.
- Mathilda Avenue/Innovation Way – in the PM peak hour.
- Mathilda Avenue/Moffett Park Drive/Westbound 237 – in the AM and PM peak hours.
- Mathilda Avenue/Ross Drive – in the AM peak hour.
- Innovation Way/Juniper Network Driveway – in the PM peak hour.



Source: Fehr & Peers, 2016.

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Figure 2.14-2
Existing Transit Service
Mathilda Avenue Improvements at SR 237 and US 101 Project

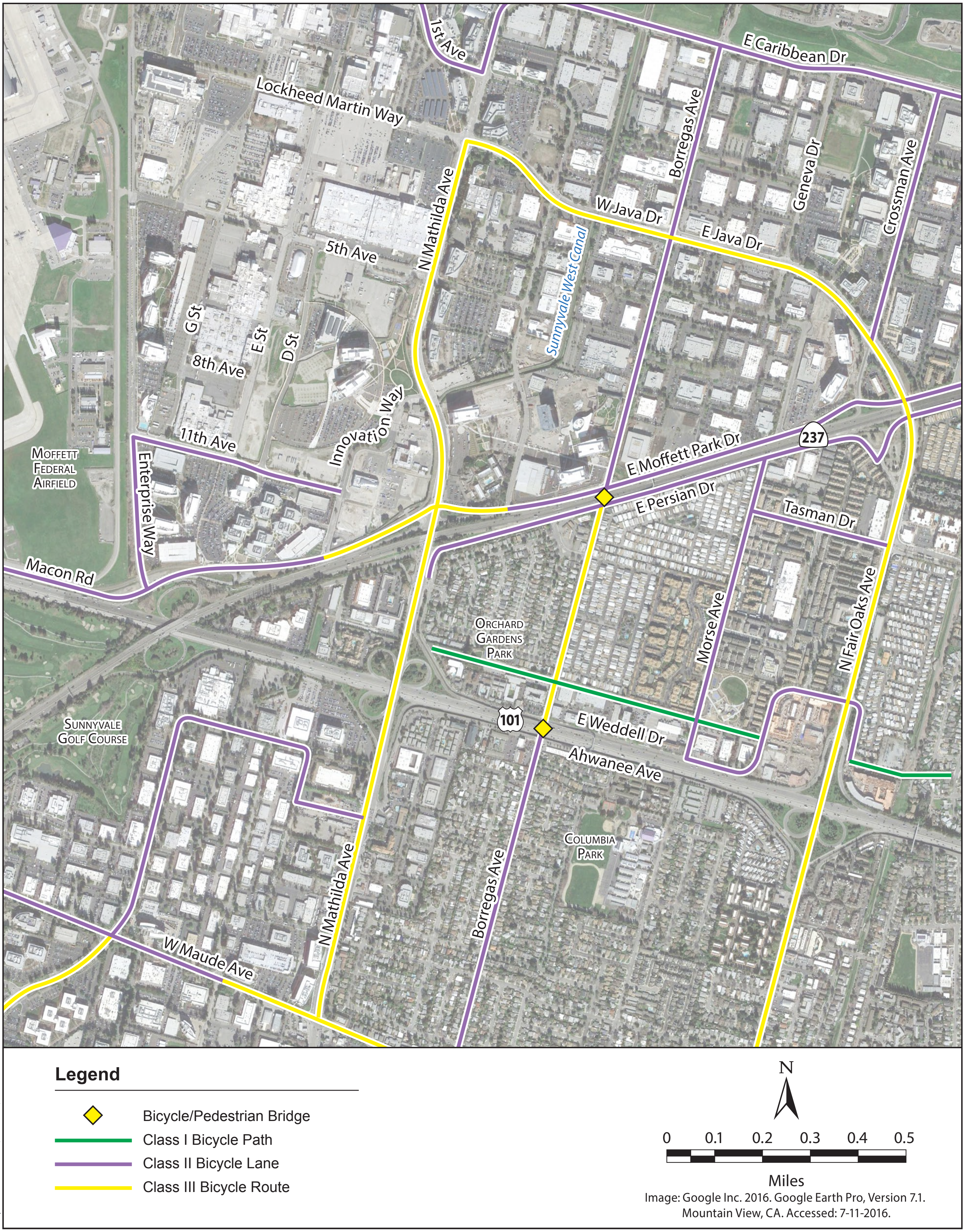
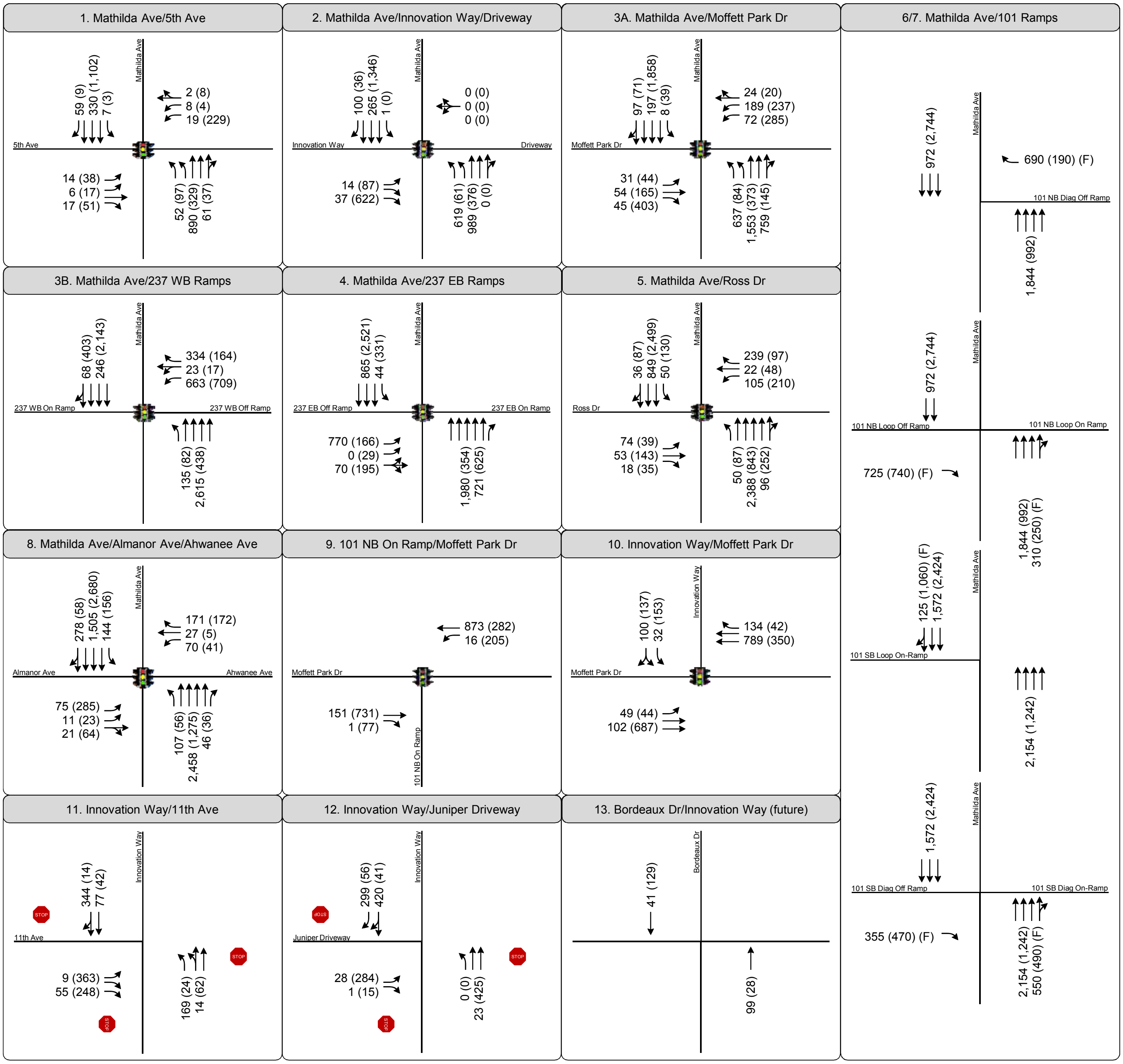


Figure 2.14-3
Existing Bicycle Facilities
Mathilda Avenue Improvements at SR 237 and US 101 Project



(##) - AM(PM) Peak Hour Demand Volumes

(F) - Unsignalized (free) Movement

Source: Fehr & Peers, 2016.

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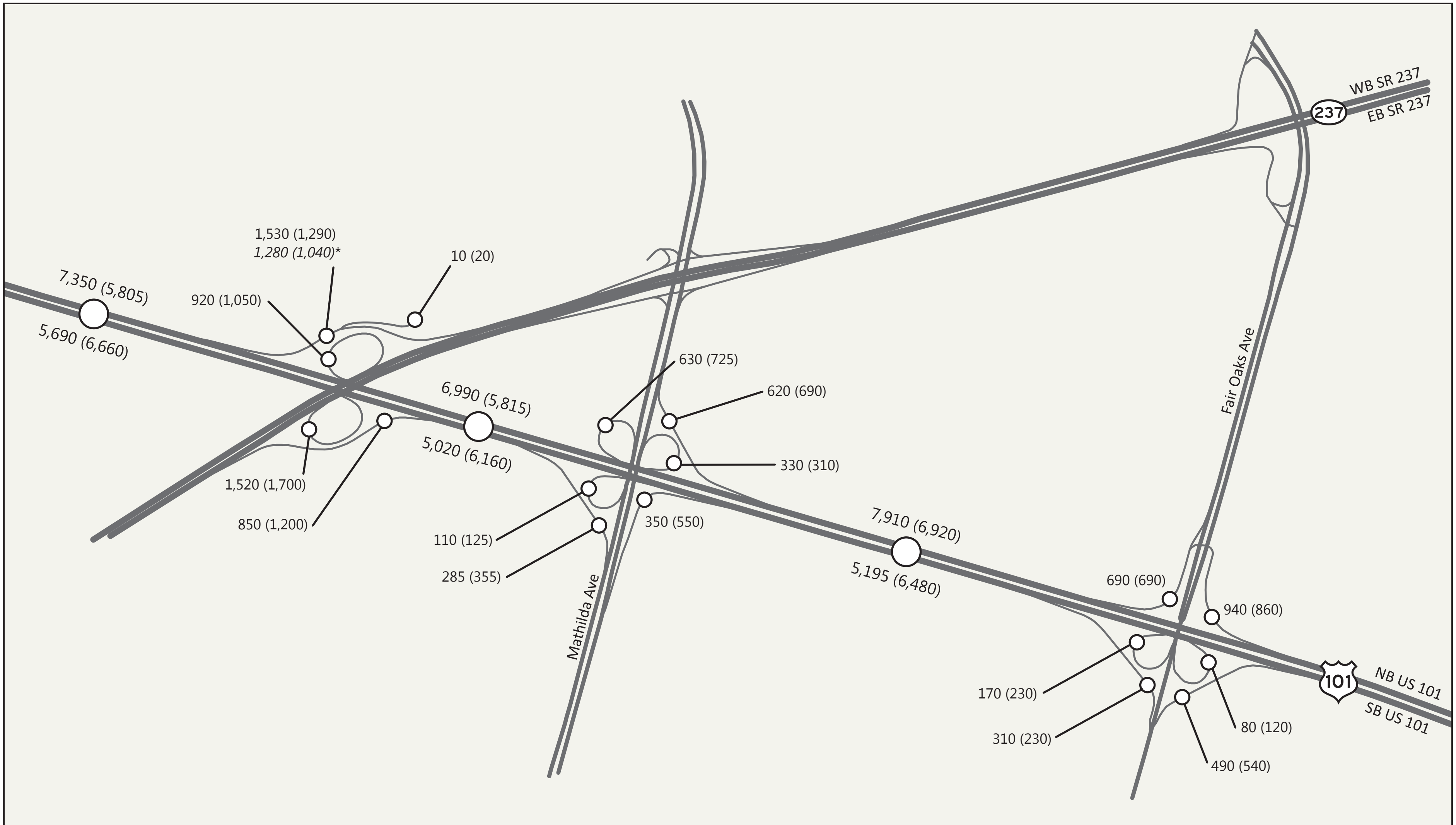
Figure 2.14-4

Existing (2013) Intersection Demand Peak Hour Volumes and Lane Configurations

Mathilda Avenue Improvements at SR 237 and US 101 Project



7:00 AM (8:00 AM) Segment/Ramp Volume Location

* The constrained on-ramp demand is shown in italics and reflects the condition that not all of the off-ramp unconstrained demand is delivered downstream due to congestion.

Source: Fehr & Peers, 2016.

N

No Scale

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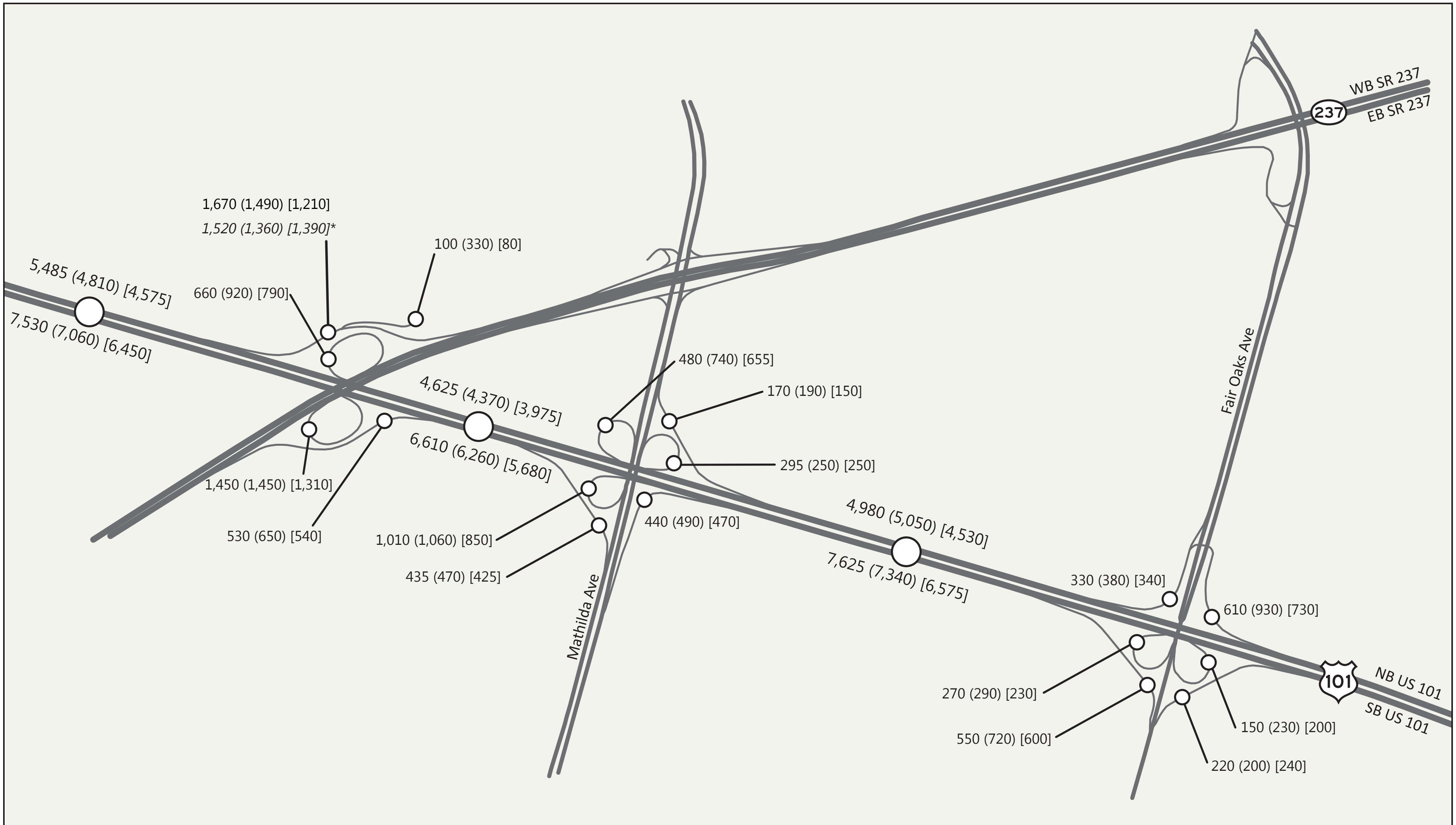
Figure 2.14-5
Existing (2013) AM Peak Period US 101 Demand Volumes
Mathilda Avenue Improvements at SR 237 and US 101 Project



4:00 PM (5:00 PM) [6:00 PM] Segment/Ramp Volume Location

* The constrained on-ramp demand is shown in italics and reflects the condition that not all of the off-ramp unconstrained demand is delivered downstream due to congestion.

Source: Fehr & Peers, 2016.

N

No Scale

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Figure 2.14-6
Existing (2013) PM Peak Period US 101 Demand Volumes
Mathilda Avenue Improvements at SR 237 and US 101 Project

7:00 AM (8:00 AM) Segment/Ramp Volume Location

** Ramp volume may not match ramp terminal intersection due to slip ramp form Moffett Park Drive.

N

No Scale

Source: Fehr & Peers, 2016.

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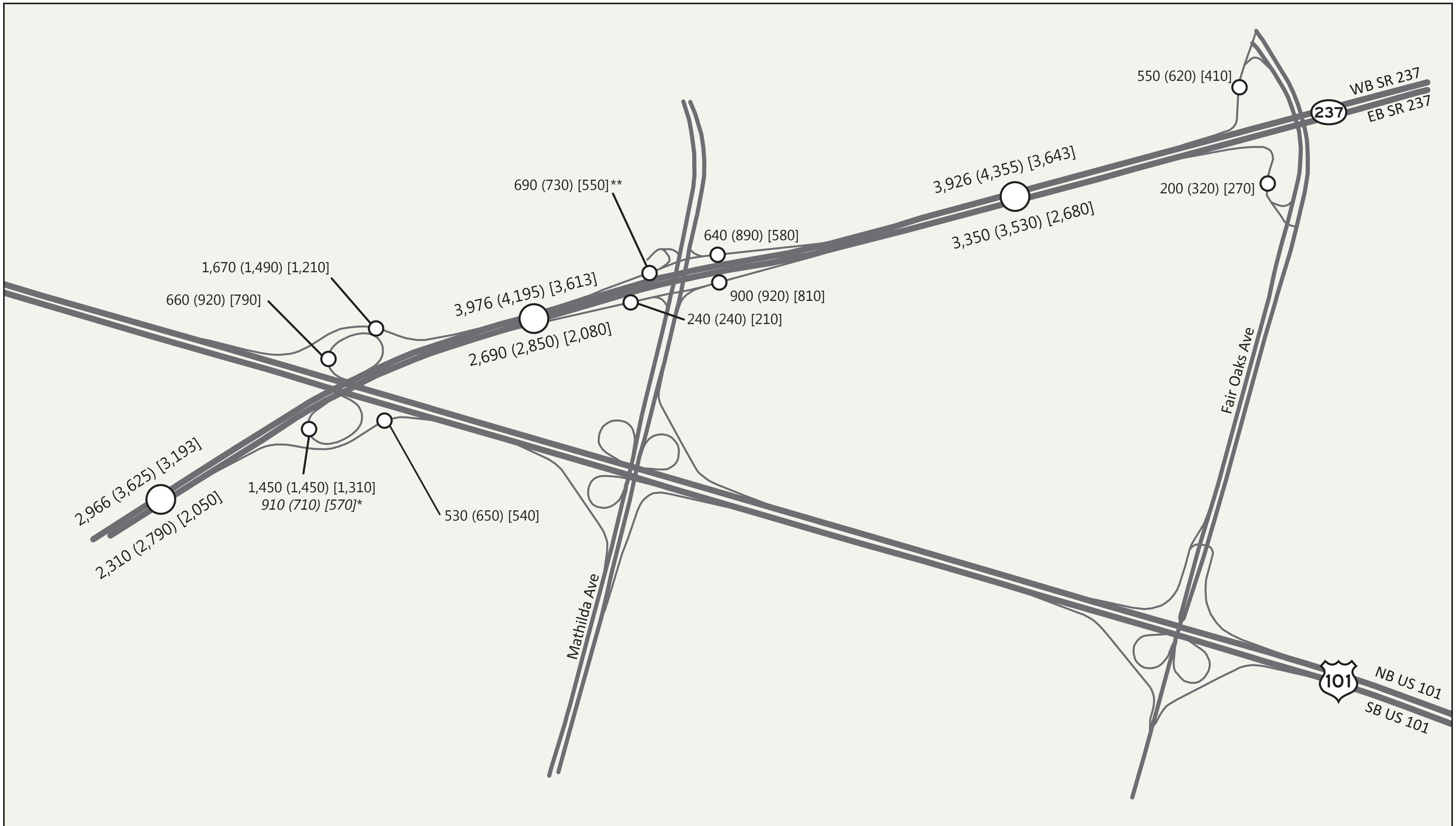
Figure 2.14-7
Existing (2013) AM Peak Period SR 237 Demand Volumes
Mathilda Avenue Improvements at SR 237 and US 101 Project



○ 4:00 PM (5:00 PM) [6:00 PM] Segment/Ramp Volume Location

* The constrained on-ramp demand is shown in italics and reflects the condition that not all of the off-ramp unconstrained demand is delivered downstream due to congestion.

** Ramp volume may not match ramp terminal intersection due to slip ramp form Moffett Park Drive.

Source: Fehr & Peers, 2016.

N

No Scale

Graphics ... 00522.13 (7-12-2016) tm

Figure 2.14-8
Existing (2013) PM Peak Period SR 237 Demand Volumes
Mathilda Avenue Improvements at SR 237 and US 101 Project

Table 2.14-3. Existing, 2018, and 2040 Peak Hour Intersection Analysis

				2013 Existing		2018 No-Build			2018 Build			2040 No-Build			2040 Build		
	Intersection	**Traffic Control[a]**	**Peak Hour[b]**	**Delay[c]**	**LOS**	**Delay[c]**	**LOS**	**% Demand Served[d]**	**Delay[c]**	**LOS**	**% Demand Served[d]**	**Delay[c]**	**LOS**	**% Demand Served[d]**	**Delay[c]**	**LOS**	**% Demand Served[d]**
1	Mathilda Avenue / Fifth Avenue[e]	Signal	AM	14.8	B	17.4	B	87.8	17.1	B	97.5	33.5	C	77.7	25.3	C	84.9
			PM	**112.4**	**F**	**227.0**	**F**	**85.7**	**238.1**	**F**	**79.8**	**>300**	**F**	**63.3**	**>300**	**F**	**66.9**
2	Mathilda Avenue / Innovation Way[e]	Signal	AM	20.6	C	42.1	D	83.5	44.1	D	98.7	**116.9**	**F**	**67.2**	**88.9**	**F**	**79.2**
			PM	**168.9**	**F**	**206.1**	**F**	**79.9**	**218.4**	**F**	**77.0**	**222.0**	**F**	**59.0**	**220.9**	**F**	**56.8**
3	Mathilda Avenue / Moffett Park Drive / SR 237 Westbound Ramps	Signal	AM	**131.0**	**F**	**>300**	**F**	**80.5**	53.1	D	98.2	**>300**	**F**	**63.3**	**81.4**	**F**	**79.7**
			PM	**286.7**	**F**	**>300**	**F**	**82.9**	**197.8**	**F**	**81.7**	**>300**	**F**	**65.0**	**221.4**	**F**	**62.5**
4	Mathilda Avenue / SR 237 Eastbound Ramps	Signal	AM	30.1	C	**116.3**	**F**	**78.1**	28.7	C	97.2	**257.7**	**F**	**59.7**	**142.3**	**F**	**76.9**
			PM	20.3	B	19.4	B	84.3	29.0	C	85.9	25.0	C	67.6	46.5	D	68.4
5	Mathilda Avenue / Ross Drive	Signal	AM	**94.6**	**F**	**285.7**	**F**	**74.6**	31.6	C	97.7	**>300**	**F**	**55.3**	76.0	E	80.6
			PM	46.7	D	**141.4**	**F**	**84.3**	46.9	D	88.2	**200.0**	**F**	**67.1**	**148.3**	**F**	**71.2**
6	Mathilda Avenue / US 101 Northbound Ramps (Project)	Slip Ramp (Signal)*	AM	N/A	N/A	N/A	N/A	N/A	47.2	D	98.2	N/A	N/A	N/A	**87.9**	**F**	**81.1**
			PM	N/A	N/A				47.8	D	90.3				**112.6**	**F**	**74.1**
7	Mathilda Avenue / US 101 Southbound Ramps (Project)	Slip Ramp (Signal)*	AM	N/A	N/A	N/A	N/A	N/A	20.7	C	97.8	N/A	N/A	N/A	42.0	D	79.6
			PM	N/A	N/A				11.1	B	91.7				29.0	C	78.3
8	Mathilda Avenue / Almanor Avenue-Ahwanee Avenue	Signal	AM	52.3	D	**>300**	**F**	**82.3**	**83.1**	**F**	**97.6**	**>300**	**F**	**62.3**	**>300**	**F**	**78.6**
			PM	48.8	D	**139.9**	**F**	**87.3**	34.9	C	94.3	**>300**	**F**	**67.9**	71.5	E	83.9
9	US 101 Northbound On-Ramp / Moffett Park Drive	Signal	AM	4.6	A	3.9	A	86.8	5.7	A	98.8	3.4	A	75.2	4.9	A	85.5
			PM	65.6	E	63.0	E	80.0	8.7	A	93.3	64.3	E	61.4	**85.4**	**F**	**61.1**
10	Innovation Way / Moffett Park Drive[e]	Signal	AM	12.4	B	13.7	B	85.7	19.2	B	99.5	14.2	B	73.6	24.8	C	83.6
			PM	**81.5**	**F**	**190.5**	**F**	**78.4**	**90.7**	**F**	**87.6**	**245.4**	**F**	**60.8**	**273.7**	**F**	**59.2**
11	Innovation Way / Eleventh Avenue[f]	AWSC (Signal)*	AM	7.7	A	10.5	B	85.0	11.8	B	98.5	10.4	B	75.6	10.9	B	85.1
			PM	6.8	A	**144.4**	**F**	**89.8**	**61.7**	**F**	**88.3**	**>300**	**F**	**59.2**	**>300**	**F**	**57.7**
12	Innovation Way / Juniper Networks Driveway	AWSC (Signal)*	AM	11.9	B	14.0	B	83.3	14.7	B	100.0	34.2	D	69.7	31.4	D	84.5
			PM	**120.6**	**F**	**>300**	**F**	**72.8**	**227.0**	**F**	**87.0**	**>300**	**F**	**50.3**	**>300**	**F**	**52.0**
13	Bordeaux Drive / Innovation Way (future)	AWSC (Signal)*	AM	N/A	N/A	3.2	A	100.0	12.7	B	99.1	4.7	A	100.0	**130.2**	**F**	**75.5**
			PM	N/A	N/A	13.5	B	100.0	**>300**	**F**	**61.1**	**7.1**	A	**65.0**	**>300**	**F**	**39.3**
	Total Vehicle Hours of Delay (hours)					**AM - 1,319** **PM - 1,504**			**AM - 493** **PM - 1,285**			AM - 2,989 PM - 3,830			AM - 1,948 PM - 3,130		
	Network-wide Percent Demand Served					**AM - 89.0%** **PM - 85.8%**			**AM - 99.3%** **PM - 89.9%**			AM - 79.9% PM - 70.6%			AM - 88.3% PM - 77.8%		

Source: Fehr & Peers 2016.
Results in **bold** represent unacceptable levels of service, N/A=not applicable.
* Traffic control type in parenthesis indicates traffic control under Build Conditions (only presented if Build Conditions differs from No-Build Conditions).
[a] Signal = signalized intersection; AWSC = all-way stop-controlled intersection; Slip Ramp = uncontrolled intersection.
[b] AM = morning peak hour, PM = evening peak hour.
[c] Average control delay in seconds.
[d] Modeled traffic volumes expressed as a ratio of **demand** traffic volume. For example: 100% indicates all demand is served.
[e] These intersections are coordinated with a light-rail crossing. Under Year 2018 and Year 2040, headway in each direction is assumed to increase from 15 minutes to 12 minutes in each direction based on the VTA light-rail efficiency project currently underway. The route from Mountain View to East San Jose is assumed to be complete in 2040, and operates with 15-minute headways.
[f] This intersection is signalized under Build Conditions and is coordinated with a light rail crossing.

Extended queues, indicating high peak period travel demand, have been observed at all intersections along Mathilda Avenue between Almanor Avenue/Ahwanee Avenue and Innovation Way. The most substantial delays occur at the Mathilda Avenue/Moffett Park Drive intersection during both AM and PM peak hours with queues spilling back to adjacent intersections. Regional growth and new local development, combined with closely spaced signalized intersections and inadequate storage for queuing vehicles, have resulted in the heavy traffic congestion experienced on Mathilda Avenue during both peak periods.

Travel times along the Mathilda Avenue corridor through the Project area are summarized in Table 2.14-4.

Table 2.14-4. Existing, 2018, and 2040 Mathilda Avenue Travel Times[a]

			No-Build		Build	
Direction	**Peak Hour**	**Free flow Travel Time(s)[b]**	**Congested Travel Time(s)**	**Delay(s)**	**Congested Travel Time(s)**	**Delay(s)**
Existing						
Mathilda Avenue Northbound	AM	116.2	395.9	279.7	N/A	N/A
	PM	116.2	310.5	194.3		
Mathilda Avenue Southbound	AM	116.2	339.6	223.4	N/A	N/A
	PM	116.2	835.2	719.0		
Year 2018						
Mathilda Avenue Northbound	AM	116.2	737.8	621.6	346.7	230.5
	PM	116.2	736.2	620.0	341.6	225.4
Mathilda Avenue Southbound	AM	116.2	432.8	316.6	399.2	283.0
	PM	116.2	1056.0	939.8	1124.3	1008.1
Year 2040						
Mathilda Avenue Northbound	AM	116.2	983.3	867.1	577.3	461.1
	PM	116.2	952.6	836.4	605.3	489.1
Mathilda Avenue Southbound	AM	116.2	954.3	838.1	437.7	321.5
	PM	116.2	1458.5	1342.3	1304.9	1188.7

Source: Fehr & Peers 2016.

[a] Travel time runs begin north of the San Aleso Avenue intersection and end south of the Lockheed Martin Way-Java Drive intersection (approximately 1.44 miles).

[b] Free flow speed is calculated assuming a travel speed of 45 miles per hour.

Freeway Mainline Operations Analysis

The following freeway mainline segments were analyzed:

1. US 101 between Ellis Street and Fair Oaks Avenue.
2. SR 237 between Fair Oaks Avenue and Maude Avenue.

The existing operating conditions for US 101 and SR 237 were analyzed and are presented in Table 2.14-5 for US 101 and Table 2.14-6 for SR 237.

In the northbound direction of US 101, traffic was observed to be in congestion throughout the mainline. In the AM peak period, a bottleneck was observed north of the Ellis Street interchange, and the congestion extended to south of the Lawrence Expressway interchange.

In the southbound direction of US 101, traffic was observed to be in congestion throughout the mainline. In the PM peak period, a bottleneck existed south of the study segments (at the US 101/Lawrence Expressway interchange and the US 101/De La Cruz Boulevard interchange), and congestion was observed to spill back throughout the study segments but dissipated after the PM peak period.

On eastbound SR 237, in the AM peak period, there was little to no congestion throughout the study segments, but congestion occurred in the westbound direction at the US 101 interchange. Westbound congestion at US 101 is directly attributed to the northbound US 101 merge spilling back onto the 237 auxiliary lane. In addition, westbound SR 237 vehicles continuing past the US 101 interchange continued to travel slowly due to the very limited merging distance from the US 101 northbound loop on-ramp.

In the PM peak period, the SR 237 eastbound mixed-flow lanes and HOV lane were observed to flow with minimal congestion. The westbound direction continued to see congestion on the US 101 northbound ramps that backed up to around the Mathilda Avenue ramps.

The weaving analysis for the freeway segments within the study area was performed using the Leisch Method[1]. Auxiliary lanes are provided intermittently along US 101 and SR 237 in both directions within the study area. Table 2.14-7 summarizes the existing peak hour mainline weaving operations at locations that provide an auxiliary lane. As shown, weave sections operate between LOS B and LOS F. Existing system-wide MOEs for the AM and PM peak periods for US 101 and SR 237 are presented in Table 2.14-7.

The highest vehicle miles traveled and average travel time occurs on southbound US 101 during the PM peak period. The average travel speed is 13 miles per hour (mph), and over 1,600 hours of vehicle delay occur during the PM peak period.

[1] The Leisch Method is one of the methodologies accepted by Caltrans for the analysis of freeway weaving sections.

Table 2.14-5. Existing, 2018, and 2040 US 101 Peak Hour Level of Service

Segment	Type	Existing		Year 2018				Year 2040			
				No-Build		Build		No-Build		Build	
		Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM
US 101 Northbound[b]											
Fair Oaks Off-Ramp	Diverge	**75.4**/25.8	**F**/C	**74.0**/26.2 (29.7/11.6)	**F**/D (D/B)	**73.7**/26.2 (29.7/11.6)	**F**/D (D/B)	**80.3/38.6*** (14.2/6.7)	**F/F** (B/A)	**78.7/45.0*** (14.2/6.7)	**F/F** (B/A)
Fair Oaks Off-Ramp to Fair Oaks On-Ramp	Basic	**68.1**/21.5	**F**/C	**67.9**/21.8 (22.0/9.8)	**F**/C (C/A)	**67.5**/21.8 (22.0/9.8)	**F**/C (C/A)	**72.5/49.3*** (12.8/5.7)	**F/F** (B/A)	**70.9/54.8*** (12.8/5.7)	**F/F** (B/A)
Fair Oaks On-Ramp	Merge	**53.8**/23.4	**F**/C	**51.6**/24.2 (26.4/10.3)	**F**/C (D/A)	**51.9**/24.2 (26.4/10.3)	**F**/C (D/A)	**50.8/58.1*** (13.7/6.1)	**F/F** (B/A)	**49.6/62.4** (13.7/6.1)	**F/F** (B/A)
Fair Oaks On-Ramp to Mathilda Northbound Off Ramp	Basic	**55.6**/23.4	**F**/C	**54.3**/24.2 (26.4/10.3)	**F**/C (D/A)	**54.7**/24.2 (26.4/10.3)	**F**/C (D/A)	**53.7/66.7*** (13.7/6.1)	**F/F** (B/A)	**52.4/71.0** (13.7/6.1)	**F/F** (B/A)
Mathilda Northbound Off-Ramp	Diverge	**57.3**/23.4	**F**/C	**54.9**/17.8 (26.4/10.3)	**F**/B (D/A)	**55.8**/17.8 (26.4/10.3)	**F**/B (D/A)	**54.6/74.1** (13.7/6.1)	**F/F** (B/A)	**57.0/85.3** (13.7/6.1)	**F/F** (B/A)
Mathilda Northbound Off-Ramp to Mathilda Northbound On-Ramp	Basic	**61.4**/22.5	**F**/C	**59.9**/23.0 (21.8/9.9)	**F**/C (C/A)	**65.6**/19.2 (20.1/8.4)	**F**/C (C/A)	**59.4/87.9** (12.8/5.8)	**F/F** (B/A)	**62.7/119.8** (12.0/4.8)	**F/F** (B/A)
Mathilda Northbound On-Ramp	Merge	**61.3**/23.8	**F**/C	**59.9**/24.2 (24.1/10.1)	**F**/C (C/A)	**65.6**/20.4 (20.9/8.8)	**F**/C (C/A)	**59.9/89.3** (13.0/5.9)	**F/F** (B/A)	**62.9/123.1** (12.3/5.1)	**F/F** (B/A)
Mathilda Northbound On-Ramp to Mathilda Southbound Off-Ramp[d]	Basic	**61.5**/23.8	**F**/C	**60.7**/24.2 (24.1/10.1)	**F**/C (C/A)	**66.8**/20.4 (20.9/8.8)	**F**/C (C/A)	**60.5/90.7** (13.0/5.9)	**F/F** (B/A)	**63.9/126.0** (12.3/5.1)	**F/F** (B/A)
Mathilda Southbound Off-Ramp[e]	Diverge	**61.7**/23.8	**F**/C	**59.5**/24.3 (24.1/10.1)	**F**/C (C/A)	N/A	N/A	**59.3/88.0** (13.0/5.9)	**F/F** (B/A)	N/A	N/A
Mathilda Southbound Off-Ramp to SR 237 Westbound Off-Ramp[e]	Basic	**66.1**/20.3	**F**/C	**65.0**/20.1 (20.7/8.7)	**F**/C (C/A)	N/A	N/A	**64.4/116.4** (12.2/5.0)	**F/F** (B/A)	N/A	N/A
SR 237 Westbound Off-Ramp	Diverge	**70.1**/20.3	**F**/C	**66.5/18.9*** (20.7/8.7)	**F/F** (C/A)	**70.0/37.8*** (20.9/8.8)	**F/F** (C/A)	**65.0/131.1** (12.2/5.0)	**F/F** (B/A)	**66.0/149.0** (12.3/5.1)	**F/F** (B/A)
SR 237 Westbound Off-Ramp to SR 237 Westbound On-Ramp	Basic	**82.2/13.6**	**F/F**	**81.1/38.1*** (18.1/7.0)	**F/F** (C/A)	**85.1/64.8** (18.4/7.2)	**F/F** (C/A)	**80.3/198.9** (10.5/4.0)	**F/F** (A/A)	**81.7/220.9** (10.6/4.1)	**F/F** (A/A)
SR 237 Westbound On-Ramp	Merge	**74.3/35.8**	**F/F**	**68.4/53.8** (22.0/10.4)	**F/F** (C/A)	**70.7/73.1** (24.2/10.5)	**F/F** (C/A)	**68.3/154.9** (12.5/5.8)	**F/F** (B/A)	**69.3/156.8** (12.6/5.9)	**F/F** (B/A)
SR 237 Westbound On-Ramp to Ellis	Basic	**76.9/59.8**	**F/F**	**75.8/72.2** (22.0/10.4)	**F/F** (C/A)	**78.4/92.3** (24.2/10.5)	**F/F** (C/A)	**75.7/169.8** (12.5/5.8)	**F/F** (B/A)	**76.7/170.1** (12.6/5.9)	**F/F** (B/A)

Segment	Type	Existing		Year 2018				Year 2040			
				No-Build		Build		No-Build		Build	
		Density[a] AM/PM	**LOS[b] AM/PM**	**Density[a] AM/PM**	**LOS[b] AM/PM**	**Density[a] AM/PM**	**LOS[b] AM/PM**	**Density[a] AM/PM**	**LOS[b] AM/PM**	**Density[a] AM/PM**	**LOS[b] AM/PM**
US 101 Southbound[c]											
Ellis On-Ramp to SR 237 Eastbound Off-Ramp	Weave	23.8/**107.4**	C/**F**	18.8/**84.5** (15.2/24.7)	C/**F** (B/C)	18.8/**88.0** (15.2/24.7)	C/**F** (B/C)	21.3/**112.7** (8.5/13.9)	C/**F** (A/B)	21.3/**117.4** (8.5/13.9)	C/**F** (A/B)
SR 237 Eastbound Off-Ramp	Diverge	23.8/**91.7**	C/**F**	18.8/**71.7** (15.2/24.7)	C/**F** (B/C)	18.8/**75.9** (15.2/24.7)	C/**F** (B/C)	21.3/**95.6** (8.5/13.9)	C/**F** (A/B)	21.3/**101.4** (8.5/13.9)	C/**F** (A/B)
SR 237 Eastbound Off-Ramp to SR 237 Eastbound On-Ramp	Basic	17.0/**158.2**	B/**F**	17.9/**145.2** (11.0/18.0)	B/**F** (A/B)	18.8/**146.6** (11.5/18.3)	C/**F** (B/C)	18.6/**172.6** (5.7/10.8)	C/**F** (A/A)	19.8/**174.6** (6.0/11.0)	C/**F** (A/B)
SR 237 Eastbound On-Ramp	Merge	15.7/**181.7**	B/**F**	16.4/**111.5** (13.0/19.5)	B/**F** (B/C)	17.1/**114.4** (13.4/19.9)	B/**F** (B/C)	17.4/**139.3** (6.9/11.8)	B/**F** (A/B)	18.3/**146.9** (7.2/12.0)	C/**F** (A/B)
SR 237 Eastbound On-Ramp to Mathilda Off-Ramp	Weave	15.7/**186.2**	B/**F**	16.4/**115.6** (13.0/19.5)	B/**F** (B/C)	17.1/**118.9** (13.4/19.9)	B/**F** (B/C)	17.4/**144.8** (6.9/11.8)	B/**F** (A/B)	18.3/**152.2** (7.2/12.0)	C/**F** (A/B)
Mathilda Off-Ramp	Diverge	15.7/**182.8**	B/**F**	16.4/**111.6** (13.0/19.5)	B/**F** (B/C)	17.1/**114.3** (13.4/19.9)	B/**F** (B/C)	17.4/**138.7** (6.9/11.8)	B/**F** (A/B)	18.3/**145.0** (7.2/12.0)	C/**F** (A/B)
Mathilda Off-Ramp to Mathilda Southbound On-Ramp	Basic	19.6/**151.4**	C/**F**	20.5/**143.0** (12.3/18.0)	C/**F** (B/C)	20.5/**145.7** (12.3/18.2)	C/**F** (B/C)	21.2/**170.2** (6.5/10.7)	C/**F** (A/A)	21.2/**177.3** (6.5/10.7)	C/**F** (A/A)
Mathilda Southbound On-Ramp	Merge	20.1/**109.5**	C/**F**	20.9/**97.9** (12.6/20.7)	C/**F** (B/C)	20.9/**103.2** (12.6/20.7)	C/**F** (B/C)	21.7/**122.2** (6.6/12.1)	C/**F** (A/B)	21.7/**135.0** (6.6/11.9)	C/**F** (A/B)
Mathilda Northbound On-Ramp	Merge	21.7/**97.7**	C/**F**	22.1/**87.9** (13.3/21.9)	C/**F** (B/C)	22.8/**88.0** (13.5/22.1)	C/**F** (B/C)	23.0/**116.4** (6.9/12.7)	C/**F** (A/B)	23.6/**114.9** (7.0/12.8)	C/**F** (A/B)
Mathilda Northbound On-Ramp to Fair Oaks Southbound Off-Ramp	Basic	21.7/**102.6**	C/**F**	22.1/**92.2** (13.3/21.9)	C/**F** (B/C)	22.7/**93.3** (13.5/22.1)	C/**F** (B/C)	23.0/**120.4** (6.9/12.7)	C/**F** (A/B)	23.5/**121.4** (7.0/12.8)	C/**F** (A/B)
Fair Oaks Southbound Off-Ramp	Diverge	21.7/**97.1**	C/**F**	22.1/**86.5** (13.3/21.9)	C/**F** (B/C)	22.7/**87.6** (13.5/22.1)	C/**F** (B/C)	23.0/**115.0** (6.9/12.7)	C/**F** (A/B)	23.6/**115.9** (7.0/12.8)	C/**F** (A/B)
Fair Oaks Southbound Off-Ramp to Fair Oaks Southbound On-Ramp	Basic	20.2/**128.7**	C/**F**	20.8/**119.0** (12.7/20.3)	C/**F** (B/C)	21.1/**119.8** (12.9/20.6)	C/**F** (B/C)	21.4/**143.1** (6.6/11.9)	C/**F** (A/B)	21.8/**144.0** (6.8/12.1)	C/**F** (A/B)
Fair Oaks Southbound On-Ramp	Merge	15.7/**171.8**	B/**F**	16.2/**88.7** (13.2/21.2)	B/**F** (B/C)	16.5/**89.4** (13.4/21.5)	B/**F** (B/C)	16.8/**107.3** (6.9/12.4)	B/**F** (A/B)	17.2/**108.0** (7.1/12.6)	B/**F** (A/B)
Fair Oaks Northbound Off-Ramp	Diverge	15.7/**172.9**	B/**F**	16.2/**89.8** (13.2/21.2)	B/**F** (B/C)	16.5/**90.5** (13.4/21.5)	B/**F** (B/C)	16.8/**108.8** (6.9/12.4)	B/**F** (A/B)	17.2/**109.4** (7.1/12.6)	B/**F** (A/B)

Segment	Type	Existing		Year 2018				Year 2040			
				No-Build		Build		No-Build		Build	
		Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM	Density[a] AM/PM	LOS[b] AM/PM
Fair Oaks Northbound Off-Ramp to Fair Oaks Northbound On-Ramp	Basic	20.6/**126.8**	C/**F**	21.2/**116.9** (13.0/20.7)	C/**F** (B/C)	21.6/**117.6** (13.3/21.0)	C/**F** (B/C)	22.0/**139.8** (6.8/12.2)	C/**F** (A/B)	22.7/**140.7** (7.0/12.3)	C/**F** (A/B)
Fair Oaks Northbound On-Ramp	Merge	22.8/**117.5**	C/**F**	23.8/**107.2** (14.4/21.4)	C/**F** (B/C)	24.3/**107.9** (14.6/21.6)	C/**F** (B/C)	25.5/**128.3** (7.6/12.6)	C/**F** (A/B)	26.2/**129.1** (7.8/12.7)	D/**F** (A/B)

Source: Fehr & Peers 2016.

Bold font indicates LOS F conditions. Locations marked with an asterisk (*) designate the end of bottleneck congestion. A segment may be designated LOS F even if the density is below the LOS F threshold if any portion of the segment is in queue.

Merge, diverge, and weave segments were not calculated differently from basic segments. All results are based on the density produced from the peak period mainline analysis (FREQ). Weaving segments are further evaluated in the Mainline Weaving Analysis section of the TOAR. Refer to the TOAR for # of lanes by segment and year.

[a] Density and LOS results shown as: mixed-flow lanes (express lane).

[b] The AM peak hour for northbound US 101 occurs between 7:00 a.m. and 8:00 a.m. The PM peak hour for northbound US 101 occurs between 5:00 p.m. and 6:00 p.m.

[c] The AM peak hour for southbound US 101 occurs between 7:00 a.m. and 8:00 a.m. The PM peak hour for southbound US 101 occurs between 5:00 p.m. and 6:00 p.m.

[d] Due to the closure of the US 101 northbound loop off-ramp to southbound Mathilda Avenue, this freeway segment is assumed to extend from the Mathilda Avenue loop on-ramp to SR 237 westbound off-ramp.

[e] These segments do not exist under the Build Alternative due to the closure of the US 101 northbound loop off-ramp to southbound Mathilda Avenue.

Table 2.14-6. Existing, 2018, and 2040 SR 237 Peak Hour Level of Service

Segment	Type	Existing		Year 2018				Year 2040			
				No-Build		Build		No-Build		Build	
		Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM
SR 237 Westbound[b]											
Lawrence On-Ramp to Crossman On-Ramp	Basic	23.0/19.2	C/B	41.7/29.5 (19.3/10)	D/D (C/A)	54.6/30.4 (19.3/10)	D/D (C/A)	**94.6/110.8** (22.7/12.0)	**F/F** (C/B)	**94.6/110.8** (22.7/12.0)	**F/F** (C/B)
Crossman On-Ramp	Merge	24.5/22.1	C/C	55.2/45.5 (19.3/10)	D/E (C/A)	**62.5**/46.2 (19.3/10)	**F**/E (C/A)	38.2/38.3 (23.6/12.8)	E/E (C/B)	38.2/38.3 (23.6/12.8)	E/E (C/B)
Crossman On-Ramp to Mathilda Off-Ramp	Basic	24.5/**47.9**	C/**F**	**65.0**/50.9 (19.3/20)	**F**/E (C/A)	**71.2**/51.5 (19.3/10)	**F**/E (C/A)	37.3/37.6 (23.6/12.8)	E/E (C/B)	37.3/37.7 (23.6/12.8)	E/E (C/B)
Mathilda Off-Ramp	Diverge	27.1/**55.0**	C/**F**	**57.1**/47.4	**F**/D	**60.8**/48.1	**F**/D	21.2/21.2 (23.6/12.8)	C/C (C/B)	21.2/21.3 (23.6/12.8)	C/C (C/B)
Mathilda Off-Ramp to Mathilda On-Ramp	Basic	40.4/**84.4**	E/**F**	**69.7/72.7**	**F/F**	**73.4/73.2**	**F/F**	25.6/24.4 (19.1/10.0)	C/C (C/A)	25.6/24.4 (19.1/10.0)	C/C (C/A)
Mathilda On-Ramp to US 101 Northbound Off-Ramp	Weave	**48.4/53.3**	**F/F**	**56.0/73.0**	**F/F**	**56.4/73.5**	**F/F**	17.8/18.8 (19.6/10.7)	B/C (C/A)	17.9/18.8 (19.6/10.6)	B/C (C/A)
US 101 Northbound Off-Ramp to US 101 Northbound On-Ramp	Basic	18.5/19.4	B/B	18.5/19.2	C/C	18.5/19.4	C/C	17.8/17.7 (13.7/7.3)	B/B (B/A)	18.0/17.5 (13.87/7.2)	B/B (B/A)
US 101 Northbound On-Ramp	Merge	26.7/28.2	C/D	23.5/25.9	C/C	23.4/26.1	C/D	22.1/24.4 (15.9/9.3)	C/C (B/A)	22.3/24.2 (16.1/9.1)	C/C (B/A)
Maude Off-Ramp	Diverge	26.7/28.2	C/D	23.5/25.9	C/C	23.4/26.1	C/D	22.1/24.4 (15.9/9.3)	C/C (B/A)	22.3/24.2 (16.1/9.1)	C/C (B/A)
SR 237 Eastbound[c]											
Maude On-Ramp to US 101 Southbound Off-Ramp	Weave	19.7/14.3	C/B	22.0/**81.9**	C/**F**	22.0/**36.8** *****	C/**F**	20.9/**127.7** (19.4/16.0)	C/**F** (C/B)	20.6/**115.3** (19.5/16.0)	C/**F** (C/B)
US 101 Southbound Off-Ramp to US 101 Southbound On-Ramp	Basic	20.3/16.5	C/B	22.7/**129.6**	C/**F**	22.8/**88.4**	C/**F**	21.6/**183.3** (13.8/13.0)	C/**F** (B/B)	21.0/**164.3** (13.7/13.0)	C/**F** (B/B)
US 101 Southbound On-Ramp	Merge	22.3/14.6	C/B	28.9/**75.4**	D/**F**	23.9/**61.0**	C/**F**	22.9/**145.4** (20.6/17.1)	C/**F** (C/B)	22.5/**136.6** (20.5/16.8)	C/**F** (C/B)
US 101 Southbound On-Ramp to Mathilda Off-Ramp	Basic	22.3/14.6	C/B	28.9/**79.3**	D/**F**	23.9/**68.7**	C/**F**	22.9/**161.1** (20.6/17.1)	C/**F** (C/B)	22.5/**158.2** (20.5/16.8)	C/**F** (C/B)
Mathilda Off-Ramp	Diverge	22.3/14.6	C/B	28.9/**83.3**	D/**F**	23.9/**76.5**	C/**F**	22.9/**157.8** (20.6/17.1)	C/**F** (C/B)	22.5/**159.6** (20.5/16.8)	C/**F** (C/B)

Segment	Type	Existing		Year 2018				Year 2040			
				No-Build		Build		No-Build		Build	
		Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM	Density[a] AM/PM	LOS AM/PM
Mathilda Off-Ramp to Mathilda On-Ramp	Basic	29.0/20.1	D/C	34.5/**129.4**	D/**F**	34.5/**109.0**	D/**F**	26.9/**171.8** (17.9/16.0)	D/**F** (B/B)	28.9/**169.3** (18.5/15.9)	D/**F** (C/B)
Mathilda On-Ramp	Merge	38.7/29.4	E/D	23.5/**105.4**	C/**F**	24.7/**88.8**	C/**F**	19.8/**144.0** (19.7/18.5)	C/**F** (C/C)	21.7/**137.7** (21.2/18.7)	C/**F** (C/C)
Mathilda On-Ramp to Persian Off-Ramp	Basic	33.3/22.2	D/C	18.4/**102.2** (15.5/13.1)	C/**F** (B/B)	19.3/**81.5** (16.4/11.3)	C/**F** (b/B)	19.8/**107.9** (19.7/18.5)	C/**F** (C/C)	21.7/**102.4** (21.2/18.7)	C/**F** (C/C)
Persian Off-Ramp to Lawrence	Basic	32.5/19.6	D/C	25.7/**147.5** (15.5/13.1)	C/**F** (B/B)	27.4/**116.3** (16.4/11.3)	D/**F** (b/B)	27.8/**148.6** (18.9/18.0)	D/**F** (C/B)	32.0/**142.8** (20.3/18.0)	D/**F** (C/C)

Source: Fehr & Peers 2016.

Bold font indicates LOS F conditions. Locations marked with an asterisk (*) designate the end of bottleneck congestion. A segment may be designated LOS F even if the density is below the LOS F threshold if any portion of the segment is in queue.

Merge, diverge, and weave segments were not calculated differently from basic segments. All results are based on the density produced from FREQ. Weaving segments are further evaluated in the Mainline Weaving Analysis section of the TOAR. Refer to the TOAR for # of lanes by segment and year.

[a] Density and LOS results shown as: mixed-flow lanes (express lane).

[b] The AM peak hour for westbound SR 237 occurs between 7:00 a.m. and 8:00 a.m. The PM peak hour for westbound SR 237 occurs between 5:00 p.m. and 6:00 p.m.

[c] The AM peak hour for eastbound SR 237 occurs between 8:00 a.m. and 9:00 a.m. The PM peak hour for eastbound SR 237 occurs between 5:00 p.m. and 6:00 p.m.

Table 2.14-7. Existing, 2018, and 2040 Peak Period Measures of Effectiveness

Scenario	Measure of Effectiveness	Peak Hour	Existing	Year 2018			Year 2040		
				No-Build	Build		No-Build	Build	
					Results	% Change		Results	% Change
US 101 Northbound	Vehicle Miles of Travel (vehicle-miles)	AM PM	20,110 24,630	25,070 30,250	24,530 29,860	-2.2% -1.3%	25,810 32,500	25,530 31,660	-1.1% -2.7%
	Average Travel Time (min:sec)	AM PM	06:25 02:52	6:37 3:40	7:20 4:54	9.8% 25.2%	6:36 10:11	7:04 11:05	6.6% 8.1%
	Average Travel Speed (mph)	AM PM	20 45	19.6 35.3	17.7 26.4	-10.7% -33.7%	19.6 12.7	18.3 11.7	-7.1% -8.5%
	Mainline Vehicle Delay (vehicle-hours)	AM PM	662 160	672 314	763 527	11.9% 40.4%	660 1,562	730 1,703	9.6% 8.3%
	Maximum Individual Vehicle Delay (min:sec)	AM PM	04:30 01:18	4:48 3:10	5:36 5:45	14.3% 44.9%	4:40 14:32	5:19 15:43	12.2% 7.5%
US 101 Southbound	Vehicle Miles of Travel (vehicle-miles)	AM PM	17,800 28,150	24,090 36,350	24,590 36,330	2.0% -0.1%	23,650 35,910	24,380 35,760	3.0% -0.4%
	Average Travel Time (min:sec)	AM PM	02:07 09:29	2:02 9:10	2:03 9:17	0.8% 1.3%	1:59 11:16	2:01 11:33	1.7% 2.5%
	Average Travel Speed (mph)	AM PM	60 13	62.0 13.8	61.5 13.6	-0.8% -1.5%	63.6 11.2	62.5 10.9	-1.8% -2.8%
	Mainline Vehicle Delay (vehicle-hours)	AM PM	24 1,695	17 1569	21 1595	19.0% 1.6%	8 1,906	12 1,946	33.3% 2.1%
	Maximum Individual Vehicle Delay (min:sec)	AM PM	00:11 08:16	0:10 8:08	0:13 8:16	23.1% 1.6%	0:05 9:55	0:06 10:05	16.7% 1.7%
SR 237 Westbound	Vehicle Miles of Travel (vehicle-miles)	AM PM	18,560 23,060	19,800 25,210	19,600 25,240	-1.0% 0.1%	20,030 27,300	20,090 27,230	0.3% -0.3%
	Average Travel Time (min:sec)	AM PM	02:22 02:49	3:46 2:53	4:02 2:54	6.6% 0.6%	2:33 3:01	2:33 3:01	0.0% 0.0%
	Average Travel Speed (mph)	AM PM	56 47	35.6 46.5	33.3 46.3	-6.9% -0.4%	52.6 44.5	52.6 44.5	0.0% 0.0%
	Mainline Vehicle Delay (vehicle-hours)	AM PM	41 136	220 142	240 152	8.3% 6.6%	110 163	110 163	0.0% 0.0%
	Maximum Individual Vehicle Delay (min:sec)	AM PM	00:25 01:37	1:58 1:32	2:08 1:34	7.8% 2.1%	0:32 1:05	0:32 1:05	0.0% 0.0%

Scenario	Measure of Effectiveness	Peak Hour	Existing	Year 2018			Year 2040		
				No-Build	Build		No-Build	Build	
					Results	% Change		Results	% Change
SR 237 Eastbound	Vehicle Miles of Travel (vehicle-miles)	AM PM	17,650 20,720	16,200 19,740	16,400 21,020	1.3% 6.1%	19,060 22,020	20,050 22,820	4.9% 3.5%
	Average Travel Time (min:sec)	AM PM	02:08 02:06	2:13 9:32	2:12 8:04	-0.8% -18.2%	2:10 14:31	2:12 13:22	1.5% -8.6%
	Average Travel Speed (mph)	AM PM	62 63	60.4 14.1	60.9 16.6	0.8% 15.1%	61.8 9.2	60.9 10.0	-1.5% -8.0%
	Mainline Vehicle Delay (vehicle-hours)	AM PM	12 11	20 1124	17 751	-16.3% -49.5%	14 1,497	17 1,441	20.0% -3.9%
	Maximum Individual Vehicle Delay (min:sec)	AM PM	00:10 00:04	0:13 11:28	0:10 7:10	-20.0% -60.0%	0:07 18:41	0:10 17:49	30.0% -4.9%
Source: Fehr & Peers 2016.									

2.14.4 Impact Analysis

This section evaluates the potential impacts on traffic/transportation associated with the No-Build and Build conditions for both Opening Year 2018 and Design Year 2040.

The traffic operations analysis results for all study scenarios, which were combined for comparison purposes, were presented in the section tables as follows:

- Table 2.14-3 – study intersection peak hour delay and LOS summary.
- Table 2.14-4 – Mathilda Avenue travel times.
- Table 2.14-5 – US 101 mainline peak hour LOS summary.
- Table 2.14-6 – SR 237 mainline peak hour LOS summary.
- Table 2.14-7 – US 101 and SR 237 mainline peak period network MOEs for both directions.
- Table 2.14-8 – 2018 and 2040 Innovation Way travel times.

For the queuing analysis and results, refer to the TOAR. The following describes the traffic operational impacts for the No-Build Alternative and the Build Alternative compared to the No-Build Alternative under Opening Year 2018 and Design Year 2040 conditions.

2.14.4.1 Opening Year 2018

Local Roadway and Ramp Termini Operations

No-Build Alternative

In general, peak hour traffic volumes are highest on Mathilda Avenue at the US 101 and SR 237 interchanges, and the highest traffic volumes occur in the vicinity of the Ahwanee Avenue /Almanor Avenue intersection.

Most study intersections along Mathilda Avenue are anticipated to operate at LOS F during one or both peak hours (see Table 2.14-3). The percent demand served is on average 89 and 86 percent during the AM and PM peak hours, respectively, which is indicative of the projected traffic demand exceeding the capacity of the roadway system. The total vehicle hours of delay are estimated to be over 1,300 in the AM peak hour and over 1,500 in the PM peak hour. On opening day, Innovation Way is assumed to extend from its current terminus at Mathilda Avenue to Bordeaux Drive as part of the Moffett Place development.

Build Alternative

Under the Build Alternative, peak hour traffic volumes on Mathilda Avenue would be similar to the No-Build Alternative with the exception of the segments between Moffett Park Drive and Innovation Way and between the US 101 and SR 237 interchanges due to the shift of traffic from eastbound 237 to southbound 101. Some additional traffic would be routed between Mathilda Avenue and Moffett Park Drive via Bordeaux Drive and Innovation Way.

The Build Alternative would improve traffic conditions at most of the study intersections. However, some would continue to operate under congested conditions, similar to the No-Build Alternative. During the AM peak hour the total vehicle hours of delay would be reduced from 1,319 to 493 (63 percent reduction compared to No-Build) and from 1,504 to 1,285 (15 percent reduction compared to No-Build) during the PM hour (see Table 2.14-3). Overall, the Build Alternative would provide a net reduction of 1,045 vehicle hours of delay during the AM and PM peak hours compared to No-Build conditions. Under the Build Alternative, an additional demand of approximately 10 percent in the AM hour and 4 percent in the PM hour would be served. The Build Alternative would also reduce queuing on local streets and freeway ramps. While conditions would improve during the PM peak hour under the Build Alternative, the Moffett Park Drive and SR 237 ramp terminal intersections would continue to act as a bottleneck for southbound traffic along Mathilda Avenue and eastbound traffic along Moffett Park Drive.

Table 2.14-4 presents the average travel times and delays along the Mathilda Avenue corridor under both alternatives. The Build Alternative would reduce the average travel time and increase the average travel speed along Mathilda Avenue. However, the PM peak hour travel times along southbound Mathilda Avenue would increase due to the increase in queue backups on southbound Mathilda Avenue north of Moffett Park Drive and Innovation Way. Nevertheless, the overall system-wide delay would still decrease compared to the No-Build Alternative.

Congestion at the US 101 and SR 237 interchanges on Mathilda Avenue for the No-Build Alternative is anticipated to result in traffic backing up onto the freeway mainlines during the AM and PM peak hours, but the Build Alternative would improve ramp operations and result in little to no vehicle queue spillback onto the freeway mainlines.

The capacity enhancements at the intersections on Mathilda Avenue and the realignment of freeway ramps proposed under the Build Alternative would improve traffic operations and reduce vehicle queue lengths compared to the No-Build Alternative conditions.

Table 2.14-8 presents the average travel times and delays along Innovation Way under both alternatives. The redistribution of traffic to this corridor under the Build Alternative warrants a signal at the Innovation Way and Juniper Networks Driveway to optimize capacity at the Mathilda Avenue and Innovation Way intersection. Due to the implementation of a signal at Innovation Way and Juniper Networks Driveway, the average travel time and delay along Innovation Way generally decreases when compared to No-Build Alternative conditions.

Table 2.14-8. Year 2018 and 2040 Innovation Way Travel Times[a]

Direction	Peak Hour	Free flow Travel Time (s)[b]	Year 2018				Year 2040			
			No-Build		Build		No-Build		Build	
			Congested Travel Time(s)	Delay(s)	Congested Travel Time(s)	Delay(s)	Congested Travel Time(s)	Delay(s)	Congested Travel Time(s)	Delay(s)
Innovation Way Northbound	AM	81.5	86.2	4.7	97.9	16.4	395.3	313.8	143.7	62.2
	PM	81.5	524.4	442.9	290.5	209.0	787.9	706.4	264.3	182.8
Innovation Way Southbound	AM	81.5	112.7	31.2	110.5	29.0	129.4	47.9	124.1	42.6
	PM	81.5	404.9	323.4	389.2	207.7	634.7	553.2	664.1	582.6

Source: Fehr & Peers 2016.

[a] Travel time runs begin at the Mathilda Avenue intersection and end at the Moffett Park Drive intersection (approximately 0.42 mile).

[b] Free flow speed is calculated assuming a travel speed of 25 miles per hour.

Freeway Mainline Operations

No-Build Alternative

Tables 2.14-5 and 2.14-6 summarize the peak hour traffic operation results on US 101 and SR 237. The existing HOV lanes in both directions along US 101 and SR 237 are assumed to be converted to express lanes by Year 2018 as part of a separate project. Ramp metering is assumed to be installed at all on-ramps and an HOV bypass lane is assumed to be installed on the Mathilda Avenue on-ramp to SR 237 eastbound as part of a separate project.

For the No-Build Alternative, congestion at the US 101/Mathilda Avenue and SR 237/Mathilda Avenue interchanges is anticipated to result in vehicle spillback onto the freeway mainlines during the AM and PM peak hours. Freeway mainline operations would result in mostly LOS F conditions throughout the Project area.

Build Alternative

For the Build Alternative, ramp operations would be improved in Year 2018 and result in little to no vehicle spillback onto the freeway mainlines. There would be a slight decrease in congestion on SR 237 eastbound between the US 101 southbound on-ramp and the Mathilda Avenue off-ramp due to the shift in traffic from the SR 237 eastbound off-ramp at Mathilda Avenue to the new US 101 southbound off-ramp movement to Mathilda Avenue northbound. This shift in traffic would also result in a slight increase in congestion on US 101 southbound between the SR 237 eastbound off-ramp and the Mathilda Avenue off-ramp, and have a minor change to the LOS, as shown in Table 2.14-6. However, the Build Alternative is not anticipated to substantially change the freeway LOS and would have a negligible effect on freeway congestion levels during peak hours.

The Build Alternative would eliminate the short, non-standard weaving segment on northbound US 101 between the on-ramp from northbound Mathilda Avenue and the off-ramp to southbound Mathilda Avenue. Removing weaving sections would eliminate speed differentials along US 101.

Freeway System Performance

System-wide MOEs during both peak periods for the US 101 and SR 237 corridors within the Project limits are presented in Table 2.14-8. MOEs including average travel time and average speed are the most effective indicators as they relate directly to travelers' experience along the US 101 and SR 237 corridors.

No-Build Alternative

By Year 2018, average travel speeds on US 101 and eastbound SR 237 fall below 20 mph in the peak directions during the AM and PM peak periods. On westbound SR 237, average travel speeds fall to 35 mph during the AM peak period.

Build Alternative

Average travel speeds and mainline vehicle delays are similar to the No-Build Alternative, indicating that the Build Alternative would have little to no effect on the overall freeway system performance along the US 101 and SR 237 corridors within the Project area.

2.14.4.2 Design Year 2040

Local Roadway and Ramp Termini Operations

No-Build Alternative

Under the No-Build Alternative the majority of study intersections along Mathilda Avenue are anticipated to operate at LOS F conditions during both peak hours (see Table 2.14-3). This would result in a low percent of vehicle demand being served during both peak hours (80 and 70 percent during the AM and PM peak hours, respectively), which is indicative of the projected traffic demand exceeding the capacity of the roadway system. The total vehicle hours of delay are estimated to be over 2,900 in the AM peak hour and over 3,800 in the PM peak hour.

By Year 2040, the AM peak hour volume is forecasted to be 3,640 vehicles per hour (vph) on Mathilda Avenue northbound near Almanor Avenue-Ahwanee Avenue and 4,040 vph during the PM peak in the southbound direction. Corresponding traffic volumes near the Innovation Way intersection in the northbound direction in the AM peak hour and southbound direction in the PM peak hour are forecasted to be 2,740 and 1,580 vph, respectively.

Under the No-Build Alternative, Innovation Way is assumed to extend from its current terminus at Mathilda Avenue to Bordeaux Drive as part of the Moffett Place development. By Year 2040, the Mary Avenue extension from Mary Avenue south of the SR 237/US 101 interchange north to E Street is assumed to be constructed as part of a separate project.

Build Alternative

The Build Alternative would improve traffic conditions at most of the study intersections. However, some would continue to operate under congested conditions, similar to the No-Build Alternative, for at least one peak hour. During the AM peak hour the total vehicle hours of delay would be reduced to approximately 1,900 (35 percent reduction) and to approximately 3,100 (18 percent reduction) during the PM peak hour. The reduction in overall vehicle hours of delay for the AM and PM peak hours indicates the Build Alternative would provide an overall benefit to the traffic operations in the Project area compared to the No-Build Alternative.

As a result of closing Moffett Park Drive between Mathilda Avenue and Bordeaux Drive, an additional 520 vph would be shifted to northbound Mathilda Avenue in the AM peak hour, and an additional 495 vph would be shifted to southbound Mathilda Avenue in the PM peak hour between the Moffett Park Drive/SR 237 westbound off-ramp and Innovation Way by Year 2040.

As shown in Table 2.14-3, the overall percent demand served through local intersections along the Mathilda Avenue corridor and at nearby study intersections increases by approximately 8 and 7 percent in the AM and PM peak hours, respectively, under the Build Alternative.

Queue spillback is anticipated to continue to occur at some off-ramps during peak hours, but would be substantially less than under the No-Build Alternative. On local streets, overall queuing would be reduced along Mathilda Avenue in both directions. The closure of Moffett Park Drive between Bordeaux Drive and Mathilda Avenue would shift the queuing from Moffett Park Drive to Innovation Way and Bordeaux Drive on the east side of Mathilda Avenue.

As shown in Table 2.14-4, the Build Alternative would reduce the average travel time and increase the average travel speed along Mathilda Avenue.

As shown in Table 2.14-8, under the Build Alternative, delays would decrease on northbound Innovation Way during both peak hours. In the southbound direction, travel times would remain relatively unchanged in the AM peak hour and slightly increase in the PM peak hour due to the increase in volume resulting from the closure of Moffett Park Drive on the east side of Mathilda Avenue.

Freeway Mainline Operations

No-Build Alternative

As shown in Tables 2.14-5 and 2.14-6, freeway operations under the No-Build Alternative would continue to result in mostly LOS F conditions in peak commute directions throughout the Project area.

The new express lanes along SR 237 will be extended to west of the US 101 interchange. On US 101, an additional express lane, for a total of two lanes, will be added by Year 2040. Under the No-Build Alternative, the SR 237 westbound bottleneck moves upstream to the Fair Oaks Avenue on-ramp, and congestion on the mixed-flow lanes worsens.

Build Alternative

The Build Alternative is not anticipated to add additional bottlenecks to the freeway. However, the capacity enhancement at Mathilda Avenue would increase the on-ramp throughput, resulting in an increase in queuing along eastbound SR 237 in the PM peak hour. The SR 237 eastbound weaving section between US 101 and the Mathilda Avenue off-ramp would improve from LOS E to LOS D in the PM peak hour under the Build Alternative. In addition, the SR 237 westbound weaving section between the Mathilda Avenue on-ramp and US 101 is anticipated to improve from LOS F to LOS E in the PM peak hour. The US 101 southbound weaving section between SR 237 and the Mathilda Avenue off-ramp would decrease from an LOS C to LOS E in the PM peak hour due to the shift in traffic associated with the full access interchange at US 101 and Mathilda Avenue.

Freeway System Performance

No-Build Alternative

System-wide MOEs during both peak hours for the US 101 and SR 237 corridors within the Project limits are presented in Table 2.14-7.

The highest mainline vehicle delay occurs on southbound US 101 during the PM peak hour. For the No-Build Alternative, the average travel speed on southbound US 101 is reduced to 11 mph compared to Year 2018. The vehicle delay increases to over 1,900 hours on southbound US 101 and approximately 1,500 hours on eastbound SR 237 in the PM peak hour.

Build Alternative

With the implementation of a full-access interchange at US 101 and Mathilda Avenue, there would be a shift in some vehicular traffic from SR 237 to US 101. Consequently, travel time, delay, and maximum individual delay would increase slightly along US 101 southbound and decrease along SR 237 eastbound. The US 101 northbound results show an increase in travel time and mainline vehicle delay with the Build Alternative due to the increase in the demand served at the ramp terminal intersection, which in turn results in additional Mathilda Avenue traffic entering northbound US 101 during peak hours.

Bicycle and Pedestrian Facilities

No-Build Alternative

Under the No-Build Alternative, no pedestrian and bicycle facility improvements included in the Project would be implemented.

Build Alternative

The Build Alternative would enhance pedestrian and bicycle facilities in the corridor, including along Mathilda Avenue and Moffett Park Drive. The following improvements to bicycle and pedestrian conditions would be included:

- New pedestrian and bicycle facilities
  - New east–west Class I trail on Moffett Park Drive between Borregas Avenue and Innovation Way.
  - Class II bicycle lanes on Mathilda Avenue.
- Controlled and more convenient pedestrian crossings
  - Elimination of uncontrolled ramp movements and construction of tee-intersections for US 101 off-ramps to Mathilda Avenue.
  - Crosswalks with optimum crossing distance and pedestrian refuges where applicable.
  - Enhanced pavement delineation and signing treatments.
- Improved bike circulation and connectivity
  - Improved bicycle connections between Mathilda Avenue and Moffett Park Drive.
- Improvements to increase ADA access
  - New accessible curb ramps confirming to ADA guidelines.
  - Pedestrian countdown signals at new or modified intersections.
  - Pushbutton-integrated accessible pedestrian signals.

2.14.4.3 Impact Summary

No-Build Alternative

Under the No-Build Alternative, there would be no modification to existing facilities or changes in the existing environment other than the Mary Avenue extension, Innovation Way extension, and express lane conversion as described under the Opening Year 2018 and Design Year 2040, No-Build Alternative, discussions above. Under the No-Build Alternative, traffic/transportation in the Project area is anticipated to worsen, with increased congestion (increases in travel time and delays), and vehicle queue spillback onto the freeway mainlines. Bicycle and pedestrian facilities in the corridor would remain unimproved, resulting in a conflict with adopted policies, plans, and programs regarding public transit, bicycle, and pedestrian facilities, decreasing the performance safety of these facilities. Furthermore, degradation of traffic operations is expected to cause inadequate emergency access and delay transit service.

Build Alternative

Operation

While multiple intersections would be operating at LOS F (as shown in Table 2.14-4), the Build Alternative would not be the cause of these conditions because the No-Build Alternative would also be operating at an equal or worse LOS. In most cases, the Build Alternative would result in a reduction in average travel time and an increase in average travel speed on Mathilda Avenue. An overall reduction in peak hour delay, queueing on local streets, and freeway ramps would also occur under the Build Alternative. The Build Alternative would increase the percent of peak hour traffic served through local intersections along Mathilda Avenue and at nearby study intersections.

Construction

During construction of the Project, vehicular, bicycle, and pedestrian circulation would be maintained in each direction (using detours and temporary signs, as required).Temporary lane and ramp closures would be required when low traffic volumes occur to construct specific items of work such as placement of temporary concrete barriers. Work would be conducted along the roadways, sidewalks, and pedestrian crossings. Implementation of Avoidance and Minimization Measure TRF-1, *Prepare a Transportation Management Plan*, would reduce temporary impacts on traffic, transit users, bicycles, and pedestrians to a less-than-significant level.

2.14.5 Avoidance, Minimization, and/or Mitigation Measures

Avoidance and Minimization Measure TRF-1: Prepare a Transportation Management Plan

A Transportation Management Plan (TMP) will be prepared to ensure efficient movement of local and regional traffic during construction. The TMP will provide for public outreach to inform community agencies, such as the fire department, and the public of the times and locations of upcoming construction, signage in and approaching the Project area, and incident management for traffic control in the vicinity of construction activities.

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2.15 Cumulative Impacts

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the Project. A cumulative impact assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor but collectively substantial impacts taking place over a period of time.

Cumulative impacts on resources in the Project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the Project, such as changes in community character, traffic patterns, housing availability, and employment.

State CEQA Guidelines Section 15130 describes when a cumulative impact analysis is necessary and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the State CEQA Guidelines.

2.15.1 Approach to Cumulative Impact Analysis

In a cumulative impacts analysis, the identification of "past, present, and reasonably foreseeable future actions" can utilize either the "list approach" or the "adopted plan" approach. The list approach identifies specific projects in the vicinity, typically provided by a local planning department. The adopted plan approach relies on a general plan or transportation plan or other planning document, which by definition accounts for cumulative growth in a defined area. Depending on the resource area discussed, this analysis uses a combination of the list approach and the adopted plan approach.

The discussion below addresses resource areas where the Project would result in an impact and where, therefore, there is a potential for a cumulative impact. Resources areas not affected by the Project are not discussed because, by definition, no cumulative impact could occur. Examples of the latter include (but not limited to): farmlands/timberlands, land use and recreation, and mineral resources.

The cumulative analysis for the Project takes into consideration the other ongoing projects and plans in the same geographic area as the Project, as well as planned land uses and transportation and transit projects identified in the City and County general plans and policy documents.

Table 2.15-1 lists the projects and plans that were included in the cumulative analysis for the Project. The projects listed have been included in this analysis because they are within 0.25 mile of the Project area or could affect transportation and traffic circulation within the Project area. Projects identified with an asterisk (*) are shown in Figure 2.10-3, *Current and Planned Development Projects*, in Section 2.10, *Land Use and Recreation*.

Table 2.15-1. Projects Considered for Potential Cumulative Impacts

Jurisdiction	Project Title	Estimated Construction Schedule	Location relative to the Project (miles)
Transportation Projects Planned			
City of Sunnyvale	Innovation Way Extension	Under construction; unknown completion date	Within Project area
Santa Clara County	Lawrence Expressway Ramp Improvements at SR 237	Expressway Plan 2040 Study in progress, construction 2020+	1.30 miles
Santa Clara County	Central Expressway Auxiliary Lanes	Expressway Plan 2040 Study in progress, construction 2020+	0.75 mile
VTA	SR 237 Express Lanes	Mid-2017 thru late 2018	Within Project area
VTA	SR 85 and US 101 Express Lanes	2018 thru 2020	Within Project area
VTA	VTA's Freeway Performance Initiative: All freeway ramps metered on US 101 and SR 237 (includes widening of SR 237 eastbound on-ramp at Mathilda Avenue to two lanes)	Studies and design in progress, unknown construction start	Within Project area
VTA	Stevens Creek Bus Rapid Transit	Unknown construction start	5 miles from Stevens Creek Boulevard/De Anza Boulevard stop
VTA	El Camino Bus Rapid Transit	Unknown construction start	1.85 miles from Hollenbeck Avenue/El Camino Real stop
VTA	VTA's Next Network Implementation	Goes into effect in July 2017	Within Project area
VTA/BART	BART Extension, Fremont Station to Berryessa Station	Under construction; complete in 2018	8.25 miles to Berryessa Station
VTA/BART	BART Extension, Berryessa Station thru downtown San Jose to Santa Clara	2020 thru 2025	8.25 miles to Berryessa Station
Caltrain	Caltrain Electrification	Unknown construction start; expected completion in 2020	1.25 miles from Sunnyvale Caltrain Station

Jurisdiction	Project Title	Estimated Construction Schedule	Location relative to the Project (miles)
Land Development in the Vicinity and Adjacent to the Project Right-of-Way			
City of Sunnyvale	City of Sunnyvale: Moffett Park Specific Plan, Amended	Ongoing, 2020+	Within Project area
City of Sunnyvale	Onizuka Air Force Station Local Redevelopment Authority Amended Redevelopment Plan	Ongoing	Within Project area
City of Sunnyvale	Moffett Towers II: 215 Moffett Park Drive*	Under construction; unknown completion date	0.12 mile
City of Sunnyvale	Foothill De Anza Community College: 1070 Innovation Way*	Under construction; complete in Fall 2016	Within Project area
City of Sunnyvale	Sheraton Sunnyvale Hotel Expansion: 1100 N. Mathilda Avenue*	Approved by Planning Commission on December 8, 2014; unknown construction start	Within Project area
City of Sunnyvale	Old Fire Station #5 Site/New Hotel at 1120 Innovation Way*	Under Planning Commission review; unknown construction start	Within Project area
City of Sunnyvale	Hilton Garden Inn Development at 767 N. Mathilda Avenue*	Under Planning Commission review; unknown construction start	0.05 mile
City of Sunnyvale	Moffett Place Campus: 1152 Bordeaux Drive*	Under Construction; unknown completion date	Within Project area
City of Sunnyvale	Google Ariba Campus Expansion: 807 Eleventh Avenue*	Under Construction; unknown completion date	0.01 mile
City of Sunnyvale	Reconstruct Office Building at 520 Almanor Avenue*	Under Planning Commission review; unknown construction date	0.01 mile
City of Sunnyvale	Two New Office Buildings at 615 N. Mathilda Avenue*	Under Planning Commission review; unknown construction date	0.21 mile
City of Sunnyvale	Peery Park Specific Plan	Draft EIR in preparation, estimate Spring 2016 release	Within Project area

Jurisdiction	Project Title	Estimated Construction Schedule	Location relative to the Project (miles)
City of Sunnyvale	General Plan Amendment: Rezone 210 W. Awhanee Avenue from Industrial to Residential High Density*	Under Planning Commission review; unknown construction date	0.01 mile
City of Sunnyvale	St. Jude Medical Facility Expansion: 645 Alamanor Avenue*	Approved by City Council on March 25, 2014; unknown construction date	0.15 mile
Sources: Association of Bay Area Governments and Metropolitan Transportation Commission 2013; City of Sunnyvale 2016a, 2016b; Santa Clara Valley Transportation Authority 2016a, 2016b, 2016c, 2016d * Shown in Figure 2.10-3, *Current and Planned Development Projects* VTA = Santa Clara Valley Transportation Authority, SR = State Route, BART = Bay Area Rapid Transit			

2.15.2 Cumulative Impact Contributions

The discussion below addresses resource areas where the Project would result in an impact, and where, therefore, there is a potential for a cumulative impact. Environmental resource areas included in Section 2.1, *Introduction*, Table 2.1-1 are not included in this section. Furthermore, for this analysis, where evaluation of Project impacts was found to have no impact or be less than significant with incorporation of avoidance, minimization, and/or mitigation measures, and potential cumulative impacts would be localized to only the Project area (i.e., cultural resources, hazards, and hydrology), cumulative impacts are not anticipated to occur, and no further discussion is included.

2.15.2.1 Aesthetics

The cumulative area for aesthetics is identified as the area within 0.5 mile of the Project limits. This area is where Project-related changes could result in cumulatively substantial impacts on aesthetics.

As described in Section 2.2, *Aesthetics*, most of the proposed Project elements are modifications to existing features. Construction of Project facilities would require the removal of existing vegetation. Project facilities would be visible to adjacent residents, businesses, and users of SR 237 and US 101. During construction, there is potential for visual impacts due to the presence of construction equipment and stock pilings for the Project as well as other nearby large-scale development and transportation projects. However, construction visual impacts are temporary and short-tem in nature. Therefore, the Project's contributions would not be cumulatively considerable. Other planned development and transportation projects would alter the existing visual character of the Project area in the long term.

The Project would alter the existing visual landscape, degrade the visual quality of the Project area, and negatively affect highway users and highway neighbors. Future development and roadway improvements also would add to ambient atmospheric light and glare in the area by infilling unlit areas with lit buildings and roadways. Implementation of Avoidance and Minimization Measures AES-1 through AES-5, identified in Section 2.2, would ensure that the Project's cumulative impact on visual resources, including introduction of light and glare, would not be cumulatively considerable.

2.15.2.2 Air Quality

The cumulative area for air quality is identified as the San Francisco Bay Area Air Basin, which is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). This area is where Project-related changes, coupled with increased traffic from ongoing growth, could result in cumulatively substantial increases in emissions of air pollutants.

As described in Section 2.3, *Air Quality*, construction of the Project would result in less-than-significant impacts on criteria pollutants.

With implementation of the Avoidance and Minimization Measures AQ-1 and AQ-2, identified in Section 2.3, the Project's impacts on air quality are not expected to be cumulatively considerable.

2.15.2.3 Biological Resources

The cumulative area for biological resources is identified as the northern region of the south bay. This area is where Project-related changes, coupled with increased traffic from ongoing growth, could result in cumulatively substantial biological resources impacts.

As described in Section 2.4, *Biological Resources*, the Project would have less-than-significant impacts on nesting birds and raptors, tree removal, and invasive species. The Project would have no impact on Riparian Habitat/Sensitive Natural Communities, Wildlife Corridors, or Habitat Conservation Plans/Natural Community Conservation Plans.

With implementation of Avoidance and Minimization Measures BIO-1 through BIO-3, identified in Section 2.4, the Project's impacts on biological resources are not expected to be cumulatively considerable.

2.15.2.4 Greenhouse Gas Emissions

The cumulative area for greenhouse gas emissions is identified as the San Francisco Bay Area Air Basin, which is within the jurisdiction of BAAQMD. According to the BAAQMD CEQA Guidelines, any project that would individually have a significant GHG impact would also have a cumulatively considerable GHG impact. This cumulative area is where Project-related changes, coupled with increased traffic from ongoing growth, could result in cumulatively substantial increases in greenhouse gas emissions.

As stated in Section 2.7, *Greenhouse Gas Emissions*, an individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHG.[1] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (State CEQA Guidelines Sections 15064(h)(1) and 15130). To make this determination the incremental impacts of the Project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

As discussed in Section 2.7, both the No-Build Alternative and the 2040 Build Alternative show decreases in CO_2 emissions over existing levels; the Build Alternative GHG emissions for both 2018 and 2040 are also lower than the future No-Build emissions. While there are minor short-term construction-related GHG emissions, the operational analysis indicates the Project would result in a net decrease in GHG emissions that would ultimately offset the temporary increases in construction GHG emissions. It is Caltrans' determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding the significance of a project's direct impact and its contribution on the cumulative scale to climate change. However, Caltrans is firmly committed to implementing measures (refer to Section 2.7.4, *Greenhouse Gas Reduction Strategies)* to help reduce the potential effects of the Project.

2.15.2.5 Noise and Vibration

The cumulative area for noise and vibration is identified as any planned development that could affect sensitive receptors within 1,000 feet of the Project limits. This area is where project-related changes, coupled with increased traffic from ongoing growth, could result in cumulatively substantial increases in noise and vibration.

Noise

Construction of the Project is expected to begin in 2018 and last for approximately 12 months. The cumulative projects listed in Table 2.15-1 that have construction activities scheduled for 2018 within 1,000 feet of the Project area include the Sheraton Sunnyvale Hotel Expansion at 1100 N. Mathilda Avenue, the SR 237 Express Lanes project, and the SR 85 and US 101 Express Lanes project. Construction activities for these projects could coincide with those of the proposed Project. All other cumulative /projects that have construction activities scheduled in 2018 are farther than 1,000 feet from the Project limits. Construction of cumulative projects farther than 1,000 feet from the Project site have not been analyzed because the noise levels would be significantly reduced by both the distance and shielding effects of intervening buildings. In the event that construction of the Sheraton

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[1] This approach is supported by the Association of Environmental Professionals: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: *The CEQA Guide*, April 2011) and the US Forest Service (*Climate Change Considerations in Project Level NEPA Analysis*, July 13, 2009).

Sunnyvale Hotel Expansion coincides with construction of the proposed Project, it is possible that it could increase overall construction noise levels at nearby sensitive receptors.

As detailed in Section 2.11, *Noise and Vibration*, construction noise impacts for the Project would be less than significant with implementation of Avoidance and Minimization Measure NV-1. Assuming the construction methods and equipment used for the Sheraton Sunnyvale Hotel Expansion are similar to those identified for the Project, then noise levels could be increased by approximately 3 decibels (due to a doubling of the number of sources). However, cumulative projects would be required to comply with mandatory noise regulations to keep construction noise levels at an acceptable level. In addition, cumulative projects would be required to implement any noise mitigation that may be required under CEQA. Therefore, cumulative future increases in noise would not be substantial, and the Project's contribution to noise would not be cumulatively considerable.

Vibration

Impacts related to vibration are typically limited to construction activities. Cumulative projects could contribute to a cumulatively significant vibration impact, but only if located close to the Project site. The only cumulative projects that have construction activities scheduled for 2018 within 1,000 feet of the Project area are the Sheraton Sunnyvale Hotel Expansion at 1100 N. Mathilda Avenue, the SR 237 Express Lanes project, and the SR 85 and US 101 Express Lanes project. It is not anticipated that construction activities associated with the Sheraton Hotel Expansion would use vibration-intensive equipment (e.g., pile drivers, vibratory rollers, etc.), and therefore the vibration impact would not be cumulatively considerable. In addition, it is not anticipated that at any given time construction activities for the SR 237 Express Lanes Project or SR 85 and US 101 Express Lanes project would be occurring in the vicinity of the proposed Project site. Therefore, vibration impacts are not expected to be cumulatively considerable with incorporation of Avoidance and Minimization Measure NV-2, identified in Section 2.11, *Noise and Vibration*.

2.15.2.6 Transportation/Traffic

The cumulative area for transportation/traffic is identified as all the intersections that were examined for the Project (shown in Figure 2.14-1). This area is where Project-related changes, coupled with increased traffic from ongoing growth, could result in cumulatively substantial increases in transportation/traffic impacts.

Other projects in the area may be under construction at the same time as the Project. To the extent that construction periods overlap, there is a potential for cumulative local traffic impacts from multiple project detours and lane reductions to occur simultaneously in and adjacent to the Project area, potentially resulting in deterioration of traffic operations on roadways. The City, County, and Caltrans would coordinate the timing of Project detours and lane closures with other projects' construction activities to minimize cumulative traffic impacts. With incorporation of Avoidance and Minimization Measure TRF-1, identified in Section 2.14, *Transportation/Traffic*, the Project would have less-than-significant short-term impacts on traffic/transportation; therefore, the Project's contribution would not be cumulatively considerable.

The cumulative traffic analysis for the Project is based on future traffic conditions in the Year 2018 and Year 2040, which accounts for future development in the Project area and General Plan build out. The future year VTA model used in the analysis reflects regional land use projections consistent with ABAG projections, as well as roadway network improvements contained in *Plan Bay Area 2040*. Future traffic conditions are expected to further deteriorate the US 101 and SR 237 mainlines, as well as key intersections by Year 2040 (refer to the No-Build Alternative discussion in Section 2.14). The Project would improve future traffic operations on Mathilda Avenue and the freeway ramps at several intersections within the Project area. The Project also would improve traffic operations and reduce vehicle queue lengths by enhancing the capacity at intersections on Mathilda Avenue and realigning the ramps. Thus, the Project would not contribute to a cumulative impact related to local roadway and ramp operations.

US 101 and SR 237 mainline operations are expected to be similar with or without the Project and would result in mostly LOS F conditions throughout the Project area. With the implementation of a full-access interchange at US 101 and Mathilda Avenue, there would be a decrease in congestion on SR 237 eastbound between the US 101 southbound on-ramp and Mathilda Avenue off-ramp and a slight increase on US 101 southbound between the SR 237 eastbound on-ramp and Mathilda Avenue off-ramp. This shift in traffic would have a negligible effect on peak hour freeway congestion levels. Overall, the Project would result in an improvement in intersection operations, as well as an improvement in mainline operations by preventing off-ramp queues spilling back onto the mainline. As such, the Project's contribution to traffic would not be cumulatively considerable.

Chapter 3
Other CEQA-Required Analysis

3.1 Determining Significance under CEQA

The Project is subject to CEQA. As such, this chapter includes the following discussions.

- Significance of Impacts
- Mandatory Findings of Significance
- Growth-Inducing Impacts

State CEQA Guidelines Section 15143 provides that an environmental impact report (EIR) must focus on the significant effects on the environment, discussing the effects with "…emphasis in proportion to their severity and probability of occurrence." Resources that were determined to not have potential for adverse impacts were identified in Section 2.1 of Chapter 2, *Environmental Setting, Impacts and Avoidance, Minimization and/or Mitigation Measures*. Resources that were evaluated to determine if adverse impacts would occur are discussed in Sections 2.2 through 2.15; these sections discuss resources for which it was determined that the Project would have no impact or a less-than-significant impact. A summary of the impact determinations and associated avoidance and minimization measures are included in Table ES-1 of the *Executive Summary*.

3.2 Significance of Impacts

3.2.1 No Impacts

Refer to Chapter 2**,** *Environmental Setting, Impacts, and Avoidance, Minimization and/or Mitigation Measures* for a discussion of resources for which there would be no impact as a result of the Project. These include the following topical areas.

- Cultural Resources (Section 2.5)
- Land Use (Section 2.10)
- Population and Housing (Section 2.12)
- Public Services and Utilities (Section 2.13)

3.2.2 Less-than-Significant Impacts of the Proposed Project

Based on the analysis completed for this EIR, which is discussed in Chapter 2, the Project would result in less-than-significant environmental impacts in the following topical areas.

- Aesthetics (Section 2.2)
- Air Quality (Section 2.3)
- Biological Resources (Section 2.4)
- Geology, Soils, and Seismicity (Section 2.6)
- Greenhouse Gas Emissions (Section 2.7)
- Hazardous Waste/Materials (Section 2.8)
- Hydrology and Water Quality (Section 2.9)
- Noise and Vibration (Section 2.11)
- Transportation/Traffic (Section 2.14)

3.2.3 Unavoidable Significant Environmental Impacts

Section 21067 of CEQA and Sections 15126(b) and 15126.2(b) 15126.2 (b) of the State CEQA Guidelines require that an EIR describe any significant impacts, including those that can be mitigated but not reduced to a less-than-significant level. Furthermore, where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the Project is being proposed, notwithstanding their effect, should also be described.

Sections 2.2 through 2.15 of this EIR discuss impacts considered less than significant and the avoidance, minimization, and/or mitigation measures that would avoid or reduce these impacts. There are no significant or significant and unavoidable impacts associated with the Project.

3.3 Mandatory Findings of Significance

Under State CEQA Guidelines Section 15065(a), a finding of significance is required if a project “has the potential to substantially degrade the quality of the environment.” In practice, this is the same standard as a significant effect on the environment, which is defined in Section 15382 of the State CEQA Guidelines as “a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.” This EIR, in its entirety, addresses and discloses potential environmental effects associated with construction and operations-related activities of the Project, including direct, indirect, and cumulative impacts.

Pursuant to State CEQA Guidelines Section 15065(a), an EIR must be prepared if a project may have a significant effect on the environment where any of the conditions occur as outlined in Section XVIII, Mandatory Findings of Significance, of the CEQA Checklist (Appendix A).

An EIR has been prepared for the Project, which fully addresses all of the Mandatory Findings of Significance, as described.

a) The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species . . . or eliminate important examples of major periods of California history or prehistory.

As discussed in Section 2.4, *Biological Resources*, the Project does not have the potential to impact riparian habitat, sensitive natural communities, wetlands, or an adopted Habitat Conservation Plan/Natural Community Conservation Plan. The Project would have a less-than-significant impact on nesting birds and raptors, tree removal, and invasive species with the implementation of avoidance and minimization measures.

b) The project has possible environmental effects which are individually limited but cumulatively considerable. . . .

Cumulative impacts are discussed in Section 2.15, *Cumulative Impacts*, and have been found to be less than significant.

c) The environmental effects of the project will cause substantial adverse effects on human beings, either directly or indirectly.

Potential direct and indirect impacts that result from the Project are discussed in detail in Sections 2.2 through 2.15 and summarized in Table ES-1. These impacts have been found to be less than significant.

3.4 Growth-Inducing Impacts

State CEQA Guidelines Section 15126.2(d) requires an EIR to address the growth-inducing effects of a project. A project is considered growth inducing if it has the potential to directly or indirectly foster economic or population growth or the construction of new housing. The State CEQA Guidelines do not require projects to examine the indirect consequences or secondary impacts that may occur as a result of a proposed project.

The Project could have an effect on growth by providing enhanced access to the surrounding business and industrial areas. The analysis in this section focuses on whether the Project would directly or indirectly induce economic, population, or housing growth within the surrounding area.

Transportation projects have the potential for multiple growth-inducing effects. Improvements in transportation infrastructure are likely to support growth by reducing travel times and improving accessibility to employment opportunities throughout the region. Social, economic, and technological changes within the City of Sunnyvale and the region influence growth rates and patterns. In addition, all city and county governments regulate population growth and economic development through zoning, land use plans, policies, and decisions on specific development proposals. By implementing the Project and therefore enhancing access to the surrounding area, the Project would serve local transportation needs and accommodate future development.

3.4.1 Growth Inducement Analysis

The current regional transportation plan prepared by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments is *Plan Bay Area*, which identifies long-range transportation planning efforts intertwined with regional housing, jobs, and land use projections for the San Francisco Bay Area. The MTC and Association of Bay Area Governments project that between 2010 and 2040, the nine-county Bay Area will add 1.1 million jobs, 2.1 million people, and 660,000 homes, for a total of 4.5 million jobs, 9.3 million people, and 3.4 million homes (Association of Bay Area Governments and Metropolitan Transportation Commission 2013). Future growth into 2040 is largely anticipated in the Project region, and the City of Sunnyvale is one of the many cities accounting for housing growth and job growth between 2010 and 2040 (Association of Bay Area Governments 2013).

The Project is a transportation improvement project aimed at enhancing the mobility and reducing the congestion of an existing transit corridor. The Project is designed to serve the current and planned growth in population, housing, and employment in the Project vicinity. This Project would not have significant growth-inducing effects because it intends to serve current and future growth both locally and regionally, which has already surpassed the capacity of the existing transportation network.

3.4.1.1 Direct Growth Inducement in the Project Corridor

An increase in the amount of development in the vicinity of the Project has resulted in additional traffic congestion. Most of the land surrounding the Project corridor is already developed, or consists of approved or planned projects. These projects are undergoing or have undergone consistency analysis with the appropriate local jurisdictions' plans, policies, and strategies. No new homes or businesses are proposed as part of the Project. Therefore, the Project would not directly induce substantial population or housing growth beyond what is currently planned.

The Project would result in the creation of temporary construction-related employment; however, as the Project construction schedule is expected to last 12 months, workers would likely be drawn from within Santa Clara County and from neighboring areas and, as a result, the Project would not directly induce substantial population or housing growth. In addition, the Project area is already anticipated to receive a substantial increase in population and employment by 2040, as indicated in the *City of Sunnyvale General Plan* (City of Sunnyvale 2011) and the *Moffett Park Specific Plan* (City of Sunnyvale 2013). Implementation of the Project would improve the area by providing mobility options, alleviating congestion, and by supporting development consistent with local plans.

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4.1 Introduction

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process. It helps planners to determine the necessary scope of environmental documentation, the level of analysis required, potential impacts and mitigation measures, and related environmental requirements. Agency consultation and public participation for this Project have been accomplished through a variety of formal and informal methods, including Project Development Team meetings, interagency coordination meetings, a scoping meeting, and a presentation to the VTA Bicycle and Pedestrian Committee. This chapter summarizes efforts to fully identify, address, and resolve Project-related issues through early and continuing coordination. While every effort is made to address public and agency concerns expressed during scoping and the development of the Project, in some cases, due to physical or environmental constraints, safety issues, or for other reasons, it is not possible to incorporate suggestions related to the design, construction, or operation of the Project.

4.2 Notice of Preparation and Scoping Process

Caltrans circulated a Notice of Preparation of an Environmental Impact Report/Environmental Assessment[1] to local, regional, state, and federal agencies on August 18, 2015, and the 30-day scoping period was between August 18, 2015, and September 16, 2015.

Caltrans held an Environmental Scoping Meeting in the Staff Lounge of Columbia Middle School, 739 Morse Avenue, Sunnyvale, California, 94085, on August 27, 2015. Approximately 4,600 notices for the scoping meeting were mailed to residences and businesses within a 0.25-mile radius of the Project. VTA staff hand-distributed public meeting flyers to businesses along Mathilda Avenue from Almanor Avenue to Innovation Way and posted notices in the City of Sunnyvale Public Library. VTA posted the public meeting notice on the VTA website, VTA Headways Blog, VTA Twitter feed, and VTA Facebook page, in addition to sending the meeting notice to local media outlets. Notices were published in five newspapers (*Sunnyvale Sun*, *Viet Nam Daily*, *Philippines Today*, *Sing Tao*

[1] An Environmental Assessment is prepared in accordance with the National Environmental Policy Act (NEPA) to determine if a federal action will have significant impact on the environment. An Environmental Assessment was originally proposed for the Mathilda Avenue Improvements Project; however, later in the project development process, it was determined that no federal funding would be pursued to construct the Project and that no federal approvals or environmental permits were needed. As a result, the Project sponsors and the CEQA lead agency determined no NEPA compliance would be pursued.

Daily, and *El Observador*). A Project factsheet was translated in five languages (Spanish, Chinese, Vietnamese, Korean, and Tagalog) and posted on the Project website. An email notification about the scoping meeting was sent to agencies, organizations, and individual stakeholders. The meeting notice was published in VTA's August Take-One passenger newsletter. Approximately 37 people attended the scoping meeting.

Twenty-one public comments were received during the 30-day scoping period, which ended on September 16, 2015. These comments from members of the public and/or local jurisdictions included the following:

- General safety concerns about pedestrian and bicycle access.
- Concern about impeding company bus traffic.
- Concern about long traffic signal cycles and too many stoplights.
- Concern about air quality from traffic congestion.
- Support of VTA increasing bus and light rail train transit options.
- A request to submit a Complete Streets checklist.
- A request not to close Moffett Park Drive.
- Concern that closing the Moffett Park Drive connection would force bicyclists onto SR 237.

4.3 Agency/Committee Consultation and Coordination

VTA and the City of Sunnyvale have conducted partnership meetings throughout the environmental process to address local issues. Meeting participants include key City staff and key VTA representatives from the Environmental, Planning, Public Affairs, and Engineering departments. The purpose of these meetings is to ensure ongoing communication and coordination with VTA and the City.

Members from the Project Development Team presented a conceptual design of the Project to the Sunnyvale City Council on June 10, 2014. The meeting was attended by Sunnyvale City Councilmembers, City of Sunnyvale staff, VTA, WMH Corporation, and members of the public.

Comments from the public at this meeting included the following:

- A request to incorporate Complete Streets concepts into design.
- Concern about long traffic signal cycles with the diverging diamond interchange alternative.
- A request for more details on accommodation of bicycles.

- Concern about construction impacts on businesses near Mathilda Avenue and US 101.
- Support of the alternatives presented.

The VTA Bicycle and Pedestrian Committee received a presentation on the Project on October 7, 2015.

Comments from the Committee at this meeting included the following:

- The Project as a high priority for the City.
- Potential construction impacts of the improvements on US 101 and SR 237.
- Bicycle lane design.
- Bicycle facility at Moffett Park.
- Adding a lane reduction option as part of the Environmental Impact Report.
- Bicycle access across Mathilda Avenue.

VTA and Caltrans meet on a regular basis to coordinate the development of the Project and to address any questions or issues related to Project design, construction, and planned operation.

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Chapter 5
List of Preparers

5.1 California Department of Transportation

Dina El-Tawansy	Project Manager	Office of Program/Project Management
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Kathryn Rose	Branch Chief, Archaeology	Office of Cultural Resource Studies
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5.2 Santa Clara Valley Transportation Authority

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Biological Resources	Eric Christensen, Amy May, Angela Alcala, Leslie Allen, Matt Ricketts
Cultural Resources	Ed Yarborough, Lily Henry Roberts, Aisha Fike, Joanne Grant
Geology, Soils, and Seismicity	Diana Roberts, Gary Clendenin, Terry Rivasplata
Greenhouse Gas Emissions	Shannon Hatcher, Darrin Trageser
Hazardous Waste/Materials	Diana Roberts, Gary Clendenin, Terry Rivasplata
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Land Use and Recreation	Liza Farr, Karin Bouler, Shilpa Trisal
Noise and Vibration	Eric Moskus, Peter Hardie, Dave Buehler
Paleontology	Diana Roberts, Karin Bouler, James Allen
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Public Services and Utilities	Liza Farr, Ashley McBride, Karin Bouler, Shilpa Trisal
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Cumulative Impacts	All technical authors, Karin Bouler
Other CEQA-Required Conclusions	Liza Farr, Patrick Maley, Karin Bouler
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5.4.2 BASELINE Environmental Consulting

5.4.2.1 Preliminary Geological Assessment and Initial Site Assessment

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Patrick Sutton	Environmental Scientist III

5.4.3 Fehr and Peers

5.4.3.1 Traffic Operations Analysis Report

Matt Haynes	Principal
Eddie Barrios	Senior Associate
Ashley Brooks	Transportation Engineer

5.4.4 WRECO

5.4.4.1 Water Quality Assessment Report and Summary Floodplain Encroachment Report

Analette Ochoa	Senior Associate
Sonia Leung	Associate Engineer
Kathryn Stelljes	Environmental Scientist

Chapter 6
Distribution List

6.1 Introduction

This Draft Environmental Impact Report (EIR) was distributed to the following officials, agencies, and organizations. Distribution of the Draft EIR included hard copy, electronic media, reference to the web site in which the document is available, or a combination of these. In addition to the following list, stakeholders, community groups, businesses, and interested persons on the Project mailing list were notified of the availability of this document and public meetings as described in Chapter 4.0, *Comments and Coordination*.

6.1.1 Public Officials

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One Post Street, Suite 2450
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California Senator Barbara Boxer
United States Senate
70 Washington Street, Suite 203
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California Senator Jerry Hill
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California Senator Jim Beall
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California Assemblymember Richard Gordon
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3331 North First Street
San Jose, CA 95134

VTA Alternate Board Member Larry Carr
3331 North First Street
San Jose, CA 95134

VTA Board Member Perry Woodward
3331 North First Street
San Jose, CA 95134

VTA Board Member Glenn Hendricks
3331 North First Street
San Jose, CA 95134

VTA Board Member Jose Esteves
3331 North First Street
San Jose, CA 95134

VTA Board Member Teresa O'Neill
3331 North First Street
San Jose, CA 95134

VTA Alternate Board Member Dave Cortese
3331 North First Street
San Jose, CA 95134

VTA Board Member Ken Yeager
3331 North First Street
San Jose, CA 95134

6.1.2 State Agencies

California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

California Department of General Services
Enivornmental Services Section
505 Van Ness Avenue
San Francisco, CA 94102

California Department of Housing and Community Development
2020 West El Camino Avenue
Sacramento, CA 95833

California Department of Resources Recycling
1001 I Street
Sacramento, CA 95814

California Department of Toxic Substances Control
9211 Oakdale Avenue
Chatsworth, CA 91311

California Environmental Protection Agency
1001 I Street
Sacramento, CA 95812

California Office of Planning & Research
1400 10th Street
Sacramento, CA 95814

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

California State Lands Commission
750 Alfred Nobel Drive # 201
Hercules, CA 94547

San Francisco Regional Water Quality Control District
1515 Clay Street, Suite 1400
Oakland, CA 94612

California Department of Conservation
801 K Street
Sacramento, CA 95814

California Department of Fish and Wildlife
1740 North Market Boulevard
Sacramento, CA 95834

California Department of Parks and Recreation
1416 9th Street
Sacramento, CA 95814

California Department of Parks and Recreation - Office of Historic Preservation
1725 23rd Street #100
Sacramento, CA 95816

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

California Highway Patrol
2020 Junction Avenue
San Jose, CA 95131

California State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

California Transportation Commission
1120 North Street
Sacramento, CA 95814

Native American Heritage Commission
1550 Harbor Boulevard, Suite 100 West
Sacramento, CA 95691

6.1.3 Regional Agencies

Association of Bay Area Governments
375 Beale Street #700
San Francisco, CA 94105

Bay Area Air Quality Management District
375 Beale Street #600
San Francisco, CA 94105

Metropolitan Transportation Commission
375 Beale Street
San Francisco, CA 94105

6.1.4 Local Agencies

City of Sunnyvale
456 West Olive Avenue
Sunnyvale, CA 94086

County of Santa Clara
70 West Hedding Street
San Jose, CA 95110

Santa Clara County Historical Heritage Commission
70 West Hedding Street
San Jose, CA 95110

Santa Clara County Parks and Recreation
298 Garden Hill Drive
Los Gatos, CA 95032

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95110

6.1.5 Organizations

Birdland Association

Braly Corners Neighborhood Association

Canary Drive Neighborhood Association

Charles Street 100 Neighborhood Association

Cherry Chase Neighborhood Association

Cherry Orchard Neighbors Association

Cherryhill Neighborhood Association

Cumberland South Neighborhood Association

Cumberland West Neighborhood Association

Gavello Glen Neighborhood Association

Heritage District Neighborhood Association

Historic Preservation Society of Santa Clara
1889 Market Street
Santa Clara, CA 95050

Lakewood Village Neighborhood Association

Lowlanders Neighborhood Association

Moffett Park Business Group
PO Box 60995
Sunnyvale, CA 94088-0995

Morse Park Neighborhood Association

Nimitz Neighborhood Community Communications and Advocacy Association

Ortega Park Neighborhood Association

Pacific Gas & Electric Company
111 Almaden Boulevard
San Jose, CA 95113

Panama Park Neighborhood Association

Ponderosa Park Neighborhood Association

Preservation Action Council of San Jose
72 North 5th Street
San Jose, CA 95112

Raynor Park Neighborhood Association

San Miguel Neighbors Association

Santa Clara Chamber of Commerce
1850 Warburton Avenue
Santa Clara, CA 95050

Santa Clara Valley Audubon Society
22221 McClellan Rd
Cupertino, CA 95014

Santa Clara Valley Habitat Agency
535 Alkire Avenue
Morgan Hill, CA 95037

Sierra Club Loma Prieta Chapter
3921 E Bayshore Rd
Palo Alto, CA 94303

Silicon Valley Bicycle Coalition
96 North 3rd Street, Suite 375
San Jose, CA 95109

Silicon Valley Leadership Group
2001 Gateway Place #101E
San Jose, CA 95110

Stevens Creek Neighbors

Stowell Orchard

Stratford Gardens Neighborhood Association

SunnyArts

Sunnyvale Downtown Association
260 S Sunnyvale Avenue #4
Sunnyvale, CA 94086

Sunnyvale Neighbors of Arbor Including La Linda (SNAIL)

Sunnyvale West Neighborhood Association

Transform
436 14th Street, Suite 600
Oakland, CA 94612

Washington Park Neighborhood Association

West Valley Neighborhood Association

Wisteria Terrace Neighborhood Association

Wrightmont Corners Neighborhood Association

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