SR 92-82 Interchange Improvement Project

San Mateo, California
DISTRICT 4 – SM – 92-82(PM 11.0/10.3, 11.5 /10.7)
E.A. 23552/Project ID 0412000496

Initial Study with Proposed Negative Declaration

Prepared by the
State of California Department of Transportation

December 2013

General Information about This Document

What's in this document:

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), has prepared this Initial Study/Negative Declaration (IS/ND), which examines the potential environmental impacts of the alternatives being considered for the proposed project located in San Mateo County, California. Caltrans is the lead agency under the National Environmental Policy Act (NEPA) and 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 the District office, 111 Grand Ave., Oakland, CA 94612. Electronic copies are available online at http://www.dot.ca.gov/dist4/envdocs.htm.

We welcome your comments. If you have any comments about the proposed project, please attend the **open house at San Mateo City Hall on January 29, 2014, from 5:30 PM to 8:30 PM** and/or submit your comments to Caltrans, District 4, 111 Grand Ave., Oakland, CA 94612.

Please send your written comments to Caltrans by February 15, 2014. Submit email comments to Caltrans at Leahnora_Romaya@dot.ca.gov or send by postal mail to Caltrans District 4, Attn: Yolanda Rivas, PO Box 23660, MS 8B, Oakland, CA 94623-0660. Hard copies or compact disks of the document are available by writing to the above mailing address. **Be sure to submit comments by the deadline: February 15, 2014.**

What happens next:

After comments are received from the public and reviewing agencies, Caltrans, as assigned by the FHWA, may: (1) give environmental approval to the proposed project, (2) conduct additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is obtained, Caltrans could design and construct all or part of the project.

For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternate formats, please call or write to Department of Transportation, Attn: Yolanda Rivas, Environmental Planning, Caltrans District 4 PO Box 23660, MS 8B, Oakland, CA 94623-0660, (510) 286-6216 (Voice), or use the California Relay Service 1 (800) 735-2929 (TTY), 1 (800) 735-2929 (Voice) or 711.

FHWA Highway ID No.

04-SM-92/82-PM 11.0/11.5, 10.3/10.7

E.A.23552
ID-0412000496

State Route 92/82 Interchange Improvement Project. State Route 92/82 Interchange in San Mateo County, (post miles 11.0/11.5, 10.3/10.7) E.A. 23552

INITIAL STUDY Proposed Negative Declaration

Submitted Pursuant to: (State) Division 13, California Public Resources Code
(Federal) 42 USC 4332(2)(C)

THE STATE OF CALIFORNIA
Department of Transportation

Responsible Agencies: California Transportation Commission, City of San Mateo, San Mateo Transportation Authority

12/20/13

Date of Approval

STEFAN GALVEZ-ABADIA

Office Chief of Environmental Analysis
District 4
California Department of Transportation

CEQA Lead Agency

PROPOSED NEGATIVE DECLARATION

Pursuant to: Division 13, Public Resources Code

Project Description

The California Department of Transportation (Caltrans) proposes to modify the State Routes 82 (SR 82) and SR 92 interchange to reduce traffic congestion, bottlenecks, weaving and queuing spillback at the interchange on and off ramps.

Determination

This proposed Negative Declaration (ND) is included to give notice to interested agencies and the public that it is Caltrans intent to adopt an ND for this project. This does not mean that Caltrans regarding the project is final. This ND is subject to change based on comments received by interested agencies and the public.

Caltrans has prepared an Initial Study (IS) for this project, and pending public review, expects to determine from this study that the proposed project would not have a significant effect on the environment for the following reasons:

The proposed project would have no effect on the following resources: Air Quality, Community Character and Cohesion, Environmental Justice, Existing and Future Land Use, Farmlands and Timberlands, Mineral Resources, Parks and Recreation, Public Services, Right of Way and Wild and Scenic Resources. The project is consistent with state, regional and local plans and programs.

In addition, the proposed project would have less than significant affects to Aesthetics/Visual, Transportation/Traffic, Geology and Soils, and Noise resources.

_____ _____

Melanie Brent Date
District Director
District 4
California Department of Transportation

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SUMMARY

The City of San Mateo, the San Mateo County Transportation Authority (SMCTA) and Caltrans are proposing to modify the intersection of State Route (SR) 92 and SR 82 (also known as El Camino Real [ECR]). The current configuration of the SR 92 and SR 82 interchange is resulting in operational deficiencies which is causing queuing and weaving on SR 92.

The purpose of this project is to increase performance at the on and off ramps and to address the secondary operation deficiencies on the SR 92 mainline. This would entail widening the existing ramps and reconfiguring the existing interchange from a full cloverleaf to a partial cloverleaf.

Project Information

Location

The proposed project is located where SR 92 and SR 82 intersect, in the City and County of San Mateo, in the San Francisco Bay Area in California. The project limits are from post mile (PM) 11.0 to PM 11.5 on SR 92 and PM 10.3 at intersection of ECR/W. 20th Avenue to PM 10.7 at intersection of ECR/17th Avenue & Bovet Road. The project, located in the San Francisco Bay Area, is depicted in Figure 1, below:

Figure 1. Project Vicinity

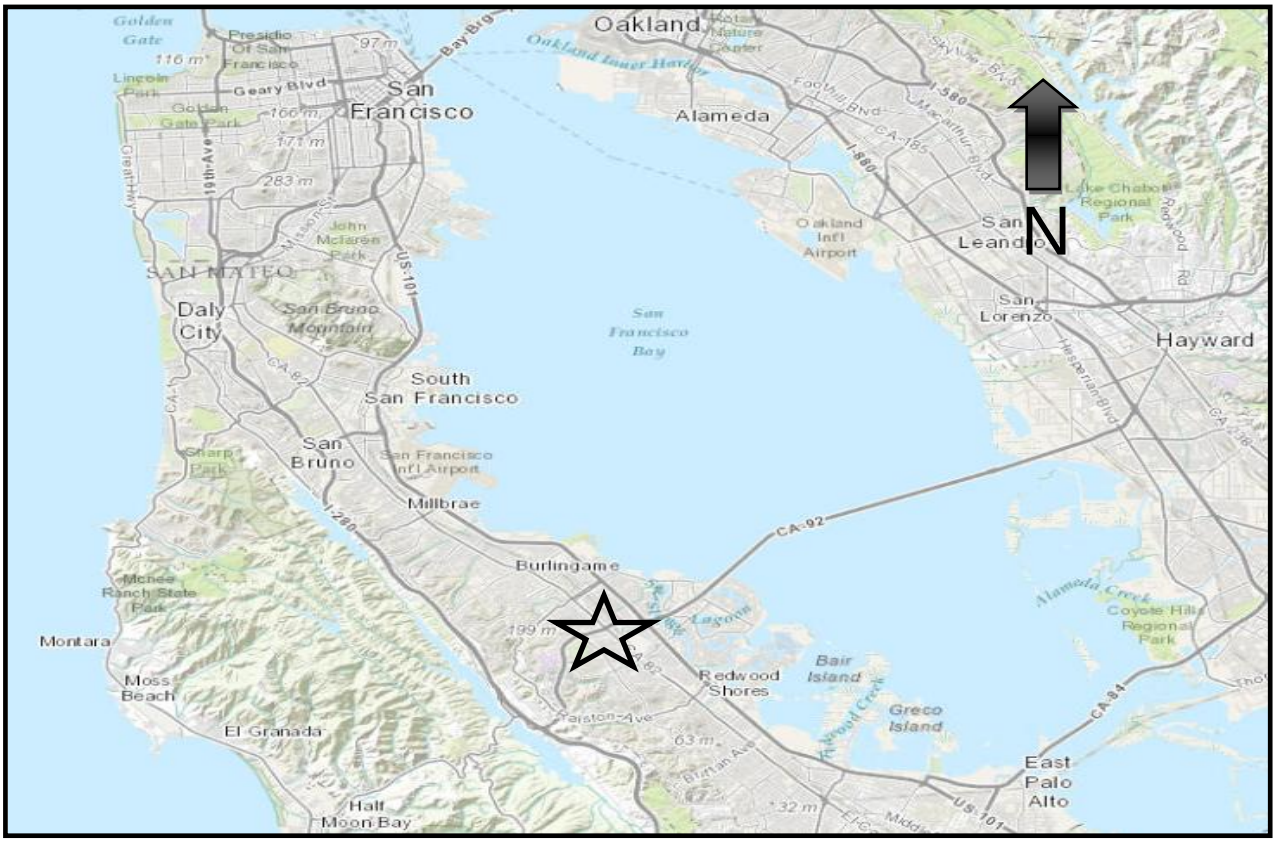


Figure 2. Project Limits

The project location is shown above in Figure 2.

Figure 3. Existing Cross Section of SR 82

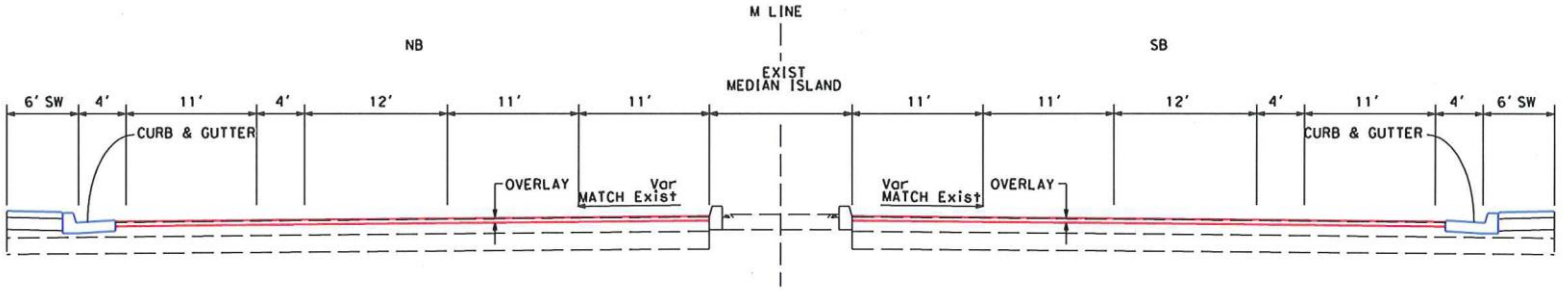


Figure 4. Existing Cross Section of SR 92

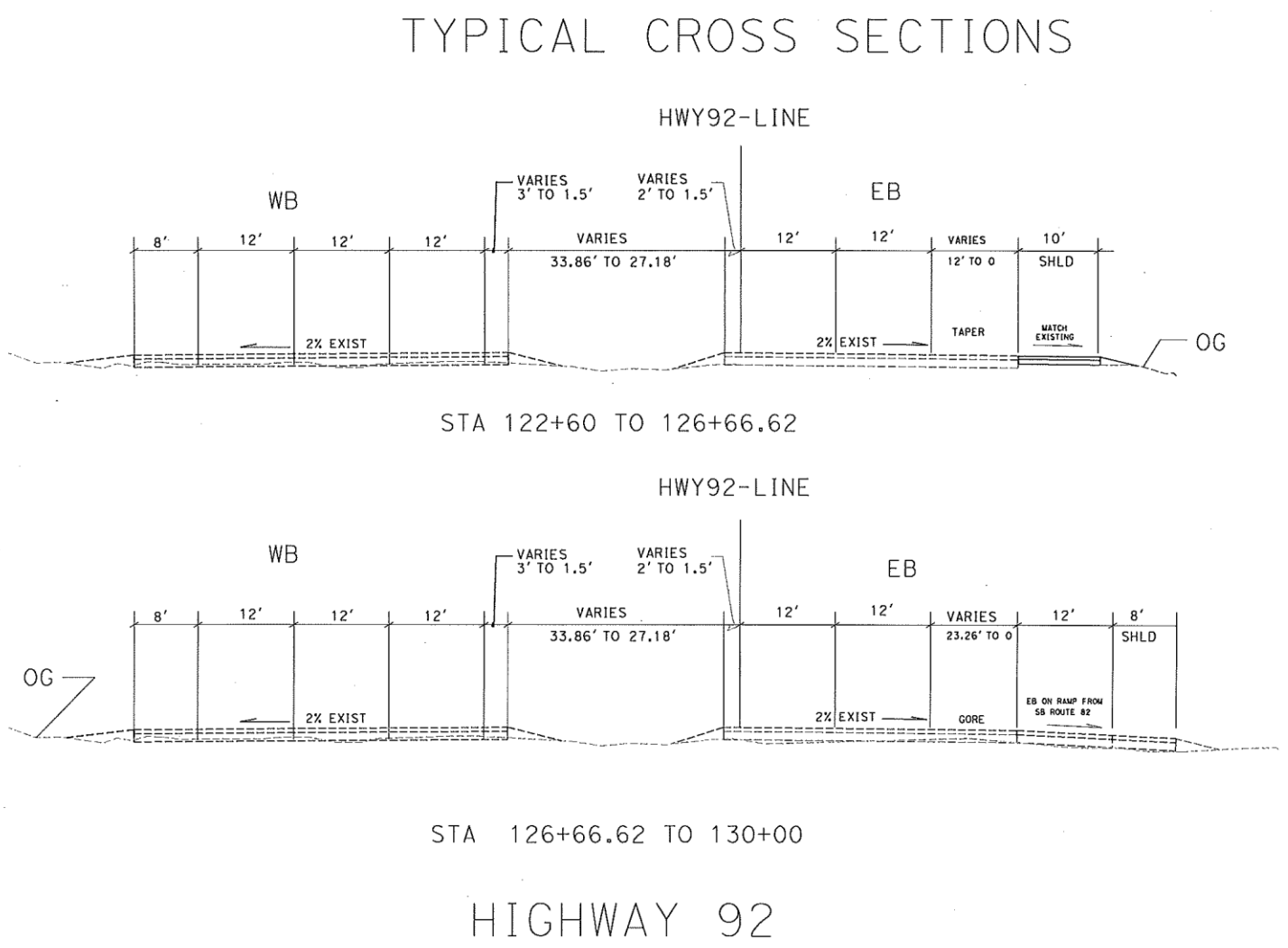


Figure 5. Conceptual Design (no scale)

CHAPTER 1- Proposed Project

Introduction

The Department of Transportation (Caltrans) is the lead agency under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Caltrans proposes to improve and reconstruct the State Route (SR) 92 and SR 82 interchange. Project location limits are post mile PM 11.0 to PM 11.5 for SR 92, and PM 10.3 (20th Ave.) to PM 10.7 (17th Ave./Bovet Rd.) for SR 82.

The project proposes to eliminate short weaving distances and provide more storage capacity for the interchange on and off-ramps to improve traffic operations and increase performance at the SR 92/82 interchange. The project is a partnership effort between City of San Mateo, SMCTA, and Caltrans. The project sponsor is the City of San Mateo. A single interchange ramps design alternative is currently being considered, and will be referred to as a "Partial Cloverleaf" for the purpose of this document.

Purpose and Need

The purpose and need of the project is to reduce existing traffic congestion, bottlenecks, weaving and queue spillback at the interchange on and off ramps. According to the Traffic Operations Report for the State Route 92/82 Interchange[1], traffic congestion is causing 451 vehicle hours of delay in the AM peak hour and 554 vehicle hours of delay in the PM peak hour within the study limits. The Level of Service (LOS) of SR 92 in the eastbound and westbound directions for the AM (8:00-9:00 AM) and PM (5:00-6:00 PM) peak hours range from LOS D to F. LOS D representing freedom to maneuver in the traffic stream, is noticeably limited. LOS E represents virtually no usable gaps within the traffic stream, leaving little room to maneuver and F represents a breakdown in flow. LOS should be in the A-C range for best traffic operations. See Table 6 for Freeway Level of Service definitions.

[1] Traffic Operations Report for the State Route 92 (SR 92)/El Camino Real (SR 82) Interchanges PA/ED. Prepared for San Mateo County Transportation Authority, City of San Mateo and Caltrans. Fehr & Peers, October 2013.
Pg. 35, Table 2-13, pg 27, Table 2-7 and pg. 28, Table 2-8.

CHAPTER 2 - Project Alternatives

Alternatives

Nine alternatives were studied for this project including the No-Build alternative and Partial Cloverleaf Interchange alternative. Eight of the alternatives were rejected because they did not meet the purpose and need or were not within the scope of the project. These are discussed further under the Alternatives Considered but Withdrawn section later in this chapter. The No-Build Alternative analyzed project conditions if the proposed improvements were not to be constructed. The No-Build Alternative serves as the baseline to which the Build Alternative can be compared.

Following the screening results, refinements to technical analysis indicated that the Partial Cloverleaf was the viable Build Alternative identified for further analysis. This alternative best addressed the need and purpose of the project.

This environmental document will discuss the Build Alternative (the Partial Cloverleaf, and the No-Build alternative) in further detail.

Build Alternative Partial Cloverleaf

The partial cloverleaf design would eliminate the short weaving distances on SR 92 between the loop on and off-ramps to and from SR 82 . It is proposed to remove the southeast and the northwest quadrant loops. Two new signalized intersections would be created at new on and off-ramps on SR 82. The traffic using the southeastern loop for the connection from eastbound SR 92 to northbound SR 82 would instead use the existing eastbound diagonal off-ramp from SR 92 to SR 82. The left turn onto SR 82 would be improved by a new traffic signal at the intersection of the off-ramp and SR 82. Similarly, traffic using the northwestern loop ramp for the connection from westbound SR 92 to southbound SR 82 would use the westbound diagonal off-ramp to SR 82 where traffic signal would be installed at this intersection. Discussed below are the proposed design features.

Ramp Widening

The SR 92 diagonal eastbound and westbound off-ramps will still be one lane off-ramps but will transition to 4 lanes before the junction with SR 82 to provide adequate storage lanes for turn movements into SR 82. The diagonal on-ramp entrances will be widened to 2 lanes to increase storage capacity and will taper down to a single lane before entering SR 92. The loop on-ramps will be widened (specific geometrics to be determined during the design phase) to better facilitate trucks, but will remain single lane ramps.

Noise Barriers and Retaining Walls

Noise studies and cost estimates completed for the project conclude that it is feasible to have one, approximately 530-foot (ft), soundwall installed at the southwest quadrant diagonal on-ramp. Noise barriers will not be needed at other locations assessed for noise impacts as the noise abatement criteria levels were not exceeded. Retaining walls will be needed at diagonal ramps at the northeast, southwest and southeast quadrants to facilitate the widening, as the existing terrain is on a slope.

Concrete Barriers and Metal Beam Guard Railing

The ramps at the northeast and southwest quadrants would have concrete barriers and metal beam guardrails serving as buffers and safety features.

Drainage Systems

The drainage systems will be addressed in the design phase of the project.

High Occupancy Vehicle (HOV) (Bus and Carpool) Lanes

An HOV bypass lane will be provided for all on ramps with the exception of the eastbound loop on-ramp where room is available for only 2 mixed flow lanes.

Ramp Metering

The SR 92 freeway corridor is included in the Statewide Ramp Metering Development Plan (RMDP). An Exception to the Ramp Metering Policy Fact Sheet will be drafted as the HOV lane requirements for the eastbound loop on-ramp cannot be met.

California Highway Patrol (CHP) Enforcement Areas

There are CHP Enforcement areas proposed for the build alternative on the two diagonal on-ramps. However, at the loop on-ramps the CHP Enforcement Areas and the Maintenance Vehicle Pullouts (MVPs) have been combined due to space constraints.

Highway Planting

The estimated area of replacement highway planting is 9.0 acres. The total disturbed soil area (DSA) for the highway widening work was estimated at 12.0 acres, as shown in the project's Storm Water Data Report (May 2012). The replacement planting/irrigation work is planned at the project interchange location, including outside of the diagonal ramps, and within current Caltrans Right of Way areas. The general replacement highway planting design concept is "relate to California natural and cultural history". The design objective for the landscape ground plan is to be somewhat uniform and low, and would be made up of grasses and shrubs. Some ground plan variation will be achieved by the use of rock and bark mulches, low growing shrubs, and various plant species having unique color, form, and texture. Larger shrubs and trees will be utilized along the outside of the diagonal ramps, to screen views of traffic and the sound wall from neighboring residences. The existing

remaining planting within the project limits, will be selectively preserved to respect an overall corridor planting theme, maintain visual character, and reduce maintenance. Trees and shrubs that are problematic, dead, or showing a decline in health will be removed. Quercus *Oak trees* are the dominant remnant tree species occurring along the SR 92 corridor, and within the project limits. New trees and shrubs species, noted for their foliage color, texture and drought tolerance, will be incorporated to enhance the dark green foliage and character of the oak trees. Highway replanting will be designed further in a later phase, becoming an independent project in the future.

Erosion Control

Temporary and permanent erosion control measures will be installed to protect disturbed soils, at various phases of highway planting construction. Erosion control will provide: highway facility protection, roadside slope stabilization, source control of any soil silts, reduction/management of any concentrated storm water flow conditions, and cover for disturbed soil areas from construction operations/staging impacts. Additionally, erosion control is necessary also to help meet water quality discharge requirements. Permanent erosion control will be achieved by installation of planting (trees, shrubs, groundcovers, and grasses) and other landscape materials (compost, mulches, and netting). Temporary erosion control will be achieved through placement of straw fiber rolls and organic/inorganic materials to cover soil areas and drain inlets. Compost will be used extensively to improve soil fertility, storm water infiltration, plants, rooting depth and water holding capacity, as well as reduce soil erosion and improve water quality. This project will incorporate the use of temporary construction site Best Management Practices (BMPs) and permanent erosion control BMPs. The project does not require hydromodification mitigation since it is located within the exempt area (i.e., hardened channel) per San Mateo County's C.3 Stormwater Technical Guidance (2012). The project will not cause water discharge into navigable waters and will not be filling or dredging wetlands. Thus, the project is not anticipated to require Clean Water Act (CWA) Section 401 Certification from the Regional Water Quality Control Board (RWQCB) and there is no need for a CWA Section 404 permit from U.S. Army Corps of Engineers (USACE).

Nonmotorized and Pedestrian Features, etc.

The design shall apply the Caltrans Complete Streets Deputy Directory Policy on Complete Streets-Integrating the Transportation System (DD-64-R1) to develop a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit riders, and motorists appropriate to the function and context of the facility.

- Construction details

A Traffic Management Plan (TMP) answers questions regarding potential lane/ramp closures, closure periods, length of construction, and coordination with Emergency Service Providers. A TMP typically includes information regarding project impacts and transportation management measures. Project impacts include lane closures and modified access and transit, pedestrian and bicycle impacts. Transportation management measures include the following components: public information, motorist information, incident management, construction strategies and demand management strategies. The Transportation Management Plan cost for this project has been estimated to be $450,000.

The TMP for this project will not likely have lane or ramp closures during the day due to traffic conditions. However, if a lane closure is necessary, the closure hours will be determined during the plans, specification and estimates (PS&E) phase. Full ramp closures are possible with detours in place (standard in construction). On SRs 82 and 92 lane closures are permitted but at least 1 through lane will always be provided to the public. The length of time for the closures will be determined during the PS&E phase of the project for SRs 92, 82 and the ramps.

Typically, Caltrans will coordinate with and notify the local California Highway Patrol (CHP) office and the local Fire Department weekly of upcoming lane closures. CHP will also be on site at nights if Caltrans is doing the construction inspection. Caltrans will also coordinate with the City of San Mateo on the weekly schedule of upcoming closures.

No Build Alternative

The No-Build Alternative analyzes project conditions if the proposed improvements were not to be constructed. The queuing and weaving at the SR 82/92 Interchange will continue to worsen if the current interchange is not modified.

Alternatives Discussed But Eliminated From Further Analysis:

The Diamond Interchange alternative was found to be operationally not feasible. Generally, the proposed diamond configuration would not support the projected growth in volumes and would result in poor level of service for the ramps.

Diamond Interchange

This alternative would eliminate all the loop ramps. Two new traffic signals would be installed at the off-ramp intersections with SR 82. The SR 92 diagonal eastbound and westbound off-ramps would still be one lane off ramps but would transition to 4

lanes before the junction with El Camino Real to provide adequate storage lanes for turns onto El Camino Real. The diamond on-ramps at the El Camino Real Interchange (I/C) would be two-lane entrance ramps transitioning to a single lane before reaching SR 92. In addition, triple left turns from southbound (SB) SR 82 (EB) SR 92 at the new intersection would be needed. Level of service would still be F and the existing width of SR 82 is not wide enough to support the additional lanes without reconstruction of the SR 92 over crossing.

The Traffic Operations Analysis Report (TOAR) considered the following alternatives and they were rejected as it was determined that they were not feasible because of design constraints:

1. *Roundabout Diamond Interchange (RDI):* A roundabout diamond interchange has a similar ramp configuration to a spread diamond interchange (SDI). A SDI configuration is the most common type where a major facility intersects a minor highway. The design allows free flow operation on the major highway but creates at grade intersections on the minor highway with the ramps. In contrast the RDI is designed with two on-ramps and two-off-ramps; however, the ramp terminal intersections are controlled with roundabouts instead of stop signs or traffic signals. Roundabouts at the SR 92/SR 82 would need to be two or three lane to accommodate the high traffic volumes on SR 82. To accommodate pedestrians at multilane roundabouts, pedestrian activated signalization is needed at the crosswalks, thus reducing the operational benefits of the roundabout. Additionally, a roundabout would not be able to accommodate the high volume of left-turning traffic from SB SR 82 to EB SR 92.

2. *A single point urban interchange (SPUI)* is similar to a diamond interchange; however, there is a single ramp terminal intersection instead of two. SPUIs typically show the most benefit at locations with closely spaced intersections, since they eliminate one intersection and provide better spacing between remaining intersections. In the case of the SR 92/SR 82 interchange, there is already sufficient spacing between ramp terminal intersections and adjacent downstream intersections. A SPUI would also require complete reconstruction of the existing SR 92 structure over SR 82, adding significant cost over the other alternatives considered.

3. *The diverging diamond interchange (DDI)* is a type of diamond interchange that uses crossover movements at the ramp terminal intersections to increase capacity. The design allows for fewer lanes on the local street compared to a regular diamond interchange because left-turn storage lanes are not needed. The DDI is more efficient because all turns onto on-ramps are uncontrolled and the signals at the ramp terminal intersections can be operated with two signal phases instead of three. However, a DDI does not accommodate high volumes of through traffic on the local street since opposing directions of traffic have conflicting green phases; signal progression through the corridor

is therefore sacrificed. This configuration would not be appropriate at this location due to the high volume of through traffic on SR 82.

4. *L-8 Configuration Interchange*

   This alternative would eliminate both the diagonal and loop ramps in the northeast (NE) quadrant and the loop off-ramp in the southeast (SE) quadrant. All the remaining ramps would be widened to at least two lanes at the intersection with SR 82, with the exception of the westbound SR 92 loop off-ramp, which would be four lanes wide. This option was not included in the TOR study because design constraints eliminated this alternative from further consideration. The widening of the westbound loop off-ramp would provide a tight radius through which the motorist would have to decelerate from freeway speeds to a design speed of 25 mph. In addition, the loop-off ramp will likely not have enough storage. It is likely that more accidents would occur due to congestion and minimal sight distances.

CHAPTER 3 - Affected Environment, Environmental Consequences and Avoidance, Minimization, and/or Mitigation Measures

As a part of the scoping and environmental analysis conducted for the proposed project, the following environmental issues were considered but no adverse impacts were identified. Consequently, there is no further discussion regarding these issues in this document.

- *Air Quality* – The proposed project would not conflict with or obstruct implementation of any applicable air quality plan, but rather conforms to both the 2035 Regional Transportation Plan (RTP) and the 2011 Transportation Improvement Program (TIP). The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, and would not result in a cumulatively considerable net increase of any criteria pollutant under applicable federal or state ambient air quality standards. The project would not expose sensitive receptors to substantial pollutant concentrations.

  The project does not require a regional emissions analysis and is not considered capacity increasing, but rather an operational improvement. The Construction Impacts section includes a discussion of avoidance and minimization measures related to temporary air quality effects during construction.

- *Community Character and Cohesion* - The proposed project will not alter the character or cohesiveness of existing neighborhoods or communities.

- *Consistency with State, Regional and Local Plans and Programs* - The proposed project, under its purpose and need, is consistent with state, regional and local plans and programs, as well as transportation plans and programs. The 2035 Transportation Plan for the San Francisco Bay Area, adopted by the Metropolitan Transportation Commission in 2009, identified the proposed project as Project ID 230424. The proposed project is consistent with the City of San Mateo "Vision 2030" General Plan. Circulation elements will be discussed in the Traffic and Transportation/Pedestrian and Bicycle Facilities section.

- *Environmental Justice* – There would be no impacts concentrated in any area of minority or low-income residents. The proposed project would not cause adverse affects on any minority or low-income populations.

- *Existing and Future Land Use*- The proposed project would not affect existing or future land uses. No acquisition of residential or commercial structures is anticipated, and the project would not alter community interaction patterns.

- *Farmlands and Timberlands* – Historically, the proposed project area has been designated for highway use. There are no farmlands or timberlands within the project vicinity.

- *Growth* – The proposed project is a reconfiguration to an existing interchange, not a modification to highway capacity operation or accessibility increasing or influencing growth.

- *Mineral Resources*- There are no known mining resources within the proposed project vicinity.

- *Parks and Recreation* – No parks or recreational facilities are affected by the project.

- *Population and Housing*- The proposed project would not displace any existing housing or people with pre, during, or post construction activities.

- *Public Services*- The proposed project would not result in any adverse impacts to fire protection, police protection, schools, parks, or other public facilities. Caltrans would notify the local CHP office and the Fire Department weekly of upcoming closures. CHP would also be on site at night if Caltrans is doing the construction inspection. The City traffic engineering or transportation planning department would also be expected to do the same.

- *Right-of-Way*- The proposed project would not require any additional right-of-way. All work would be within existing Caltrans right-of-way.

- *Wild and Scenic rivers*- The proposed project would not impact any wild or scenic rivers.

UTILITIES AND EMERGENCY SERVICES

Affected Environment

The affected environment is the SR 82 and SR 92 highway I/C including on and off-ramps and loops.

Environmental Consequences

Utility and Other Owner Involvement

Underground utilities that are within or near the project vicinity will be investigated through potholing during the design phase of the project and will be modified as required during construction. Verification of utilities will require extensive potholing at the plans, specifications and estimates (PS&E) phase of this project. The utility owners within the project limits are the City of San Mateo, AT&T phone company, Comcast cable provider, Pacific Gas and Electric Company (PG&E) and Caltrans. Utility relocation costs have been included in the overall project estimates.

Emergency Services

No law enforcement, fire, or other emergency services should be affected by the project. Caltrans would notify the local California Highway Patrol (CHP) office and the Fire Department weekly of upcoming closures. CHP would also be on site at night if Caltrans is doing the construction inspection. The City transportation or traffic engineering staff would also be expected to do the same.

A TMP is anticipated to be prepared for the project and is discussed in the Avoidance, Minimization, and/or Mitigation Measures of the Traffic and Transportation/Pedestrian and Bicycle Facilities section of this chapter.

Avoidance Minimization and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are proposed.

Traffic and Transportation/Pedestrian and Bicycle Facilities

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 [USC] 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.

Affected Environment

As discussed in the project description the project would improve traffic operations of the SR 92/ SR 82 Interchange and increase performance at the on and off-ramps. The *State Route 92 (SR 92)/El Camino Real (SR 82) Interchange Traffic Operations Report* was prepared for the project and completed in October, 2013. This report is available upon request.

Existing Conditions

The study corridor is located within San Mateo County and traverses the City of San Mateo. The freeway and interchange system in the study area includes:

State Route 92 (SR 92) extends between State Route (SR 238) also known as Mission Boulevard in Hayward to State Route 1 (SR 1) in Half Moon Bay. SR 92 varies between two and seven lanes. The highway is classified as an arterial (Jackson Street) between SR 238 (Mission Boulevard) and Interstate 880 (I-880), a freeway between I-880 and Interstate 280 (I-280), and as a two-lane highway west of I-280. SR 92 also includes the San Mateo Bridge, which connects Alameda County to San Mateo County. Within the study area, SR 92 is a four-lane freeway, with two lanes in each direction. Auxiliary lanes are provided between the El Camino Real loop ramps and between the Delaware Avenue and U.S. Highway 101 (US101) interchanges in both directions. An auxiliary lane is provided in the eastbound direction between the El Camino Real on-ramp and Delaware Avenue off-ramp. In

the westbound direction, although it is not striped, drivers treat the segment between the Delaware on-ramp and the SR 82 off-ramp as an auxiliary lane.

The SR 92/US 101 interchange is a Type F-3 freeway-to-freeway configuration that provides full access. All ramps are either single-lane or dual-lane entry or exit. This interchange provides access to the San Mateo Bridge.

The SR 92/South Delaware Street interchange is a hybrid Type L-1/L-6 configuration that provides full access. All ramps are a single-lane entry or exit and the ramp terminal intersections are signalized.

The SR 92/El Camino Real (SR 82) interchange is a Type L-10 full cloverleaf configuration that provides full access. All ramps are single-lane entry or exit. Off-ramps are yield controlled at SR 82 and on-ramps are all free movements.

The **SR 92/Alameda De Las Pulgas interchange** is a Type L-1 tight diamond configuration that provides full access. All ramps are a single-lane entry or exit and ramp terminal intersections are signalized.

The **SR 92/West Hillsdale Boulevard interchange** is a hybrid Type L-1/L-9 configuration that provides full access. All ramps are a single-lane entry or exit and the ramp terminal intersections are signalized.

El Camino Real (SR 82) is a four- to six-lane arterial that runs north-south along the San Francisco peninsula between San Jose and San Francisco. It primarily runs parallel to US101. In the study area it is a six-lane road with painted and raised medians and a posted speed limit of 35mph.

Bovet Road is a four-lane collector with a posted speed limit of 25mph. It serves office buildings and retail space between Borel Avenue and SR 82. It also provides signalized access at SR 82 for residences located off of Borel Avenue as well as Borel Middle School. Bovet Road ends at the railroad tracks to the east and changes to 17th Avenue east of SR 82.

17th Avenue is a two-lane collector with a posted speed limit of 25mph. It serves retail, multi-family residential, and single-family residential east of SR 82. 17th Avenue changes to Bovet Road west of SR 82.

20th Avenue is primarily a two-lane collector with a four-lane segment between Pioneer Court and SR 82. The posted speed limit is 25mph. It serves retail, multi-family and single-family residential, as well as San Mateo City Hall.

Existing Bicycle and Pedestrian Facilities

Typical pedestrian facilities include sidewalks, crosswalks, and pedestrian signals at signalized intersections. Sidewalks are provided on both sides of SR 82 (SR 82),

Bovet Road, 17th Avenue, and 20th Avenue. Crosswalks are provided across all legs of each signalized intersection with pedestrian signal heads. Crosswalks are also provided across the on and off-ramps at the SR 92 I/C; however, the ramps are designed for higher vehicle speeds which are less conducive to pedestrian travel. Crosswalks across SR 82 are not provided at the ramp terminal intersections. This results in a distance of approximately 1,850 feet between marked pedestrian crossings on SR 82.

Typical bicycle facilities include the following:

- Bicycle paths (Class I) – Paved trails that are separated from roadways
- Bicycle lanes (Class II) – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs
- Bicycle routes (Class III) – Designated roadways for bicycle use by signs only' may or may not include additional pavement width for cyclists.

According to the City of San Mateo's Bicycle Master Plan, there are currently no bicycle facilities in the vicinity of the project location. A Class III signed bicycle route is planned on 20th Avenue east and west of SR 82. Class III bicycle routes with shared lane markings are planned on Bovet Road and 18th Avenue east and west of SR 82. Bicycle facilities are not planned on SR 82. Palm Drive, a parallel street to the east of SR 82 is the preferred bicycle route in the City.

Existing Public Transit

The primary transit service provider offering service in the study area is San Mateo County Transit District (SamTrans). SamTrans currently operates four multi-city routes along SR 82 (SR 82) within the study area; bus Routes 390, 391, 397, and ECR. Bus Routes 390 and 391 are commuter routes, 397 is a late night service running between 12:00 AM and 6:00 AM, and ECR is a weekend route. SamTrans also operates Bus Route 53 that uses SR 92 within the study area. Bus Route 53 provides service between San Mateo Park and Borel Middle School on school days only and is limited to school start and end times.

Existing Rail Service

Caltrain provides passenger rail service in San Mateo, connecting San Mateo with the San Francisco Peninsula between San Francisco and San Jose. Three stops serve the City of San Mateo: Hillsdale Boulevard, Hayward Park, and downtown San Mateo. Hayward Park is the closest station to the study area, located near the SR 92/Delaware Street interchange.

Existing Truck Routes

SR 92 within the study area is classified as a national Surface Transportation Assistance Act (STAA) truck route. SR 82 within the study area is classified as a

Terminal Access truck route. STAA trucks may travel on Terminal Access routes. A map of the regional truck routes is provided in Appendix A of the Traffic Operations Analysis Report. Other STAA truck routes within the region include U.S. 101, I-280, and I-380.

Existing Traffic Conditions

Local street performance is measured using the “level of service” (LOS) concept, whereby traffic demand is evaluated in the context of capacity. Since intersections are a key factor in determining the capacity of local streets, the adopted procedures of most jurisdictions focus on peak-hour operations at intersections. The methodology computes a level of service taking into account factors such as the demand for each traffic movement (i.e., left turns, straight, right turns), the number of lanes, and, where applicable, signal timing. As summarized in Table 5 below, level of service can range from “LOS A,” representing free-flow conditions, to “LOS F,” representing jammed/over-saturated conditions.

Table 5. Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay * Per Vehicle (Seconds)
A	Progression is extremely favorable and most vehicles arrive during the green phase. Short cycle lengths may contribute to this low delay.	Up to 10.0
B	Good progression, short cycle lengths, or both. More vehicles stop than LOS A, causing higher level of delay	10.1 to 20.0
C	Fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant.	20.1 to 35.0
D	Influence of congestion becomes noticeable. Unfavorable progression, long cycle lengths, and high volume/capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.1 to 55.0
E	Poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.	55.1 to 80.0
F	Arrival flow rates exceed the capacity of the lane groups and the intersection is oversaturated. High v/c ratios with many individual cycle failures. Poor progression, long cycle lengths may also contribute significantly to high delay levels. This level, considered unacceptable to most drivers.	Greater than 80.0
Source: Transportation Research Board, 2*010 Highway Capacity Manual*, (Washington D.C. 2010)		

***Average Control Delay includes the time for initial deceleration delay, queue move-up time, stopped delay, and final acceleration.

Additionally, the level of service concept can be applied to freeways as described in Table 6 below ranging from "LOS A," representing free-flow speeds, to "LOS F," representing a breakdown in flow.

Table 6. Freeway Level of Service Definitions

Level of Service	Description	Density (passenger cars/mile/lane)
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	Up to 11.0
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	11.1 to 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.	18.1 to 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.	26.1 to 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.	35.1 to 45.0
F	Represents a breakdown in flow.	Greater than 45.0
Source: Transportation Research Board, 2*010 Highway Capacity Manual*, (Washington D.C. 2010)		

The analysis area for the SR 92/El Camino Real (SR 82) interchange project is located within the City of San Mateo in San Mateo County. The project study area evaluated the following intersections, road segments and on-and off-ramps:

Intersections

1. SR 82/Bovet Road/17th Avenue
2. SR 82/WB SR 92 Ramps
3. SR 82/EB SR 92 Ramps
4. SR 82/20th Avenue

Freeway Mainline Segments

1. SR 92 between US101 and Delaware Avenue
2. SR 92 between Delaware Avenue and SR 82
3. SR 92 between SR 82 and Alameda De Las Pulgas
4. SR 92 between Alameda De Las Pulgas and Hillsdale Boulevard

Existing Peak Hour Network Performance Measures

For the SR 82/92 I/C project to reduce queuing and improve operations the traffic analysis examined the existing peak hour network measure of effectiveness. The following (Table 7) presents existing volume served, vehicle miles traveled, total travel time, average travel speed, total vehicle hours of delay and average delay per vehicle. The table shows that the existing traffic congestion and queuing on the highway network at the intersection on and off-ramps is causing 451 vehicle hours of delay in the AM peak hour (91.7 seconds of average delay per vehicle) and 554 hours of delay in the PM peak hour (103.9 seconds of average delay per vehicle) within the study limits. In addition, total vehicle travel time is high and traffic volume is not being served adequately at the interchange. The proposed Partial Cloverleaf alternative would reduce delay and improve vehicle traffic volume served.

Table 7. Existing Peak Hour Network Measure of Effectiveness

EXISTING PEAK HOUR NETWORK MEASURES OF EFFECTIVENESS			
Measure	**AM Peak Hour**	**PM Peak Hour**	
Volume Served	16,332	17,792	
Vehicles Miles of Travel	32,985	33,361	
Total Travel Time (hours)	1,104	1,248	
Average Travel Speed (mph)[1]	29.9	26.7	
Total Vehicle Hours of Delay	451	554	
Average delay per Vehicle (s)	91.7	103.9	
Notes: Average travel speed summary includes all network components, including mainline and ramps, and El Camino Real.			
Source: Fehr & Peers, 2013.			

Data collection efforts in the study area were undertaken during May and June 2012 to determine existing peak period traffic volumes, travel times, and mainline and intersection queuing characteristics within study area boundaries. In addition, mainline and ramp lane configurations were collected along SR 92 and intersection configurations and signal timings were collected at each of the study intersections. The analysis encompassed the weekday AM and PM peak periods that were defined as 7AM to 9AM and 4PM to 6PM, respectively.

Existing Freeway and Ramp/Connector Congestion and Queuing Observations and Analysis: AM/PM Peaks

AM Peak Period

Eastbound SR 92

At the El Camino Real (SR 82) interchange, the on-ramp volume from southbound SR 82 plus the upstream volume on SR 92 exceeds the capacity of SR 92. The short weave distance between loop on-ramp and loop off-ramp reduced capacity of SR 92 at the El Camino Real (SR 82) interchange. Table 8 shows how existing traffic queuing and congestion for eastbound SR 92 is leading to a low quality LOS, ranging from E-F at the SR 82/92 ramps segments, higher densities in vehicles per mile per lane (vpmpl) and reduced vehicle speeds.

Table 8. Existing Eastbound SR 92 AM Peak Hour Level of Service

EXISTING EASTBOUND SR92 AM PEAK HOUR LEVEL OF SERVICE

Location	Type	LOS	Density (vpmpl)	Speed (mph)
Hillsdale Boulevard Off-Ramp	Diverge	E	35.3	40.4
Hillsdale Boulevard Off-Ramp to Eastbound Hillsdale Boulevard On-Ramp	Basic	D	32.0	51.5
Eastbound Hillsdale Boulevard On-Ramp	Merge	D	34.7	46.9
Westbound Hillsdale Boulevard On-Ramp	Merge	E	38.9	44.5
Hillsdale Boulevard On-Ramp to Alameda De Las Pulgas Off-Ramp	Basic	F	48.9	38.1
Alameda De Las Pulgas off-Ramp	Diverge	F	49.8	37.0
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	F	49.8	31.3
Alameda De Las Pulgas On-Ramp to Southbound El Camino Real Off-Ramp	Weave	F	48.0	33.3
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	E	43.9	40.1
Southbound El Camino Real On-Ramp to Southbound El Camino Real Off-Ramp	Weave	E	45.2	35.4
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	F	51.1	36.3
Northbound El Camino Real On-Ramp to Delaware Avenue Off-Ramp	Weave	F	42.7	37.5
Delaware Avenue Off-Ramp to Delaware Avenue Off-Ramp	Basic	D	33.5	49.7
Delaware Avenue On-Ramp to US101 Off-Ramp	Weave	E	37.7	36.5

Note: The level of service and average density for the study segment are consistent with the HCM methodology.

Source: Fehr & Peers, 2013

Westbound SR 92

The short weave between US101 connector ramps and to Delaware Avenue off-ramp reduces the capacity of SR 92. At the Northbound SR 82 off-ramp queue spillback from the ramp-terminal intersection reaches the mainline. Table 9 shows how the existing westbound SR 92 traffic in the AM peak has a LOS of between LOS D-F, the vpmpl densities are in the mid-range to heavy congestion levels and there are reduced vehicle speeds.

Table 9. Existing Westbound SR 92 AM Peak Hour Level of Service

EXISTING WESTBOUND SR92 AM PEAK HOUR LEVEL OF SERVICE

Location	Type	LOS	Density (vpmpl)	Speed (mph)
US101 On-Ramp to Delaware Avenue Off-Ramp	Weave	E	37.0	43.7
Delaware Avenue Off-Ramp to Delaware Avenue On-Ramp	Basic	E	44.8	45.7
Delaware Avenue On-Ramp to Northbound El Camino Real Off-Ramp	Weave	F	46.0	37.4
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	F	45.2	39.8
Northbound El Camino Real Off-Ramp to Southbound El Camino Real Off-Ramp	Weave	D	33.8	46.7
Southbound El Camino Real Off-Ramp to Southbound EL Camino Real On-Ramp	Basic	D	31.0	53.9
Southbound El Cmaino Real On-Ramp to Alameda De Las Pulgas Off-Ramp	Weave	D	32.6	49.9
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	D	31.6	51.7
Alameda De Las Pulgas On-Ramp	Merge	E	35.9	45.3
Alameda De Las Pulgas On-Ramp to Hillsdale Boulevard Off-Ramp	Basic	E	42.7	43.7
Hillsdale Boulevard Off-Ramp	Diverge	E	38.9	45.7
Hillsdale Boulevard Off-Ramp to Hillsdale Boulevard On-Ramp	Basic	D	29.6	52.4
Hillsdale Boulevard On-Ramp	Merge	E	35.2	44.5

Note: The level of service and average density for th study segment are consistent with the HCM methodology.
Source: Fehr & Peers, 2013

PM Peak Period

Eastbound SR 92

At the SR 82 I/C, the on-ramp volume from southbound SR 82 added to the eastbound SR 92 volume exceeds the capacity of SR 92. The short weave distance between loop on-ramp and loop off-ramp reduces capacity of SR 92 at the SR 82 interchange. The eastbound SR 92 PM Peak Period data shows LOS of between D-F, vpmpl densities in the mid-range to heavy congestion levels and reduced vehicle speeds.

Table 10 displays the existing eastbound SR 92 peak hour level of service.

Table 10. Existing Eastbound SR 92 PM Peak Hour Level of Service

EXISTING EASTBOUND SR92 PM PEAK HOUR LEVEL OF SERVICE				
Location	Type	LOS	Density (vpmpl)	Speed (mph)
Hillsdale Boulevard Off-Ramp	Diverge	D	28.8	45.0
Hillsdale Boulevard Off-Ramp to Eastbound Hillsdale Boulevard On-Ramp	Basic	D	29.0	53.1
Eastbound Hillsdale Boulevard On-Ramp	Merge	D	32.3	47.6
Westbound Hillsdale Boulevard On-Ramp	Merge	E	36.9	45.6
Hillsdale Boulevard On-Ramp to Alameda De Las Pulgas Off-Ramp	Basic	E	42.7	43.6
Alameda De Las Pulgas off-Ramp	Diverge	F	59.9	31.2
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	F	57.2	26.7
Alameda De Las Pulgas On-Ramp to Southbound El Camino Real Off-Ramp	Weave	F	57.5	28.3
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	F	57.5	28.8
Southbound El Camino Real On-Ramp to Southbound El Camino Real Off-Ramp	Weave	E	43.4	36.3
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	E	44.4	41.4
Northbound El Camino Real On-Ramp to Delaware Avenue Off-Ramp	Weave	D	30.7	49.0
Delaware Avenue Off-Ramp to Delaware Avenue Off-Ramp	Basic	D	34.2	31.1
Delaware Avenue On-Ramp to US101 Off-Ramp	Weave	E	41.5	40.2

Note: The level of service and average density for th study segment are consistent with the HCM methodology.
Source: Fehr & Peers, 2013

Westbound SR 92

At the US101 connector ramps to SR 92 the on-ramp volumes from US101 to westbound SR 92 exceed capacity and the short weave between US 101 connector ramps and the Delaware Avenue off-ramp reduce the capacity of SR 92. At the northbound SR 82 off-ramp queue spillback from ramp-terminal intersection reaches the mainline. Data for the westbound SR 92 during the PM peak hour shows the majority of the locations in the E-F range, a greater proportion of vpmpl densities in the high mid-range to heavy congestion levels and reduced vehicle speeds.

Table 11, on the following page, displays the existing westbound SR 92 PM peak hour level of service.

Table 11. Existing Westbound SR 92 PM Peak Hour Level of Service

EXISTING WESTBOUND SR92 PM PEAK HOUR LEVEL OF SERVICE

Location	Type	LOS	Density (vpmpl)	Speed (mph)
US101 On-Ramp to Delaware Avenue Off-Ramp	Weave	F	59.1	25.8
Delaware Avenue Off-Ramp to Delaware Avenue On-Ramp	Basic	F	49.6	35.7
Delaware Avenue On-Ramp to Northbound El Camino Real Off-Ramp	Weave	F	62.2	28.1
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	F	50.4	33.5
Northbound El Camino Real Off-Ramp to Southbound El Camino Real Off-Ramp	Weave	E	41.6	36.4
Southbound El Camino Real Off-Ramp to Southbound EL Camino Real On-Ramp	Basic	F	46.5	36.2
Southbound El Cmaino Real On-Ramp to Alameda De Las Pulgas Off-Ramp	Weave	E	39.0	43.0
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	D	33.2	48.5
Alameda De Las Pulgas On-Ramp	Merge	E	44.1	36.5
Alameda De Las Pulgas On-Ramp to Hillsdale Boulevard Off-Ramp	Basic	E	41.9	45.0
Hillsdale Boulevard Off-Ramp	Diverge	E	40.3	44.3
Hillsdale Boulevard Off-Ramp to Hillsdale Boulevard On-Ramp	Basic	E	37.3	44.7
Hillsdale Boulevard On-Ramp	Merge	F	53.3	35.0

Note: The level of service and average density for th study segment are consistent with the HCM methodology.
Source: Fehr & Peers, 2013

Intersection Observations AM/PM Peak Periods

Vehicle, pedestrian and bicycle intersection turning movement counts were collected during the weekday morning (7:00-9:00 AM) and evening (4:00-6:00 PM) peak periods on May 23, 2012 at the following intersections: SR 82/Bovet Road/17th Avenue and SR 82/20th Avenue. These locations are the first signalized intersections to the north and south of the SR 92/SR 82 I/C.

In addition, field observations were conducted of traffic congestion and vehicle queues at the study intersections during the morning and evening peak periods in May 2012. The following observations were made at the study intersections:

SR 82/Bovet Road/17th Avenue

During the morning and evening peak periods, northbound left-turning traffic consistently reached the capacity of the turn pocket; however, all queued vehicles would clear most cycles. During the morning and evening peak period, northbound through vehicle queues regularly extended to the westbound SR 92 off-ramp. In the evening peak period, westbound left-turning traffic was consistently queued beyond the adjacent intersection (Ivy Street) and did not clear every cycle due to the high volume of conflicting eastbound traffic and pedestrians. Vehicle queues on other movements cleared every cycle.

SR 82/Westbound SR 92 Ramps
During the morning and evening peak period, vehicle queuing on the westbound SR 92 off ramp to northbound SR 82 extended back to mainline SR 92. This was caused by vehicles on the off-ramp waiting for gaps in northbound SR 82 traffic and by occasional queue spillback from the SR 82/Bovet Road/17th Avenue intersection. Vehicles did not queue on the other ramps.

SR 82/Eastbound SR 92 Ramps
During the morning and evening peak period, vehicle queuing on the eastbound SR 92 off ramp to southbound SR 82 would reach four or five vehicles. This was caused by vehicles on the off-ramp waiting for gaps in southbound SR 82 traffic and by occasional queue spillback from the SR 82/20th Avenue intersection. Vehicles did not queue on the other ramps.

SR 82/20th Avenue
During the morning peak period, southbound through vehicle queues occasionally extended to the eastbound SR 92 off-ramp. In the evening peak period, southbound through vehicle queues often extended to the eastbound SR 92 off-ramp. During the morning and evening peak periods, southbound through vehicle queues blocked the southbound left-turn pocket and left-turning vehicles were not able to enter the pocket until the next cycle. During the morning and evening peak period, eastbound left-turning traffic was regularly queued beyond the adjacent two intersections (McAker Court and Wyoming Way) due to heavy vehicle traffic and keep clear zones at driveways and intersections. During the evening peak period, this queue did not clear every cycle. Vehicle queues on other movements cleared every cycle. Table 12 displays the existing intersection peak hour level of service organized by intersection, traffic control, peak hour, delay and Level of Service (LOS). Intersection level of service and delay is LOS F at intersection #2 and in the PM peak at intersections #1 and #4 is LOS D.

Table 12. Existing Intersection Peak Hour Level of Service

EXISTING INTERSECTION PEAK HOUR LEVEL OF SERVICE

Intersection	Control[1]	Peak Hour	Delay[2] (sec/Vehicle)	LOS
1) El Camino Real/Bovet Road/17th Avenue	Signal	AM	27.6	C
		PM	41.4	D
2) El Camino Real/Westbound SR92 Ramps	Yield	AM	65	F (WB)
		PM	174.8	F (WB)
3) El Camino Real/Eastbound SR92 Ramps	Yield	AM	8.7	A (EB)
		PM	19.7	C (EB)
4) El Camino Real/20th Avenue	Signal	AM	30.2	C
		PM	37.3	D

Notes:
1. Signal = signalized intersection, Yield = yield controlled off-ramps
2. Signalized intersection level of service based on weighted average control delay per vehicle, yield controlled delay based on average delay per vehicle for the yield controlled approach.
Source: Fehr & Peers, 2013

Traffic Demand

Year 2018 (opening year) and Year 2038 (design year) traffic demand forecasts were used as the basis for the project alternatives traffic operational analysis. For each horizon year, the base or No Build forecasts were developed. Because the project is considered an operational improvement project, it was assumed that these modifications would not cause a change in the overall travel demands or origin-destination patterns within the study area, and would only result in the re-distribution of traffic between ramps at SR 82 and SR 92 interchange. The demand volumes at the four existing intersections along the study segment of SR 82 would not change from the No Build Alternative. The interchange modifications would only result in the re-distribution of traffic between the SR 92 interchange ramps and at the new intersections on SR 82.

Project Alternatives

No Build Alternative

The No Build Alternative assumes no change to the existing four quadrant cloverleaf interchange at SR 82/SR 92. The No-Build Alternative analyzes project conditions if the proposed improvements were not to be constructed. The queuing and weaving at the SR 82/92 Interchange would continue to worsen if the current interchange is not modified. The City of San Mateo is planned project to add a dedicated right-turn pocket on southbound SR 82 at the SR 82 at 20th Avenue intersection was included in the No Build alternative. All other lane configurations at the study intersections

remain the same as existing under the No Build alternative. Existing lane configuration on SR 92 and interchanges throughout the study area were used for the No-Build alternative.

Build Alternative

The partial cloverleaf design would eliminate the short weaving distances on SR 92 between the loop on and off-ramps to and from SR 82. It is proposed to remove the southeast and the northwest quadrant loops. Two new signalized intersections would be created at new on and off-ramps on SR 82.

Ramp Metering

Ramp metering was assumed for all on-ramps within the study area for both the No Build and Partial Cloverleaf alternatives in the design year.

No Build Alternative

The No Build alternative includes ramp metering at each of the on-ramps. Under the No Build, ramp widening would not occur; therefore the ramp metering would be installed on the existing single-lane on-ramps.

The eastbound SR 92 loop on-ramp would exceed storage capacity, even at the highest metering rate, during both the AM and PM peak hours in the No Build alternative. The westbound SR 92 diagonal loop on-ramp would also exceed storage capacity at the highest metering rate during the AM peak hour. It was assumed that for those ramps that exceed the storage capacity, the ramp meter would rest in green to avoid queue spillback onto SR 82.

Partial Cloverleaf Alternative

A two lane ramp metering design would be provided with the Partial Cloverleaf alternative. For the southbound SR 82 to eastbound SR 92 on-ramp, two mixed flow lanes would be provided to accommodate the high vehicle volume. At the other on-ramps, one mixed-flow lane open to all vehicles and one HOV lane would be provided.

Both the Partial Cloverleaf and No Build alternatives would have the same traffic volumes but would provide different amounts of vehicle storage on the on-ramps. Maximum and minimum queue lengths are based on Caltrans' lower and upper metering output limits of 240 and 900 vehicles per hour per lane (vphpl). Therefore, the maximum queue lengths are calculated using the lowest metering flow rate of 240 vphpl and the minimum queue lengths are calculated using the highest metering flow rate of 900 vphpl. Resulting queue lengths are the expected queue lengths at the end of the analyzed peak hour.

The 2038 ramp metering queuing summary for the No Build alternative is presented in Table 13 and the results for the 2038 Partial Cloverleaf alternative are presented

in Table 14. The on-ramp locations that would exceed storage capacity during the AM and PM peak hour period are highlighted in grey. Comparing the storage capacity for the No Build and the Partial Cloverleaf alternatives in tables 13 and 14 clearly shows an improvement in vehicle storage capacity with the Partial Cloverleaf alternative. The analysis shows that the Partial Cloverleaf alternative provides sufficient storage to accommodate vehicle queues within the on-ramps.

Ramp metering calculation sheets are available in the Appendix of the Traffic Operations Report.

Table 13. Design Year (2038) Ramp Metering Queuing Summary for No Build Alt.

DESIGN YEAR (2038) RAMP METERING QUEUING SUMMARY FOR NO BUILD ALTERNATIVE

AM Peak Hour												
Ramp	# of SOV Lanes	# of HOV Lanes	Storage Per Lane (Vehicles)	Metered Volumes Per Lane	Metering Rate (Vehicles Per Hour) 900	800	700	600	500	400	300	240
EB Loop On-Ramp	1	0	13	978	Queue Per Lane (Vehicles)							
					77	177	277	377	477	577	677	737
					Exceed Storage?							
					YES	YES	YES	YES	YES	YES	YES	YES
EB Diagonal On-Ramp	1	0	16	518	Queue Per Lane (Vehicles)							
					0	0	0	0	17	117	217	277
					Exceed Storage?							
					NO	NO	NO	NO	YES	YES	YES	YES
WB Loop On-Ramp	1	0	14	162	Queue Per Lane (Vehicles)							
					0	0	0	0	0	0	0	0
					Exceed Storage?							
					NO	NO	NO	NO	NO	NO	NO	NO
WB Diagonal On-Ramp	1	0	17	931	Queue Per Lane (Vehicles)							
					32	132	232	332	432	532	632	692
					Exceed Storage?							
					YES	YES	YES	YES	YES	YES	YES	YES

Notes: For ramp metering queuing analysis, 1 vehicle = 30 feet.
Source: Fehr & Peers, 2013.

PM Peak Hour												
Ramp	# of SOV Lanes	# of HOV Lanes	Storage Per Lane (Vehicles)	Metered Volumes Per Lane	Metering Rate (Vehicles Per Hour)							
					900	800	700	600	500	400	300	240
EB Loop On-Ramp	1	0	13	1409	Queue Per Lane (Vehicles)							
					508	608	708	808	908	1008	1108	1168
					Exceed Storage?							
					YES	YES	YES	YES	YES	YES	YES	YES
EB Diagonal On-Ramp	1	0	16	824	Queue Per Lane (Vehicles)							
					0	24	124	224	324	424	524	584
					Exceed Storage?							
					NO	YES	YES	YES	YES	YES	YES	YES
WB Loop On-Ramp	1	0	14	289	Queue Per Lane (Vehicles)							
					0	0	0	0	0	0	0	48
					Exceed Storage?							
					NO	NO	NO	NO	NO	NO	NO	YES
WB Diagonal On-Ramp	1	0	17	736	Queue Per Lane (Vehicles)							
					0	0	35	135	235	335	435	495
					Exceed Storage?							
					NO	NO	YES	YES	YES	YES	YES	YES

Notes: For ramp metering queuing analysis, 1 vehicle = 30 feet.
Source: Fehr & Peers, 2013.

Table 14. Design Year (2038) Ramp Metering Queuing Summary for Partial Cloverleaf Alternative

DESIGN YEAR (2038) RAMP METERING QUEUING SUMMARY FOR PARTIAL CLOVERLEAF ALTERNATIVE

AM Peak Hour

Ramp	# of SOV Lanes	# of HOV Lanes	Storage Per Lane (Vehicles)	SOV Volumes Per Lane[2]	Metering Rate (Vehicles Per Hour)							
					900	800	700	600	500	400	300	240
EB Loop On-Ramp	2	0	16[3]	489	Queue Per Lane (Vehicles)							
					0	0	0	0	4	89	189	249
					Exceed Storage?							
					NO	NO	NO	NO	NO	YES	YES	YES
EB Diagonal On-Ramp	1	1	8	466	Queue Per Lane (Vehicles)							
					0	0	0	0	0	65	165	225
					Exceed Storage?							
					NO	NO	NO	NO	NO	YES	YES	YES
WB Loop On-Ramp	1	1	27[4]	146	Queue Per Lane (Vehicles)							
					0	0	0	0	0	0	0	0
					Exceed Storage?							
					NO	NO	NO	NO	NO	NO	NO	NO
WB Diagonal On-Ramp	1	1	15	838	Queue Per Lane (Vehicles)							
					0	39	139	239	339	439	539	599
					Exceed Storage?							
					NO	YES	YES	YES	YES	YES	YES	YES

Notes:
1. For ramp metering queuing analysis, 1 vehicle = 30 feet.
2. Queue length is based on SOV volume, as this is volume generates the longest (worst case) queue.
3. Average storage per lane for two lanes, assumes 14 vehicles total (7 vehicles per lane) on the on-ramp and 18 vehicles in the right-turn lan lane on El Camino Real for a total of 32 vehicles.
4. Storage length assumes 8 vehicles on on-ramp and 19 vehicles in right-turn lane on El Camino Real
Source: Fehr & Peers, 2013.

PM Peak Hour

Ramp	# of SOV Lanes	# of HOV Lanes	Storage Per Lane (Vehicles)	SOV Volumes Per Lane[2]	Metering Rate (Vehicles Per Hour)							
					900	800	700	600	500	400	300	240
EB Loop On-Ramp	2	0	16[3]	705	Queue Per Lane (Vehicles)							
					0	0	9	104	204	304	404	464
					Exceed Storage?							
					NO	NO	NO	YES	YES	YES	YES	YES
EB Diagonal On-Ramp	1	1	8	742	Queue Per Lane (Vehicles)							
					0	0	42	142	242	342	442	502
					Exceed Storage?							
					NO	NO	YES	YES	YES	YES	YES	YES
WB Loop On-Ramp	1	1	27[4]	260	Queue Per Lane (Vehicles)							
					0	0	0	0	0	0	0	19
					Exceed Storage?							
					NO	NO	NO	NO	NO	NO	NO	NO
WB Diagonal On-Ramp	1	1	15	662	Queue Per Lane (Vehicles)							
					0	0	0	62	162	262	362	422
					Exceed Storage?							
					NO	NO	NO	YES	YES	YES	YES	YES

Notes: For ramp metering queuing analysis, 1 vehicle = 30 feet.
1. For ramp metering queuing analysis, 1 vehicle = 30 feet.
2. Queue length is based on SOV volume, as this is volume generates the longest (worst case) queue.
3. Average storage per lane for two lanes, assumes 14 vehicles total (7 vehicles per lane) on the on-ramp and 18 vehicles in the right-turn lan lane on El Camino Real for a total of 32 vehicles.
4. Storage length assumes 8 vehicles on on-ramp and 19 vehicles in right-turn lane on El Camino Real
Source: Fehr & Peers, 2013.

No Build - Design Year (2038) Analysis Results - AM Peak Period Conditions

The eastbound SR 92 on-ramp loops with metering would exceed storage capacity during the AM peak period.

In the No Build alternative, bottlenecks identified under existing conditions and 2018 are exacerbated with the increased traffic volume. During the AM peak hour, increased queue spillback from the westbound SR 92 off-ramp to northbound SR 82 further reduces mainline SR 92 capacity and results in worse operations from the SR 82 off-ramp to the on-ramp from US101 and substantial vehicle queuing.

In the eastbound direction, the bottleneck between the loop on-ramp and loop off-ramp at SR 82 causes vehicle queues that extend outside of the study area during the AM peak hour. Similar to existing conditions, congestion on southbound US101 causes queuing on the eastbound SR 92 to southbound US101 connector on-ramp during the AM peak hour; however, the queue increases in 2038 due to increased demand.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in design year 2038, AM Peak Period Conditions, are discussed in detail in the *Design Year (2038) Analysis Results - AM Peak Period Conditions* of the *Environmental Consequences-Future Traffic Conditions* portion of this section for comparative purposes.

No Build - Design Year (2038) Analysis Results - PM Peak Period Conditions

In the No Build alternative, bottlenecks identified under existing conditions and 2018 are exacerbated with the increased traffic volume. During the PM peak hour, increased queue spillback from the westbound SR 92 off-ramp to northbound SR 82 further reduces mainline SR 92 capacity and results in worse operations from the SR 82 off-ramp to the on-ramp from US101 and substantial vehicle queuing.

In the eastbound direction, the bottleneck between the loop on-ramp and loop off-ramp at SR 82 causes vehicles queues that extend outside of the study area during the PM peak hour. Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in design year 2038, PM Peak Period Conditions, are discussed in detail in the *Design Year (2038) Analysis Results - PM Peak Period Conditions* of the *Environmental Consequences-Future Traffic Conditions* portion of this section for comparative purposes.

Environmental Consequences

Pedestrian and Bicycle Facilities

The design shall apply the Caltrans Complete Streets Deputy Directory Policy on Complete Streets-Integrating the Transportation System (DD-64-R1) to develop a

transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit riders, and motorists appropriate to the function and context of the facility.

Public Transit
There are no proposed improvements to existing public transit service in the vicinity of the project.

Rail Service
There are no proposed railroad service improvements or impacts from this project.

Truck Routes
Under both the No Build and Partial Cloverleaf alternatives the project proposes to add a truck climbing lane on SR 92 in the westbound direction beginning at the Alameda de Las Pulgas on-ramp west to the limits of the project study area.

No Build Future Traffic Conditions

No Build-Opening Year (2018) Traffic Operations Analysis

The following section presents the traffic analysis results for opening year (2018). The operations analysis focuses on intersection and mainline operations.

No Build - Opening Year (2018) Analysis Results - AM Peak Period Conditions

In the No Build alternative, bottlenecks identified under existing conditions are exacerbated with the increased traffic volume. During the AM peak hour, increased queue spillback from the westbound SR 92 off-ramp to northbound SR 82 results in worse operations in upstream segments of westbound SR 92 with LOS F conditions from the SR 82 off-ramp to the on-ramp from US101.

In the eastbound direction during the AM peak hour, the No Build alternative shows increased density over existing conditions. The bottleneck between the loop on-ramp and loop off-ramp at SR 82 causes vehicle queues that extend to the Alameda de las Pulgas off-ramp. Similar to existing conditions, congestion on southbound US101 causes queuing on the eastbound SR 92 to southbound US101 connector ramp during the AM peak hour. Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in opening year 2018, AM Peak Period Conditions, are discussed in detail in the *Opening Year (2018) Analysis Results - AM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

No Build - Opening Year (2018) Analysis Results - PM Peak Period Conditions

During the PM peak hour, increased queue spillback from the westbound SR 92 off-ramp to northbound SR 82 results in worse operations in upstream segments of westbound SR 92 with LOS F conditions from the SR 82 off-ramp to the on-ramp

from US101. Bottlenecks also develop between the southbound SR 82 diagonal on-ramp and the Alameda de Las Pulgas off-ramp, as well as at the Hillsdale Boulevard on-ramp due to increased demand that exceeds mainline capacity.

In the eastbound direction during the PM peak hour, the No Build alternative shows increased density over existing conditions. The bottleneck between the loop on-ramp and loop off-ramp at SR 82 causes vehicle queues that extend to the Hillsdale Boulevard interchange.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in opening year 2018, PM Peak Period Conditions, are discussed in detail in the *Opening Year (2018) Analysis Results - PM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

Partial Cloverleaf Future Traffic Conditions

Opening Year (2018) Analysis Results – AM/PM Peak Period Conditions

AM Peak Period
With the Partial Cloverleaf alternative, queue spillback from the westbound SR 92 off-ramp to northbound SR 82 ramp terminal intersection is eliminated from the mainline. This results in increased mainline capacity through this segment and improved mainline operations upstream of the off-ramp. However, demand exceeds capacity between the Delaware Avenue off-ramp and on-ramp and the bottleneck shifts upstream to this segment. In the eastbound direction, the consolidation of the SR 82 loop and diagonal off-ramp into a single diagonal off-ramp under the Partial Cloverleaf alternative removes the bottleneck between the loop on-ramp and loop off-ramp. However, during the AM peak hour, a bottleneck appears between the Alameda de las Pulgas on-ramp and SR 82 off-ramp due to demand exceeding capacity. A bottleneck also develops between the northbound SR 82 on-ramp and Delaware Avenue off-ramp; however, queuing is minimal.

PM Peak Period
During the PM peak hour, queue spillback from the westbound SR 92 off-ramp to northbound SR 82 ramp terminal intersection is eliminated from the mainline with the Partial Cloverleaf alternative. In the eastbound direction, a bottleneck develops between the SR 82 diagonal on-ramp and the Delaware Avenue off-ramp, as more traffic is able to reach this location with the elimination of the bottleneck between the loop ramps.

Network Performance Measures

Table 16 provides data on opening year (2018) peak AM/PM period comparison between the No Build and Partial Cloverleaf alternatives based on the following measures of effectiveness: Volume Served, Vehicle Miles of Travel, Total Travel

Time, Average Travel Speed, Total Vehicle Hours of Delay and Average Delay per Vehicle.

Freeway Travel Times

The Partial Cloverleaf alternative shows improved network performance over the No Build Scenario in both the AM and PM peak periods. Total travel time is also reduced in the PM peak period and total vehicle hours of delay are reduced in both the AM and PM peak period. There is a large increase in volume served and a reduction in average delay per vehicle.

Table 16. Opening Year (2018) Peak Period Network Measure of Effectiveness

OPENING YEAR (2018) PEAK PERIOD NETWORK MEASURES OF EFFECTIVENESS

Measure	AM Peak Period			PM Peak Period		
	No Build	Partial Cloverleaf	% Change	No Build	Partial Cloverleaf	% Change
Volume Served	46,446	48,356	4.1%	53,319	53,663	0.6%
Vehicle Miles of Travel[2]	93,573	97,378	4.1%	99,372	98,875	-0.5%
Total Travel Time (hours)	3,568	2,641	-26.0%	3,450	2,862	-17.0%
Average Travel Speed (mph)[1]	26.2	36.9	40.8%	28.8	34.5	19.8%
Total Vehicle Hours of Delay	1,715	835	-51.3%	1,353	949	-29.9%
Avwerage Delay per Vehicle (s)	128.6	61.2	-52.4%	90.1	62.8	-30.3%

Notes:
1. Average travel speed summary includes all network components, including mainline and ramps, and El Camino Real
2. The decrease in vehicle miles of travel in the PM peak period is due to the removal of the loop off-ramps with the Partial Cloverleaf alternative which results in vehicles traveling a shorter distance on the diagonal off-ramps than on the loop off-ramps.
Source: Fehr & Peers, 2013.

Intersection Level of Service

Operations at the SR 82/Bovet Road/17th Avenue are expected to degrade to LOS F during the PM peak hour. The SR 82/20th Avenue intersection operates similarly to existing conditions under the No Build alternative. The westbound SR 92 off-ramp to northbound SR 82 yield-controlled movement continues to operate at LOS F during both the AM and PM peak periods. Additionally, the eastbound SR 92 off-ramp to southbound SR 82 off-ramp operates at LOS E during the PM peak period in the No Build alternative. This is caused by queue spillback from the SR 82/20th Avenue intersection to the ramp.

Under the Partial Cloverleaf alternative, the two existing and two proposed traffic signals are operated as a coordinated system. It was also assumed that right turns on red would be prohibited for the westbound right-turn at the westbound SR 92 ramp terminal intersection and the eastbound right-turn at the eastbound SR 92 ramp terminal intersection when pedestrians are present. This is to avoid a multiple threat situation for pedestrians in the crosswalk and would be accomplished with an extinguishable message sign.

Under the Partial Cloverleaf alternative, the ramp terminal intersections operate at LOS B during the AM and PM peak hours. This is largely due to the coordination between all four signalized intersections that provides signal progression through the corridor. Therefore, the additional signals add little delay to the system overall. LOS at the SR 82/Bovet Road/17th Avenue and SR 82/20th Avenue intersections is not shown to change between the No Build and Partial Cloverleaf alternatives.

The peak hour intersection delay and LOS are presented in **Table 17**.

Table 17. Opening Year (2018) Intersection Peak Hour Level of Service

OPENING YEAR (2018) INTERSECTION PEAK HOUR LEVEL OF SERVICE

			No Build		Partial Cloverleaf	
Intersection	Control[1]	Peak Hour	Delay [2] (sec/Vehicle)	LOS	Delay [2] (sec/Vehicle)	LOS
1) El Camino Real/Bovet Road/17th Avenue	Signal	AM	30.7	C	31.4	C
		PM	95.2	F	73.3	E
2) El Camino Real/Westbound SR92 Ramps	Yield/Signal[3]	AM	>100	F (WB)	16.8	B
		PM	>100	F (WB)	17.5	B
3) El Camino Real/Eastbound SR92 Ramps	Yield	AM	11.6	B (EB)	13.6	B
		PM	44.0	E (EB)	13.9	B
4) El Camino Real/20th Avenue	Signal	AM	28.9	C	31.2	C
		PM	42.5	D	49.1	D

Notes:

1. Signal = signalized intersection, Yield = yield controlled off-ramps

2. Signalized intersection level of service based on weighted average control delay per vehicle, yield controlled delay based on average delay per vehicle for the yield controlled approach.

3. Intersection has yield controlled off-ramps under the No Build scenario and signalized control under the Partial Cloverleaf scenario. Yield controlled delay is reported for the No Build scenario and average intersection control delay is reported for the Partial Clover leaf scenario.

Source: Fehr & Peers, 2013

AM Peak Period

During the AM peak hour with the Partial Cloverleaf alternative, queue spillback from the westbound SR 92 off-ramp to northbound SR 82 ramp terminal intersection is eliminated from the mainline. This results in increased mainline capacity through this segment and improved mainline operations upstream of the off-ramp. However, demand exceeds capacity between the Delaware Avenue off-ramp and on-ramp and the bottleneck shifts upstream to this segment.In the eastbound direction, the consolidation of the SR 82 loop and diagonal off-ramp into a single diagonal off-ramp under the Partial Cloverleaf alternative removes the bottleneck between the loop on-ramp and loop off-ramp. However, during the AM peak hour, a bottleneck appears between the Alameda de las Pulgas on-ramp and SR 82 off-ramp due to demand exceeding capacity on this segment. A bottleneck also develops between the SR 82 diagonal on-ramp and the Delaware Avenue off-ramp, as more traffic is able to reach this location with the elimination of the bottleneck between the loop ramps.

Table 18. Design Year (2038) EB and WB SR 92 AM Peak Hour Level of Service

DESIGN YEAR (2038) EASTBOUND SR92 AM PEAK HOUR LEVEL OF SERVICE

Location	Type	No Build			Partial Cloverleaf		
		LOS	Density (vpmpl)	Speed (mph)	LOS	Density (vpmpl)	Speed (mph)
Hillsdale Boulevard Off-Ramp	Diverge	F	131.9	8.5	F	71.9	24
Hillsdale Boulevard Off-Ramp to Eastbound Hillsdale Boulevard On-Ramp	Basic	F	145.7	9	F	91.7	22.8
Eastbound Hillsdale Boulevard On-Ramp	Merge	F	133.5	9.4	F	93.7	20.5
Westbound Hillsdale Boulevard On-Ramp	Merge	F	127	10.9	F	95.5	20
Hillsdale Boulevard On-Ramp to Alameda De Las Pulgas Off-Ramp	Basic	F	127.2	12	F	96.3	20.2
Alameda De Las Pulgas Off-Ramp	Diverge	F	130.7	11.6	F	100.7	19.2
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	F	140.2	9.1	F	109	15.8
Alameda De Las Pulgas On-Ramp to Southbound El Camino Real Off-Ramp	Weave	F	114.3	13.5	E[1]	90.1	24
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	F	109.3	15.6	F	57.7	34.4
Southbound El Camino Real On-Ramp to Northbound El Camino Real Off-Ramp	Weave	E[1]	67.7	26.2	N/A	N/A	N/A
Southbound El Camino Real On-Ramp to Northbound El Camino Real On-Ramp	Merge	N/A	N/A	N/A	F	62.7	30.7
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	E[2]	51.5	37.9	N/A	N/A	N/A

Note: The level of service and average density for the study segment are consistent with the HCM methodology.
1. This is a bottleneck location, and therefore, by definition, operates at LOS E.
2. Speeds and observations of the model indicate that these segments are not in queue and therefore operate at LOS E.

Source: Fehr & Peers, 2013

Design Year (2038) Westbound SR 92 AM Peak Hour Level of Service

DESIGN YEAR (2038) WESTBOUND SR92 AM PEAK HOUR LEVEL OF SERVICE

Location	Type	No Build			Partial Cloverleaf		
		LOS	Density (vpmpl)	Speed (mph)	LOS	Density (vpmpl)	Speed (mph)
US101 On-Ramp to Delaware Avenue Off-Ramp	Weave	F	146.4	5.9	F	92.6	16.6
Delaware Avenue Off-Ramp to Delaware Avenue On-Ramp	Basic	F	132.5	9.6	E[1]	55.4	36.6
Delaware Avenue On-Ramp to Northbound El Camino Real Off-Ramp	Weave	F[2]	87.8	23.4	E[3]	49.8	36.6
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	C	22.8	48.6	D	28.8	52.8
Northbound El Camino Real On-Ramp to Southbound El Camino Real Off-Ramp	Weave	B	17.4	54.5	N/A	N/A	N/A
Northbound El Camino Real On-Ramp to Southbound El Camino Real On-Ramp	Merge	N/A	N/A	N/A	D	28.4	54.5
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	B	16.8	61.5	N/A	N/A	N/A
Southbound El Cmaino Real On-Ramp to Alameda De Las Pulgas Off-Ramp	Weave	B	18.6	60.1	E	41.7	43.5
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	C	21.2	61.6	D	30.6	60.8
Alameda De Las Pulgas On-Ramp	Merge	B	18.0	60.5	C	26.5	61.1
Alameda De Las Pulgas On-Ramp to Hillsdale Boulevard Off-Ramp	Basic	B	16.9	62.1	C	22.9	61.7
Hillsdale Boulevard Off-Ramp	Diverge	B	15.9	62.0	C	21.2	61.6
Hillsdale Boulevard Off-Ramp to Hillsdale Boulevard On-Ramp	Basic	B	14.7	62.2	C	19.4	61.9
Hillsdale Boulevard On-Ramp	Merge	B	16.0	59.9	C	20.6	59.6

Notes: The level of service and average density for the study segment are consistent with the HCM methodology.

1. This is a bottleneck location, and therefore, by definition, operates at LOS E.
2. This bottleneck is caused by queue spillback from the off-ramp terminal intersection
3. Speeds and observations of the model indicate that these segments are not in queue and operate at LOS E.

Source: Fehr & Peers, 2013

PM Peak Period

During the PM peak hour, queue spillback from the westbound SR 92 off-ramp to northbound SR 82 ramp terminal intersection is eliminated from the mainline; however, demand exceeds capacity between the Delaware Avenue on-ramp and SR 82 off-ramp, and the bottleneck remains at this segment.

In the eastbound direction, the consolidation of the SR 82 loop and diagonal off-ramp into a single diagonal off-ramp under the Partial Cloverleaf alternative removes the bottleneck between the loop on-ramp and loop off-ramp. A bottleneck appears between the Alameda de las Pulgas on-ramp and SR 82 off-ramp due to demand exceeding capacity on this segment; however, the queue is reduced with the Partial Cloverleaf alternative.

Design Year (2038) Analysis Results – AM/PM Peak Period Conditions

This section presents the traffic operations analysis results for design year (2038). The operations analysis focuses on mainline, intersection, and ramp operations. For this analysis the following planned projects were included for both the No Build and Partial Cloverleaf alternatives:

- Add a dedicated right-turn pocket on southbound SR 82 at the 20th Avenue intersection.
- Add a truck climbing lane on SR 92 in the westbound direction beginning at the Alameda de Las Pulgas on-ramp west to the limits of the project study area.
- Add ramp metering to the on-ramps throughout the study area. It was assumed that the ramp metering would be added to the existing single-lane on-ramps in the No Build alternative. In the Partial Cloverleaf, the on-ramps at the SR 82 interchange would be widened to two lanes.

Table 19. Design Year (2038) WB and EB SR 92 PM Peak Hour Level of Service

DESIGN YEAR (2038) WESTBOUND SR92 PM PEAK HOUR LEVEL OF SERVICE

Location	Type	No Build			Partial Cloverleaf		
		LOS	Density (vpmpl)	Speed (mph)	LOS	Density (vpmpl)	Speed (mph)
US101 On-Ramp to Delaware Avenue Off-Ramp	Weave	F	140.4	7.1	F	85.1	20.9
Delaware Avenue Off-Ramp to Delaware Avenue On-Ramp	Basic	F	127.1	11.4	F	103.0	17.2
Delaware Avenue On-Ramp to Northbound El Camino Real Off-Ramp	Weave	F[2]	91.3	20.5	E[1]	42.8	39.5
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	E	43.6	34.2	D	34.5	50.5
Northbound El Camino Real On-Ramp to Southbound El Camino Real Off-Ramp	Weave	E	35.4	37.3	N/A	N/A	N/A
Northbound El Camino Real On-Ramp to Southbound El Camino Real Off-Ramp	Merge	N/A	N/A	N/A	E	36.0	51.3
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	E	39.2	37.5	N/A	N/A	N/A
Southbound El Cmaino Real On-Ramp to Alameda De Las Pulgas Off-Ramp	Weave	D	31.3	48.2	E	40.5	49.4
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	C	26.0	53.6	D	33.8	53.4
Alameda De Las Pulgas On-Ramp	Merge	D	28.9	45.6	D	30.7	54.6
Alameda De Las Pulgas On-Ramp to Hillsdale Boulevard Off-Ramp	Basic	C	22.0	60.0	D	26.4	61.3
Hillsdale Boulevard Off-Ramp	Diverge	B	19.8	61.8	C	24.5	60.9
Hillsdale Boulevard Off-Ramp to Hillsdale Boulevard On-Ramp	Basic	B	17.9	62.0	C	21.6	61.5
Hillsdale Boulevard On-Ramp	Merge	C	20.8	58.4	C	25.1	56.9

Note: The level of service and average density for the study segment are consistent with the HCM methodology.

1. This is a bottleneck location, and therefore, by definition, operates at LOS E.
2. This bottleneck is caused by queue spillback from the off-ramp terminal intersection

Source: Fehr & Peers, 2013

DESIGN YEAR (2038) EASTBOUND SR92 PM PEAK HOUR LEVEL OF SERVICE

Location	Type	No Build			Partial Cloverleaf		
		LOS	Density (vpmpl)	Speed (mph)	LOS	Density (vpmpl)	Speed (mph)
Hillsdale Boulevard Off-Ramp	Diverge	F	143.7	6.8	E	35.9	43.8
Hillsdale Boulevard Off-Ramp to Eastbound Hillsdale Boulevard On-Ramp	Basic	F	159.7	7.2	D	31.7	56
Eastbound Hillsdale Boulevard On-Ramp	Merge	F	142.1	7.9	E	36.1	50
Westbound Hillsdale Boulevard On-Ramp	Merge	F	131	10.2	E	41.8	48.7
Hillsdale Boulevard On-Ramp to Alameda De Las Pulgas Off-Ramp	Basic	F	132.3	11.9	E	40.9	55.6
Alameda De Las Pulgas Off-Ramp	Diverge	F	126.7	12.7	F	50	45.7
Alameda De Las Pulgas Off-Ramp to Alameda De Las Pulgas On-Ramp	Basic	F	104.7	13.3	F	83.2	22.8
Alameda De Las Pulgas On-Ramp to Southbound El Camino Real Off-Ramp	Weave	F	82.3	22.2	E[1]	66.2	33.8
Southbound El Camino Real Off-Ramp to Southbound El Camino Real On-Ramp	Basic	F	50.8	33.1	D	33.1	53.6
Southbound El Camino Real On-Ramp to Northbound El Camino Real Off-Ramp	Weave	E[1]	46.2	34	N/A	N/A	N/A
Southbound El Camino Real On-Ramp to Northbound El Camino Real On-Ramp	Merge	N/A	N/A	N/A	E	45	42.8
Northbound El Camino Real Off-Ramp to Northbound El Camino Real On-Ramp	Basic	E	42.1	43.9	N/A	N/A	N/A
Northbound El Camino Real On-Ramp to Delaware Avenue Off-Ramp	Weave	D	31.8	50.2	E	41.5	45.6
Delaware Avenue Off-Ramp to Delaware Avenue On-Ramp	Basic	D	28.3	60.2	D	32.2	58.7
Delaware Avenue On-Ramp to US101 Off-Ramp	Weave	D	28.6	52.4	D	31.8	51.4

Note: The level of service and average density for the study segment are consistent with the HCM methodology.
1. This is a bottleneck location, and therefore, by definition, operates at LOS E.
Source: Fehr & Peers, 2013

Network Performance Measures

Table 20 provides data on design year (2038) peak AM/PM peak period comparison between the No Build and Partial Cloverleaf alternatives based on the following measures of effectiveness: Volume Served, Vehicle Miles of Travel, Total Travel Time, Average Travel Speed, Total Vehicle Hours of Delay and Average Delay per Vehicle.

Freeway Travel Times

As shown in Table 20, The Partial Cloverleaf alternative provides substantial improvement in network operations over the No Build alternative with large decreases in travel time and delay and increases in average speed and volume served.

Table 20. Design Year (2038) Peak Period Network Measures of Effectiveness

DESIGN YEAR (2038) PEAK PERIOD NETWORK MEASURES OF EFFECTIVENESS

Measure	AM Peak Period			PM Peak Period		
	No Build	Partial Cloverleaf	% Change	No Build	Partial Cloverleaf	% Change
Volume Served	46,334	54,778	18.2%	54,862	60,425	10.1%
Vehicle Miles of Travel	86,726	109,879	26.7%	93,543	108,155	15.6%
Total Travel Time (hours)	7,471	4,962	-33.6%	8,243	5,396	-34.5%
Average Travel Speed (mph)[1]	11.6	22.1	90.5%	11.3	20	77.0%
Total Vehicle Hours of Delay	5,712	2,777	-51.4%	6,276	3,308	-47.3%
Avwerage Delay per Vehicle (s)	418.8	175.6	-58.1%	392.7	192.3	-51.0%

Notes:
1. Average travel speed summary includes all network components, including mainline and ramps, and El Camino Real
Source: Fehr & Peers, 2013.

Intersection Level of Service (LOS)

The peak hour delay and LOS are presented in Table 21. The SR 82/Bovet Road/17th Avenue intersection is shown to operate at LOS E during the AM peak hour and LOS F during the PM peak hour under the No Build alternative. The SR 82/20th Avenue intersection is shown to operate at LOS F during the PM peak hour under the No Build alternative. The westbound SR 92 off-ramp to northbound SR 82 movement continues to operate at LOS F during both the AM and PM peak periods. The eastbound SR 92 off-ramp to southbound SR 82 movement is shown to operate at LOS F during the PM peak hour.

Under the Partial Cloverleaf alternative, the two existing and two proposed traffic signals are operated as a coordinated system. It was also assumed that right turns on red would be prohibited for the westbound right-turn at the westbound SR 92 ramp terminal intersection and the eastbound right-turn at the eastbound SR 92 ramp terminal intersection when pedestrians are present. This is to avoid a multiple-threat situation for pedestrians in the crosswalk and would be accomplished with an extinguishable message sign.

Under the Partial Cloverleaf alternative, the westbound SR 92 ramp terminal intersection operates at LOS C during the AM and PM peak hours. The eastbound SR 92 ramp terminal intersection is expected to operate at LOS B during the AM peak period and LOS C during the PM peak period. This is largely due to the coordination between all four signalized intersections that provides signal progression through the corridor. Therefore, the additional signals add little delay to the system overall. LOS at the SR 82/Bovet Road/17th Avenue and the SR 82/20th Avenue intersections are not shown to change between the No Build and Partial Cloverleaf alternatives.

Table 21. Design Year (2038) Intersection Peak Hour Level of Service

DESIGN YEAR (2038) INTERSECTION PEAK HOUR LEVEL OF SERVICE

			No Build		Partial Cloverleaf	
Intersection	Control[1]	Peak Hour	Delay [2] (sec/Vehicle)	LOS	Delay [2] (sec/Vehicle)	LOS
1) El Camino Real/Bovet Road/17th Avenue	Signal	AM	78.1	E	76.8	E
		PM	>100	F	>100	F
2) El Camino Real/Westbound SR92 Ramps	Yield/Signal[3]	AM	>100	F (WB)	26.6	C
		PM	>100	F (WB)	20.8	C
3) El Camino Real/Eastbound SR92 Ramps	Yield/Signal[3]	AM	9.4	A (EB)	15.1	B
		PM	>100	F (EB)	21.4	C
4) El Camino Real/20th Avenue	Signal	AM	33.1	D	42.2	D
		PM	81.3	F	>100	F

Notes:

1. Signal = signalized intersection, Yield = yield controlled off-ramps

2. Signalized intersection level of service based on weighted average control delay per vehicle, yield controlled delay based on average delay per vehicle for the yield controlled approach.

3. Intersection has yield controlled off-ramps under the No Build scenario and signalized control under the Partial Cloverleaf scenario. Yield controlled delay is reported for the No Build scenario and average intersection control delay is reported for the Partial Clover leaf scenario.

Source: Fehr & Peers, 2013

Avoidance, Minimization and/or Measures

Each construction stage will attempt to maintain the existing lanes of traffic on the SR 92 overcrossing in each direction and on all on- and off-ramps from SR 92 to SR 82. Potential lane closures for this project will be made during non-peak travel periods. It is anticipated that a Transportation Management Plan (TMP) will be completed for the project which may consist of, but is not limited to, public awareness campaigns, and portable changeable message signs to detour vehicle, bicycle and pedestrian traffic for potential temporary street closures.

The Construction Impacts section of this chapter details the stage construction for the project. No other avoidance, minimization and/or mitigation measures are proposed.

VISUAL/AESTHETICS

Regulatory Setting

NEPA of 1969 as amended establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 United States Code [USC] 4331[b][2]). To further emphasize this point, FHWA in its implementation of NEPA (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, 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" (CA Public Resources Code [PRC] Section 21001[b]).

Affected Environment

Caltrans completed a Visual Impact Assessment Technical Report in June 2013. This report is available for review upon request.

The proposed project is located at the geographical center of the City of San Mateo and is highly visible to persons travelling on both SR 92 and SR 82. SR 82 is a conventional highway, with three lanes in each direction that under crosses the elevated SR 92 which has two lanes in each direction. The SR 92/82 Interchange is a high-volume traffic entry into the City of San Mateo, and it could be considered a "gateway" interchange. The interchange is adjacent to developed areas--mostly commercial and some residential. The existing undercrossing structure appears old and plain looking in visual quality, and the existing landscaping of the interchange is mature and fairly attractive visually. Some noteworthy mature plants include: oak trees, pine trees, plane trees, and acacia shrubs. It is anticipated that much of the existing landscaping will have to be removed to accommodate the interchange improvements and construction. Also, some graffiti was evident along the faces and flanks of the abutment of the undercrossing bridge structure.

The removal of some trees within the interchange, the addition of a new sound wall and four new retaining walls, and the addition of two new traffic interchanges will be the most notable visible changes to the environment from this project.

Viewer Sensitivity

Neighbors (people with views *to* the road) and *highway users* (people with views *from* the road) will not be affected by the proposed project. The project site will be partially visible to neighboring residents and pedestrians along adjacent streets Ivy Street and Palm Avenue, and visible to neighboring commercial users. Along Ivy

Street, there are about eight residents in partial view, with a visual screen provided by existing landscape trees/shrubs. Along Palm Avenue, there are about twelve residents in partial view, also with a visual screen provided by existing landscape trees/shrubs. Resident viewers along Ivy Street and Palm Avenue will likely see only the tops of new sound walls, as the existing landscaping along the outsides of the on and off ramps blocks views to the lower portions of sound walls and other elements of the interchange.

Thus, *viewer exposure* (potential visibility) of the project for residences will be moderate, and the *viewer sensitivity* (potential reaction of visibility) will be moderate to low. It will be beneficial to preserve the existing landscaping along the outside of the ramps, so as to minimize viewer response. However, if the existing landscape screen along the outside of ramps is removed, the viewer response could become higher. Along SR 82, there are two commercial businesses in direct view of the project--Sleep Train Mattress Center at north side of project, and Hot Springs Spas at south side of project.

Existing *Neighbors* (people with views *to* the road) and *highway users* (people with views *from* the road) will not be substantially affected by the proposed project. The project site elements will be partially visible to existing neighboring single-story residents and pedestrians at adjacent streets Ivy Street and Palm Avenue and Elkhorn Court, and visible to some neighboring commercial users. Along 19th Ave./Ivy Street, there are about eight residents in partial view, with a visual screen provided by existing landscape trees/shrubs . Along Palm Avenue and 18th Ave./Ivy St., there are about twelve residents in partial view, also with a visual screen provided by existing landscape trees/shrubs. The multi-story residences at Elkhorn Ct. are currently being built. After 92/82 project completion, resident viewers along Ivy Street and Palm Avenue will likely see existing and new landscaping, and some new metal beam guard rail along the outsides of the diagonal ramps. Some residences at Elkhorn Court will likely see the backside of the new sound wall, along with new replacement landscaping. The proposed sound wall is 531 feet in length and fourteen feet in height, with purpose to block/reduce highway sounds to adjacent residences of Elkhorn Court. The photos below shows the existing conditions of the proposed sound wall location—outside of diagonal off-ramp EB 92 to SB 82. Below is a photo-simulation of the new sound wall.

Figure 7. Existing Condition SM 92/82 undercrossing, looking south along El Camino Real (SR 82)

Figure 8. Existing Condition SM 92/82 undercrossing, looking north along El Camino Real (SR 82)

Figure 9. Existing Condition SM 92/82 undercrossing, at El Camino Real (SR 82)

Figure 10. Existing landscape along outside northbound SR 82 on-ramp

Note: Landscape screens traffic to homes along 18th Avenue and Ivy Street (behind)

Figure 11. Existing condition of proposed sound wall location—outside of diagonal off-ramp EB 92 to SB 82.

Note: Existing landscape screens most of traffic to homes at Elkhorn Court (behind). Much of the existing roadside landscape would be removed, to accommodate the sound wall.

Environmental Consequences

SR 92 and SR 82, at their interchange project location, are not designated CA State Scenic Highways. SR 92 is a two-lane, each direction, even profile freeway that traverses the project location with a concrete bridge structure and a median, situated in an east/west direction. SR 82 is a six-lane conventional highway that under crosses SR 92 in a north/south direction. The regional landscape is a transition of flat-to-gentle sloping terrain, suburban development, and adjacent rolling hills with stands of mature native oak trees and grass cover. The hills begin just to the west of the project. Land use adjacent to the interchange is suburban in character with approximately 60% commercial and 40% residential use. The project area 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.

There are no scenic resources identified within the immediate project area. Existing trees that would be removed to construct the project are common throughout the area and do not exhibit unique characteristics of age, type, size, species, or arrangement. Existing trees that are not in locations that could be impacted from construction are to be protected.

Visual impacts are determined by assessing changes to visual resources and predicting viewer response to those changes. During construction, work crews and equipment would be visible along the roadsides and interchanges where the new interchanges, retaining walls, sound walls, and landscaping would be constructed. After construction, the new sound walls and retaining walls would be evident to those living in residences adjacent to the interchange. The loss of some trees within the interchange ramp loops would be evident to highway motorists. The impact would be low to moderate-low.

The project would not substantially affect any scenic vistas, would not substantially degrade visual character or scenic quality, would not damage or remove any identified scenic resources, and would not result in a substantial new source of light or glare.

Avoidance, Minimization and/or Mitigation Measures

Avoidance or minimization measures have been identified that can lessen visual impacts caused by the proposed project. Environmental, aesthetic and architectural features shall be included in the project design. This section describes avoidance and/or minimization measures to address specific visual impacts. These will be designed and implemented with concurrence of the District Landscape Architect.

The following measures to avoid or minimize visual impacts will be incorporated into the project:

- Include architectural treatment on new retaining walls, on the exposed faces, so as to improve visual quality of the walls that face toward adjacent residents and other persons in the area immediately adjacent to the highway;

- Include architectural treatment on new sound walls, both front and back sides, to exhibit attractive pattern, color, texture, and/or architectural treatment, so as to improve visual quality of the walls that face toward motorists, adjacent residents, and pedestrians within the highway interchange area;

- Preserve as many existing trees and plants as is possible, within the interchange project limits. In particular, preserve the existing trees and shrubs that line outside ramps--eastbound on-ramp to SR 92, and northbound off-ramp to SR 82; Provide temporary fencing to protect trees and plants from potential construction impacts--equipment, personnel, and materials;

- Replace trees and plants that are removed, to accommodate construction of the project, at a density sufficient to create an equal amount of screening and green cover at maturity. Replacement highway planting, with plant establishment period, should be provided to offset visual impacts and ensure proper establishment and growth of new replacement landscape plants;

- Include dark colors and finishes for traffic signal and roadside appurtenances and fencing, etc., so as to minimize glare;

- Consider re-routing or covering existing conduits on the undercrossing bridge structure, so as to improve visual quality and offset visual impacts of the project;

- Consider installing City of San Mateo approved architectural street light standards, to match existing standards along SR 82 and areas adjacent to project limits;

- Consider installing new wall system of ivy-on-cable-grid, along face of bridge structure abutments next to pedestrian sidewalks, so as to improve visual quality and prevent graffiti.

CULTURAL RESOURCES

Regulatory Setting

"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. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 Code of Federal Regulations [CFR] 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA implements the Advisory Council's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. The FHWA's responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 United States Code [USC] 327). Historical resources are considered under the CEQA, as well as CA Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way.

Affected Environment

If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find. If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to CA Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Yolanda Rivas at Caltrans, District 4 Environmental Analysis Branch 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.

Environmental Consequences

Caltrans, in consultation with the State Historic Preservation Officer (SHPO), has determined that a Finding of No Historic Properties Affected is in compliance with Section 106 of the National Historic Preservation Act, as it pertains to the Administration of the Federal-Aid Highway Program in California (PA).

Avoidance, Minimization and/or Mitigation Measures

No avoidance, minimization and/or mitigation/compensation measures are proposed.

PHYSICAL ENVIRONMENT

WATER QUALITY: HYDROLOGY, FLOODPLAIN AND STORMWATER RUNOFF

Regulatory Setting

Hydrology and Floodplains:

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 Code of Federal Regulations (CFR) 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as “the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year.” An encroachment is defined as “an action within the limits of the base floodplain.”

State Requirements: Porter-Cologne Water Quality Control Act:

California’s Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a “Report of Waste Discharge” for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the state include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of “waste” as defined and this definition is broader than the CWA definition of “pollutant”. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set criteria

necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards:

The SWRCB administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

- National Pollution Discharge Elimination System (NPDES) Program:

  Municipal Separate Storm Sewer Systems (MS4)

  Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water discharges, including Municipal Separate Storm Sewer Systems (MS4s). The 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 SWRCB has identified Caltrans as an owner/operator of an MS4 pursuant to federal regulations. Caltrans' MS4 permit covers all Department rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

  Caltrans' MS4 Permit, under revision at the time of this update, contains three basic requirements:

  1. Caltrans must comply with the requirements of the Construction General Permit (see below);

  2. Caltrans must implement a year-round program in all parts of the State to effectively control storm water and non-storm water discharges; and

  3. Caltrans storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the Maximum Extent Practicable, and other measures as the SWRCB determines to be necessary to meet the 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 Best Management Practices (BMPs). The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

Construction General Permit

Construction General Permit (Order No. 2009-009-DWQ), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates storm water discharges from construction sites which result in a Disturbed Soil Area (DSA) of one 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 one acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than one 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 2009 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's Standard Specifications, a Water Pollution Control Plan (WPCP) is necessary for projects with DSA less than one acre.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the United States must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are

obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Affected Environment

Hydrology & Groundwater

The project is located within San Francisco Bay Regional Water Quality Control Board (RWQCB or Region) and Hydrologic Sub-Area of 204.40 in San Mateo Bayside Hydrologic Area of South Bay Hydrologic Unit with average annual rainfall of 21.8 inches (Water Quality Planning Tool 2012).

The project site is within Santa Mateo Subbasin of Santa Clara Valley Groundwater Basin (Basin ID: 2-9.03) (Groundwater Bulletin 118 2003). The San Mateo Subbasin occupies a structural trough, sub-parallel to the northwest trending Coast Ranges, at the southwest end of San Francisco Bay. San Francisco Bay constitutes its eastern boundary.

Receiving Water Bodies

The indirect receiving water body of the project is the Marina Lagoon located about 1.5 mile east of the project limits and the lagoon eventually discharges to San Francisco Bay (Central).

The project is within the area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods (FEMA 2012), as seen in Figure 22.

Figure 12. Flood Insurance Rate Map

The Marina Lagoon is on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments (SWRCB 2010) for Coliform Bacteria; whereas, the San Francisco Bay (Central) is on the 303(d) list for Chlordane, DDT, Dieldrin, Dioxin Compounds, Exotic Species, Furan Compounds, Mercury, PCBs (Polychlorinated biphenyls), PCBs (dioxin-like), and Selenium as the pollutant of concern. All the listed pollutants are on the Total Maximum Daily Load (TMDL) required list, except Mercury being addressed by USEPA approved TMDL.

The Water Quality Control Plan (Basin Plan) of the RWQCB designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater (SF Bay RWQCB 2011). The designated beneficial uses for the Marina Lagoon include estuarine habitat, wildlife habitat, water contact recreation,

and non-contact water recreation. On the other hand, the San Francisco Bay (Central) has beneficial uses for industrial service supply, industrial process supply, ocean, commercial, and sport fishing; shellfish harvesting, estuarine habitat, fish migration, preservation of rare and endangered species, spawning, reproduction, and/or early development, wildlife habitat, water contact recreation, non-contact water recreation, and navigation.

In addition, the San Mateo Subbasin (groundwater) has beneficial uses for municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply (potential).

Environmental Consequences

Per Caltrans Project Risk Level Determination Guidance (2010), the sediment risk factor is determined from the product of the rainfall runoff erosivity factor (R), the soil erodibility factor (K), and the length-slope factor (LS). The R factor was determined from the US EPA's "Rainfall Erosivity Factor Calculator" or Fact Sheet 3.1 to be about 80 (USEPA 2012). The K factor for the project is 0.32 and the LS factor is 0.29 according to the Geographic Information System (GIS) maps by the SWRCB or the Caltrans Stormwater Earth Map (2012) or Caltrans Statewide Webmap for Construction General Permit (2012).

The watershed erosion estimate (i.e., product of these factors = R x K x LS) is 7.42 tons/acre, thus the project is classified as having a low sediment risk (i.e., less than 15 tons/acre).

The total disturbed soil area (DSA) will be approximately 12.0 acres, which includes staging areas, temporary grading, cut and fill areas, new pavement, and pavement replacement areas. The net additional impervious area will be about 4.0 acres. The existing impervious surface is about 4.7 acres.

The receiving water risk is classified as high because the San Francisco Bay has the beneficial uses of Fish Spawning, Cold Freshwater Habitat, and Fish Migration. The high receiving water risk for the entire project area is confirmed through the use of a GIS map prepared by the SWRCB.

The combined medium sediment risk and high receiving water risk results in the project being classified as "Risk Level 2."

The project does not require hydromodification mitigation since it is located within the exempt area (i.e., hardened channel) per San Mateo County's C.3 Stormwater Technical Guidance (2012).

The project is not anticipated to require a 401 Certification from the RWQCB since there is currently no need for a 404 permit from U.S. Army Corps of Engineers (USACE). A 404 permit will be required when a project involves dredging or fill to the Waters of the U.S.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Plan (FIRM) show that the majority of residential development and properties are not within the boundaries of the base floodplain. For more detail The Technical Information for Location Hydraulic Study and Floodplain Evaluation Summary is available.

There are currently no negotiated understandings or agreements with RWQCB pertaining to this project.

Avoidance, Minimization and/or Mitigation Measures

The project would incorporate the use of temporary construction site Best Management Practices (BMPs) and permanent erosion control BMPs, which are summarized in this report, Storm Water Pollution Prevention Plan (SWPPP), and contract plans and specifications.

This project will involve construction over a period of one rainy season. The number of rainy seasons is factored into the cost estimate for each construction site BMP chosen as a line item of work. Whenever possible, earth-disturbing construction activities would be scheduled outside of an anticipated rain event. DSAs would be protected in accordance with the project's pollution control measures specified in this report and per the contract plans and specifications. The construction site BMP strategy for this project shall consist of: Soil Stabilization, Sediment Control, Tracking Control, Wind Erosion Control, Non-Stormwater Controls and Waste Management and Material Pollution Controls.

Clearing and grubbing areas would be necessary due to ramp widening. The areas to be cleared consist mostly of brush and trees. Existing vegetation will be preserved to the maximum extent practicable (MEP). Disturbed soil areas will be re-stabilized with permanent erosion control measures.

Environmentally Sensitive Areas (ESAs), the areas that should be avoided due to highly sensitive habitats, would be protected from construction activities by the placement of highly visible Temporary Fence (Type ESA).

The following soil stabilization measures are considered for this project and are included as separate bid line items in the Basic Engineering Estimating System (BEES) of this project: Temporary Cover, Temporary Hydraulic Mulch (Bonded Fiber Matrix), and Temporary Fence (Type ESA).

The temporary cover would be placed over temporary stockpiles of disturbed soil to prevent sediment runoff from wind or water. The temporary hydraulic mulch (bonded fiber matrix) would be placed on any exposed disturbed soils, stockpiles of soils, and/or unprotected slopes that may be susceptible to erosion from either runoff or wind. If there are identified ESAs within the project limits, temporary fence (Type ESA) will be designed to designate the areas as being outside the limits of work.

There will be cut/fill slopes due to widening or reconstructing of the ramps, however the cut/fill slopes will be minimized and conformed to the existing slopes.

Disturbed slopes will be planted with comparable vegetation and maintained until vegetation is well established and self-sufficient.

When possible slopes would be graded at 2:1 (horizontal:vertical or h:v) or flatter; furthermore, proposed cut and fill slopes are designed to tie into existing slopes that are also flat, which would allow for re-vegetation after construction. All projects incorporating new slopes steeper than 4:1 (h:v) must have an erosion control plan developed or approved by the District Landscape Architect. Any slopes steeper than 2:1 (h:v), a Geotechnical Design Report must be prepared by Geotechnical Services with concurrence from Maintenance.

Slopes would be protected during construction through the use of temporary construction site BMPs. Permanent erosion control would be achieved by utilizing compost incorporate and applying erosion control (hydroseeding) on disturbed slopes 4:1 (h:v) or flatter (including biofiltration strip areas), as well as placing rolled erosion control product (netting) and erosion control (hydroseeding) on disturbed slopes between 4:1 (h:v) and 2:1 (h:v).

Permanent fiber rolls would be placed on proposed slopes and on slopes with existing erosion control concerns. The erosion control measures proposed for the project would be shown on Erosion Control Plans.

Some drainage systems including inlets will be relocated as a result of the ramp widening and will be shown on Drainage Plans at a later phase.

The following sediment control measures are considered for this project and would be included as separate bid line items: Temporary Fiber Rolls, Temporary Silt Fence, and Temporary Drainage Inlet Protection.

Temporary fiber rolls would be placed in areas where there is potential for sediment to run on or off the project site; this includes placing temporary fiber rolls at the top of cut and fill slopes.

Temporary silt fence would be located along the R/W to prevent sediment from running off the project site. Temporary silt fence would also be placed around all temporary stockpiles to prevent sediment runoff. During construction, temporary silt fences would be placed around existing and proposed treatment BMPs to protect them from being impacted by sediment and construction-related activities.

Temporary drainage inlet protection would be placed at all existing and proposed inlet locations to protect inlets from sediment or other construction-related pollutant runoff.

Risk Level 2 projects are required to prepare an SWPPP developed and certified by a Qualified SWPPP Developer (QSD) prior to the start of construction. The SWPPP will identify BMPs to reduce water quality impacts during construction. The SWPPP should emphasize: 1) standard temporary erosion control measures to reduce sedimentation and turbidity of surface runoff from disturbed areas; 2) personnel training; 3) scheduling and implementation of BMPs year-round and throughout the various construction phases; 4) identification of BMPs for non-stormwater discharge such as fuel spills; and 5) mitigation and monitoring throughout the construction period.

The SWPPP also requires the QSD to develop a Construction Site Monitoring Program (CSMP) prior to the start of construction, which will be revised to meet ongoing construction activities. For Risk Level 2, the CSMP is required to include the procedures and methods related to the visual monitoring and sampling and analysis plans for non-visible pollutants, sediment and turbidity, and pH. Actual in-field work to comply with the requirements of monitoring, sampling and analysis is to be done by a QSD or Qualified SWPPP Practitioner (QSP).

Risk Level 2 projects are required to prepare a Rain Event Action Plan (REAP). A REAP is required to be prepared 48 hours prior to any likely rain event; a likely rain event is described as, “any weather pattern that is forecast to have a 50% or greater probability of producing precipitation,” as determined by the National Oceanic and Atmospheric Administration (CGP 2009). The REAP will be prepared at every phase of construction and for both active and inactive construction areas. The REAP will specify the project location, plus identify the storm water manager, erosion control provider and sampling personnel with emergency contact information. The REAP will also present the current construction activity and strategy or actions to be taken for the implementation of BMPs on the project site.

The project is required to perform storm water sampling at all discharge locations. Exact sampling and discharge locations will be finalized at a later phase.

This project does require stenciling on existing or proposed drain inlets because pedestrian or bicycle traffic is allowed within the project limits.

GEOLOGY/ SOILS/SEISMIC/TOPOGRAPHY

Regulatory Setting

Topographic and geologic features are also protected under the CEQA. This section also 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. The Department's Office of Earthquake Engineering is responsible for assessing the seismic hazard for Department projects. Structures are designed using the Department's Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see Caltrans's Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Affected Environment

A Preliminary Geotechnical Report was completed for the proposed project on December 18, 2012.

The proposed project is located on the edge on the eastern side of the Santa Cruz Mountains, at the junction between the hills and the flat land of the alluvial planes of the San Francisco Bay. The site is approximately 2.25 miles east of Buri Buri Ridge (634 feet mean sea level (msl)) and Pulgas Ridge. These ridges are separated by San Mateo Creek, the closest named creek, at 1.25 miles northwest of the proposed project site. This creek drains from Crystal Springs dam, northeast, to San Francisco Bay. The closest body of water is an unnamed canal which is approximately 1,500 feet southwest of the site. This canal drains to Seal Slough and then drains to the San Francisco Bay.

The project site is located within the California Coast Ranges geomorphic province. Extensive folding has created a series of northwest trending ranges and valleys, one of which is the San Francisco Bay. SR 92/82 separation is located on historic artificial fill deposits and Holocene alluvial fan and fluvial deposits.[2] The artificial fill, which is located at the elevated section of the separation, is

> *"...loose to very well consolidated gravel, sand, silt, clay, rock fragments, organic matter, and man−made debris in various combinations. Thickness is variable and may exceed 30 m in places. Some is compacted and quite firm, but fill made before 1965 is nearly everywhere not compacted and consists simply of dumped materials."*[3] *The flat lying areas are composed of Holocene alluvial fan and fluvial deposits"…alluvial fan deposits are brown or tan, medium dense to*

[2] USGS. Gelogy of the Onshore Part of San Mateo County CA: Derived from the Digital Database Open_file 98-137; Brabb, E.E., Graymer, R.W., Jones, D.L. 1998

[3] ibid

dense, gravely sand or sandy gravel that generally grades upward to sandy or silty clay."[4]

The Log of Test Borings (LOTBs) from the 1961 construction of the Route 92/82 Separation show silty clays, sandy silty clay, sandy clayey silt, silty sand, clayey sand, clayey gravelly sand, sand and gravelly sand. These findings are consistent with the USGS map showing Holocene artificial fill, alluvial fan and fluvial deposits.

The majority of the project is underlain by soil classified as urban land. This soil is classified with Hydraulic Soil D. *"…Group D - Soils in this group have high runoff potential when thoroughly wet."*[5] Since the soil is classified as Urban Land many classification, such as shrink swell and erodibility, have not been rated. (The USDA, NRCS; Custom Soil Resource Report for Sonoma County, California; 2012 can be supplied upon request.)

The proposed project site is located within a seismic region dominated by the northwest trending San Andreas Fault. While the San Andreas is the controlling fault for the proposed project site, there are four faults within 15 miles of project site and they are presented Table 22, with fault locations.

Table 22. Earthquake Fault Data

Fault Name	Distance: Miles	Fault ID:	Fault Type:	Maximum Magnitude (MMax):
San Andreas fault zone (Peninsula section)	3.4	309	Right Lateral Strike Slip	7.9
San Gregorio fault zone (San Gregorio section)	10.5	197	Right Lateral Strike Slip	7.0
Silver Creek fault	12.6	152	Thrust Fault	7.1
Hayward fault zone (Southern Hayward section)	15.1	354	Right Lateral Strike Slip	7.3

Groundwater in the area has not been monitored by Caltrans. Geotechnical borings that were advanced in January 1959 measured groundwater at an elevation between -2.3 and 5.3 feet (12 and 21 feet below surface grade). Groundwater levels fluctuate seasonally and are typically highest in the winter season.

[4] ibid
[5] Ibid

The proposed project is located on relatively flat land, therefore landslides and erosion by water are not an issue.

Environmental Consequences

Seismicity

Potential seismic hazards in such an active region are minimal due to the proposed project's location. According to the Alquist-Priolo Earthquake Fault Zone Maps, there are no faults within the limits of the project site, so surface rupture is not an issue.

Groundwater

Groundwater in the area has not been monitored by Caltrans; geotechnical borings will provide measurements at a later date.

Erosion and Slope Stability

As noted previously, the susceptibility of a soil to sheet and erosion by water is not an issue.

Excavation Characteristics

No excavations are planned for the proposed project. Retaining walls could be up to 300 feet in length reaching a maximum height of 15 feet. Since the deposits below the project site are Holocene and artificial fill, drilling piles should be feasible.

Avoidance, Minimization and/or Mitigation Measures

In accordance with standard Caltrans requirements, detailed geotechnical studies shall be conducted during the proposed project's future plans, specifications, and estimates (PS&E) phase. BMPs for erosion and sediment control are noted in the Water Quality section of this chapter.

PALEONTOLOGY

Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects. 23 Code of Federal Regulations (CFR) 1.9(a) states that the use of federal funds must be in conformity with federal and state law. Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

Affected Environment

A Paleontological Identification Report (PIR) was prepared on December 17, 2012. The proposed project site is located within the California Coastal Range geomorphic province on historic artificial fill deposits and Holocene alluvial fan and fluvial deposits. These Holocene deposits could overlay Pleistocene alluvial fan and fluvial deposits, which contain fresh water mollusks and extinct late Pleistocene vertebrate fossils.

A literature review and online fossil locality search were conducted for San Mateo County using the Berkeley Natural History Museum (BNHM) online database and the UC Paleontology Museum Database (UCMP). The BNHM listed over 8,607 exhibits categorized by biological classification. However it is more useful to use the UCMP Database, which lists fossils by their epoch. Over 392 fossils were found in San Mateo County, the majority not within close proximity to the project from the Holocene epoch. Ten (10) of the fossils listed are from the Pleistocene.

No specific fossil bearing formations are located in the project vicinity.

Environmental Consequences

Construction activities can impact paleontologically sensitive geologic units when vehicles or other work equipment impact previously undisturbed sediments by excavating, grading, or crushing bedrock exposed in or underlying a project. This can result in impacts to fossils by destroying them or otherwise altering them in such a way that their scientific value is lost. But since the deposits at the job site are either man made or from the Holocene epoch, and construction methods are not to extend into the Pleistocene deposits, fossil findings are not expected.

Avoidance and/or Minimization Measures

In general, avoidance and minimization measures are not feasible with regard to addressing impacts on paleontological resources. Geologic formations are usually extensive and project design cannot be adjusted sufficiently to effectively avoid or

minimize paleontological impacts. As a result, mitigation is the approach generally taken to address these impacts.

The following mitigation measures are recommended and in accordance to Caltrans' Standard Environmental Reference Guidelines (Caltrans, 2007):

- A Paleontological Evaluation Report (PER) should be prepared prior to construction to define actual locations where monitoring may be necessary based upon the project design. For budgeting, the PER will provide enough information about the level of effort needed.
- Based upon the findings from the PER, a Paleontological Mitigation Plan (PMP) may be recommended to define the specific mitigation measures and methods that will be implemented.
- These recommendations may include:
    - A qualified paleontologist could be present to consult with grading and excavation contractors at pre-grading meetings.
    - The Principal Paleontologist could also have an environmental meeting to train grading and excavation contractors in the identification of fossils.
    - If fossils are discovered, the paleontologist (or paleontological monitor) will be called to recover them. Construction work in these areas may need to be halted or diverted to allow recovery of fossil remains in a timely manner.
    - Fossil remains collected during the monitoring and salvage portion of the mitigation program will be cleaned, stabilized, 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.
    - A final report may be completed that outlines the results of the mitigation program.

HAZARDOUS WASTE/MATERIALS

Regulatory Setting

The California Health and Safety Code Section 25501(o) define *hazardous material* as:

…any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous materials and hazardous wastes are regulated by 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 Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as “Superfund,” is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides "cradle to grave" regulation of hazardous wastes. Other federal laws include:

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

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

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code Section 25501(o)

Affected Environment

A number of resources were consulted in order to identify existing locations and types of hazardous materials within the study area. These included review of historical aerial photographs; review of available regulatory information to identify possible past or present environmental violations or problems; agency records search to identify California-certified hazardous waste sites; agency records search to identify business types likely to store, transfer or use large quantities of hazardous materials; a variance from the Department of Toxic Substance Control Lead Contaminated Soils dated September 22, 2000; and field reconnaissance on September 5, 2012.

Environmental Consequences

An environmental regulatory database search revealed that there are two underground storage tank sites close to the project limits that might negatively impact the proposed project. The excavation for the projects proposed retaining wall might be affected by one of these two sites depending on the wall's final design details.

Based upon the wall design and the project's estimated soil excavation quantity, a subsurface investigation (SI) may necessary for the project. This field work will be planned and executed during the design phase, when the project footprint and potential impacts are better defined.

Avoidance, Minimization, and/or Mitigation Measures

Based on the history of the project area, there is potential aerial lead contamination due to the aerial deposition of lead from motor vehicle exhaust. Testing will be done during the design phase upon request from the Project Engineer. If test results reveal the soils are contaminated, the materials must be handled according to regulatory requirements. The special handling may include implementing a health and safety plan, and reusing the material according to the Department of Toxic Substance Control Lead Contaminated Soils variance dated September 22, 2000, or it may require off-site disposal of the materials.

NOISE

Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

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 such measures are not feasible. The rest of this section will focus on the NEPA-23 Code of Federal Regulations (CFR) 772 noise analysis; please see Chapter 4 of this document for further information on noise analysis under CEQA.

NATIONAL ENVIRONMENTAL POLICY ACT AND 23 CFR 772

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis.

Table 23 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

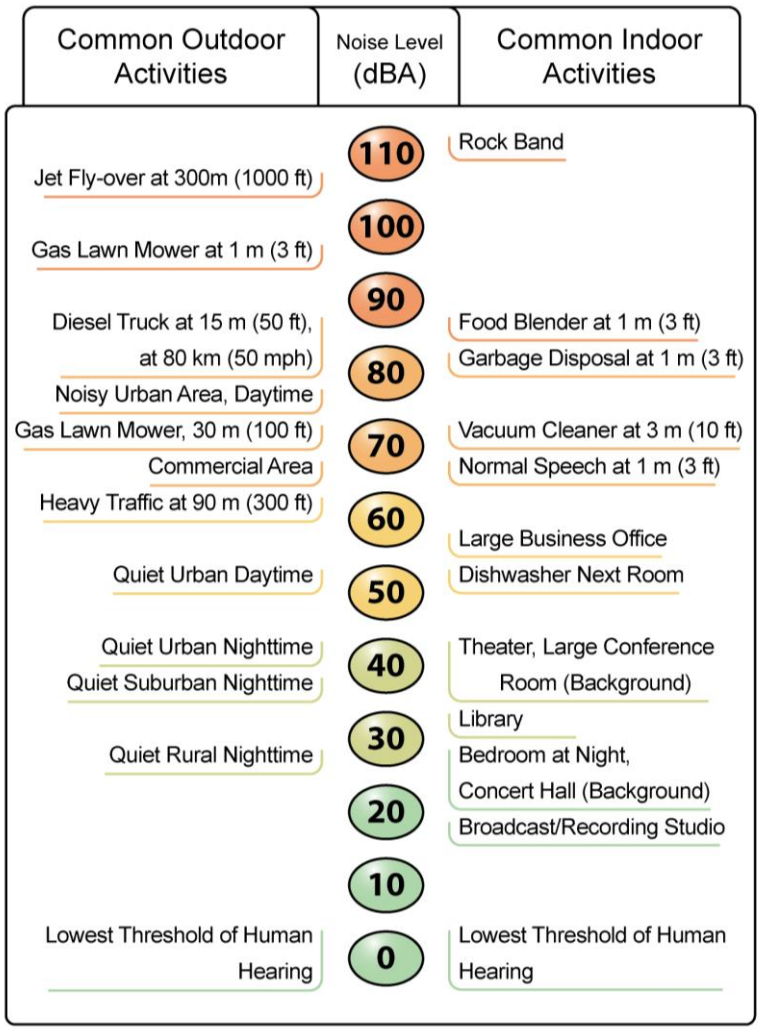
Table 23. Noise Abatement Criteria

Table 23: Noise Abatement Criteria		
Activity Category	**NAC, Hourly A-Weighted Noise Level, Leq(h)**	**Description of activity category**

A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities,

		shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.
[1] Includes undeveloped lands permitted for this activity category.		

Figure 13. Noise Levels of Common Activities



In accordance with Caltrans *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011*, a noise impact occurs when

the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

Caltrans *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 7 dBA in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents acceptance and the cost per benefited residence.

Caltrans Highway Design Manual (HDM) Chapter 1100 – Highway Traffic Noise Abatement defines general requirements and design criteria for noise abatement measures for highway projects in California. Where feasible, a sound wall should break the line of sight between a receptor 5 feet above ground and the exhaust stack of a truck, assumed to be 11.5 feet above the pavement. The minimum height of noise barriers is 6 feet. Noise barriers should not exceed 14 feet in height when located 15 feet or less from the edge of the traveled way. Barriers with heights greater than 16 feet may be considered if necessary to achieve acoustical feasibility (i.e., at least 5 dBA of noise reduction) or cost reasonableness (i.e., calculated allowance exceeds estimated cost).

Noise Impact

Predicted exterior traffic noise levels at land uses in Activity Categories A, B, C and E are evaluated to determine whether traffic noise impacts are predicted to occur. Traffic noise impacts occur when future predicted noise levels in the design year with the project in place either 1) show a *substantial* increase (12 dBA or higher) from the existing levels, or 2) approach or exceed the NAC established by the FHWA as shown in Table 25. The term ‘approach’ is defined by Caltrans as within one dBA of the NAC. For example, a residence with predicted future exterior noise levels of 66 dBA Leq(h) or higher would qualify for consideration of noise abatement. In determining noise impacts, primary consideration is given to exterior areas where frequent human use occurs that would benefit from a lowered noise level. In general, an area of frequent human use is an area where people are exposed to traffic noise for an extended period of time on a regular basis. Noise abatement or mitigation measures must be considered for Type I projects when a noise impact is identified.

A Type 1 project as defined in 23 CFR 772, is a federal or federal-aid project for construction of highway on a new location; or physical alteration of vertical or horizontal alignment of an existing highway; or adding additional through-traffic lanes.

Feasibility

The feasibility of a noise abatement measure is an engineering consideration. Noise abatement must reduce noise at least 5 dBA to be considered feasible from an acoustical perspective. Noise abatement measures that provide noise reduction of more than 5 dBA are encouraged as long as they meet the reasonableness guidelines. Feasibility may also be restricted by various factors, including topography, access requirements for driveways, presence of local cross streets, underground utilities, other noise sources in the area, and safety considerations.

Reasonableness

The determination of the reasonableness of noise abatement is more subjective than the determination of its feasibility. The overall reasonableness of noise abatement is determined by the following three factors: the cost of noise abatement, the 7 dBA noise reduction design goal and the viewpoints of benefited receptors (including property owners and residents of the benefited receptors). Cost considerations for determining noise abatement reasonableness are evaluated by comparing reasonableness allowances and projected abatement costs.

23CFR772 lists optional reasonableness factors that may be considered. However the noise abatement recommendations presented in the draft environmental documentation are based on the three factors listed above. The additional factors are considered through the remainder of the environmental review process. The Project Development Team will make the proposed noise abatement decisions that will be incorporated into the final environmental documentation. Any proposed changes to the noise abatement decision subsequent to adoption of the final environmental document should be reviewed with the District noise specialists to insure adequate acoustic performance.

Undeveloped Lands

When traffic noise impacts are predicted for undeveloped lands for which a noise-sensitive development has received final approval from a local jurisdiction before the date of public knowledge of the transportation project, noise abatement must be considered as part of the transportation project. Otherwise, noise abatements should be the responsibility of the local agencies or private developers. The issuance of a building permit is generally considered to be the final approval of a development. The date of public knowledge shall be the date of approval of the final environmental decision document (e.g. a Record of Decision).

Affected Environment

The study area is the area bounded by the limits of the proposed project. Land uses in Activity Categories B, C and E as defined in 23 CFR 772 are present in the study area. There are no undeveloped lands in the area. The existing worst-hour noise levels were calculated based on the TNM model using the traffic volumes that would yield the highest noise levels

The area in the northeast quadrant of the interchange is mainly residential (Activity Categories B), except for a row of commercial properties (Activity Categories E) along SR 82. There are no outdoor areas within the commercial properties that are considered frequent human use areas. Existing noise levels (Leq) range from 58 to 65 dBA for residences in the area, represented by R3, R4, R7, R8 and R10.

The southeast quadrant has residences (Activity Categories B), commercial properties (Activity Categories E) along SR 82, two baseball fields (Activity Categories C) and a playground (Activity Categories C) in Trinta Park. There are no outdoor areas that are considered frequent human use areas within the commercial properties along SR 82. Existing worst-hour noise levels were calculated to be 64 dBA for the area's residences, represented by R1, R5, R6 and R9. The existing noise level at the fence of the baseball field (R2), where the highest traffic noise is expected to occur in Trinta Park, is calculated to be 65 dBA.

The northwest quadrant of the interchange has a commercial development (Activity Categories E) with no frequent human use area in its exterior. The existing noise level is calculated to be 76 dBA at Receptor R11, which represents a loading area in the Borel Square Shopping Center where the highest noise level is expected to occur for the entire area.

The southwest quadrant is a mixed-use commercial/residential area that currently has a commercial development (Activity Categories E), a day care center (Activity Categories C) and a meeting venue (Activity Categories C). The outdoor play yard (R12) in the day care center at #1911 Elkhorn Court (EC) is considered an area of frequent human use. The existing worst-hour noise level is calculated to be 63 dBA at Receptor R12.

The southwest quadrant also has an unfinished multi-story apartment building (Activity Categories B) on Elkhorn Court that is presently under construction. The exterior patios on some of the apartment units are considered frequent human use areas. Since the building is currently unoccupied, they were only analyzed under the project's future conditions.

The existing worst-hour noise levels calculated by TNM are summarized in Table 24.

Table 24. Existing Noise Levels

Receptor No.	Location	Type of Use	Units Represented	Activity Category (NAC)	Existing Noise Level, Leq(h)
R1	#96 19th Ave	Residential	2	B (67)	64
R2	Trinta Park (Baseball Field)	Sport/ Recreation	2	C (67)	65
R3	#1811 Gum St	Residential	3	B (67)	62
R4	#1814 Palm Ave	Residential	1	B (67)	58
R5	#1911 Ivy St.	Residential	2	B (67)	64
R6	#106 19th Ave	Residential	1	B (67)	64
R7	#1819 Palm Ave	Residential	2	B (67)	61
R8	#1815 Palm Ave	Residential	2	B (67)	60
R9	#1922 Ivy St.	Residential	2	B (67)	64
R10	#1747 Ivy St.	Residential	2	B (67)	65
R11	51 Bovet Road (Borel Square SC)	Commercial	0*	E (72)	76
R12	#1911 Elkhorn Ct	Day Care Ctr.	1	C (67)	63
Note * No frequent human use area					

Environmental Consequences

Under the project's Build Alternative, the future noise levels for receptors in the northeast and southeast quadrants of the interchange are predicted to range from 58 to 65 dBA in the design year, which would not approach or exceed the NAC. In addition, the future noise levels at these receptors would not increase substantially (12 dBA of higher) from the existing levels. The Build Alternative would not cause noise impacts to receptors in the northeast and southeast quadrants.

The future noise levels at the exterior patios of the apartment building that is currently under construction are predicted to range from 67 to 76 dBA in the design year, which exceed the NAC for Activity Category B. Noise impacts are identified at

a total of 26 units where the future noise levels would reach 66 dBA or higher. The locations where future noise levels would reach 66 dBA or higher are shaded in Table 25 below.

The locations of the exterior patios are determined based on construction plans submitted to the City of San Mateo. Depending on its location, each receptor in the area may represent a single patio or a group of neighboring patios. There are also provisional receptors that do not represent any frequent human use areas based on the construction plans. They were analyzed in the event that the actual locations of the patios upon completion deviate from the plans. Noise impacts are not assessed at the provisional receptors.

Table 25. Future Noise Levels and Noise Impacts

Receptor No.	Location	Units Represented	Existing Noise Levels, dBA	Future Noise Levels, dBA		Activity Category (NAC)	Impact
				No-Build	Build		
R1	#96 19th Ave	2	64	64	64	B (67)	None
R2	Trinta Park	2	65	65	64	C (67)	None
R3	#1811 Gum St	3	62	62	62	B (67)	None
R4	#1814 Palm Ave	1	58	59	58	B (67)	None
R5	#1911 Ivy St.	2	64	64	64	B (67)	None
R6	#106 19th Ave	1	64	65	64	B (67)	None
R7	#1819 Palm Ave	2	61	61	61	B (67)	None
R8	#1815 Palm Ave	2	60	60	60	B (67)	None
R9	#1922 Ivy St.	2	64	65	65	B (67)	None
R10	#1747 Ivy St.	2	65	65	64	B (67)	None
R11	51 Bovet Road (Borel Square SC)	0*	76	76	76	E (72)	None
R12	#1911 Elkhorn Court (EC)	1	63	62	61	C (67)	None
R13	EC Apt N1 Ground	0*	-	71	71	B (67)	None
R14	EC Apt N1 Level 2	1	-	76	**76**	B (67)	Yes

Receptor No.	Location	Units Represented	Existing Noise Levels, dBA	Future Noise Levels, dBA		Activity Category (NAC)	Impact
				No-Build	Build		
R15	EC Apt N1 Level 3	2	-	76	**76**	B (67)	Yes
R16	EC Apt N1 Level 4	2	-	76	**76**	B (67)	Yes
R17	EC Apt N2 Ground	0*	-	71	70	B (67)	None
R18	EC Apt N2 Level 2	2	-	76	**76**	B (67)	Yes
R19	EC Apt N2 Level 3	3	-	76	**76**	B (67)	Yes
R20	EC Apt N2 Level 4	2	-	76	**76**	B (67)	Yes
R21	EC Apt N3 Ground	0*	-	69	69	B (67)	None
R22	EC Apt N3 Level 2	0*	-	74	74	B (67)	None
R23	EC Apt N3 Level 3	4	-	74	**74**	B (67)	Yes
R24	EC Apt N3 Level 4	2	-	74	**74**	B (67)	Yes
R25	EC Apt E1 Ground	0*	-	67	67	B (67)	None
R26	EC Apt E1 Level 2	0*	-	71	71	B (67)	None
R27	EC Apt E1 Level 3	1	-	71	**71**	B (67)	Yes
R28	EC Apt E1 Level 4	0*	-	71	71	B (67)	None
R29	EC Apt E2 Ground	0*	-	66	66	B (67)	None
R30	EC Apt E2 Level 2	1	-	69	**69**	B (67)	Yes
R31	EC Apt E2 Level 3	1	-	70	**70**	B (67)	Yes
R32	EC Apt E2 Level 4	0*	-	70	70	B (67)	None
R33	EC Apt W1 Ground	0*	-	68	67	B (67)	None
R34	EC Apt W1 Level 2	0*	-	72	72	B (67)	None
R35	EC Apt W1 Level 3	1	-	72	**72**	B (67)	Yes
R36	EC Apt W1 Level 4	0*	-	72	72	B (67)	None
R37	EC Apt W2 Ground	0*	-	67	67	B (67)	None
R38	EC Apt W2 Level 2	2	-	71	**71**	B (67)	Yes

Receptor No.	Location	Units Represented	Existing Noise Levels, dBA	Future Noise Levels, dBA		Activity Category (NAC)	Impact
				No-Build	Build		
R39	EC Apt W2 Level 3	2	-	71	**71**	B (67)	Yes
R40	EC Apt W2 Level 4	0*	-	71	71	B (67)	None

Notes: * No frequent human use area

Bold letters denote noise levels at impacted receptors

Shaded rows denote locations where future noise levels would reach 66 dBA or higher

Since the freeway is currently operating at its peak noise generating level (Level of Service C) during the peak periods, future noise levels with the No-Build Alternative would not significantly change from the existing worst-hour levels. Under the No-Build Alternative, the predicted future noise levels would remain unchanged or increase by 1 dBA above the existing levels at receptors in the project area. The exterior patios of the apartment building that is currently under construction in the southwest quadrant are considered frequent human use areas in this study.

Avoidance, Minimization and/or Abatement Measures

In the southwest area of the proposed new interchange (see Figure 14), the future noise levels at the exterior patios of 26 units of the future Elkhorn Court apartment building, currently under construction, are predicted to range from 67 to 76 dBA in the design year. This dBA would exceed the NAC (66 dBA or higher) for Activity Category B. This is considered an adverse noise impact to the 26 units of Elkhorn Court that are currently under construction. The proposed abatement measure for the adverse noise impact to the 26 units is a 536 foot (ft) sound wall. Noise abatement in the form of a soundwall was analyzed. Below is an aerial photo showing the approximate location of the proposed soundwall.

Figure 14. Location of Proposed Soundwall

Source: Google Earth, based on USGS imagery, 12/31/2010.

A 536 foot long soundwall, SW-1, along the edge of shoulder of the proposed off-ramp is found to be feasible, as it would reduce the future noise levels by more than 5 dBA. The soundwall would meet the 7 dBA noise reduction goal in the reasonableness consideration at the minimum height of 10 feet. At the height of 14 feet, SW-1 would break the line-of-sight between truck stacks and the receptors on the second level of the apartment building, but not be able to do so for receptors on higher levels. The number of benefited receptors would vary depending on the height of the barrier selected. Benefited receptors are those predicted to receive at least a 5 dBA noise reduction from the proposed abatement measure. Units on the third and fourth levels of the building would not be benefited at any barrier heights. Please see Visual/Aesthetics section for additional photos.

Figure 15. Simulated Image of Proposed Soundwall on EB 92

Photo simulation of proposed new 536' soundwall at location—outside of diagonal off-ramp EB 92 to SB 82. Much of the existing roadside landscape would be removed to accommodate the soundwall.

Table 26 below shows the predicted future noise levels and insertion losses (I.L.) with soundwall SW-1 at various wall heights.

Table 26. Future Noise Levels with Barrier

Receptors No.	Location	Units Represented	Future Noise Levels, dBA										
			No Barrier	6 FT Barrier		8 FT Barrier		10 FT Barrier		12 FT Barrier		14 FT Barrier	
			Leq	Leq	I. L.	Leq	I.L.	Leq	I.L.	Leq	I.L.	Leq	I.L.
R13	Apt N1 Ground	0*	71	67	4	66	5	65	6	65	6	65	6
R14	Apt N1 Level 2	1	76	73	3	71	**5**	70	**6**	69	**7**	69	**7**
R15	Apt N1 Level 3	2	76	76	0	76	0	75	1	73	3	71	**5**
R16	Apt N1 Level 4	2	76	76	0	76	0	76	0	76	0	75	1
R17	Apt N2 Ground	0*	71	66	5	65	6	64	7	63	8	63	8

Receptors No.	Location	Units Represented	Future Noise Levels, dBA										
			No Barrier	6 FT Barrier		8 FT Barrier		10 FT Barrier		12 FT Barrier		14 FT Barrier	
			Leq	Leq	I. L.	Leq	I.L.	Leq	I.L.	Leq	I.L.	Leq	I.L.
R18	Apt N2 Level 2	2	76	73	3	70	**6**	68	**8**	67	**9**	66	**10**
R19	Apt N2 Level 3	3	76	76	0	76	0	75	1	73	3	71	**5**
R20	Apt N2 Level 4	2	76	76	0	76	0	76	0	75	1	75	1
R21	Apt N3 Ground	0*	69	64	5	63	6	62	7	61	8	60	9
R22	Apt N3 Level 2	0*	74	72	2	69	5	66	8	64	10	63	11
R23	Apt N3 Level 3	4	74	74	0	74	0	73	1	72	2	70	4
R24	Apt N3 Level 4	2	74	74	0	74	0	74	0	74	0	74	0
R25	Apt E1 Ground	0*	67	62	5	62	5	61	6	60	7	60	7
R26	Apt E1 Level 2	0*	71	70	1	68	3	66	5	64	7	63	8
R27	Apt E1 Level 3	1	71	71	0	71	0	71	0	70	1	69	2
R28	Apt E1 Level 4	0*	71	71	0	71	0	71	0	71	0	71	0
R29	Apt E2 Ground	0*	66	62	4	62	4	61	5	60	6	60	6
R30	Apt E2 Level 2	1	69	69	0	68	1	66	3	64	**5**	63	**6**
R31	Apt E2 Level 3	1	70	70	0	70	0	70	0	69	1	68	2
R32	Apt E2 Level 4	0*	70	70	0	70	0	70	0	70	0	70	0
R33	Apt W1 Ground	0*	68	66	2	65	3	65	3	65	3	65	3
R34	Apt W1 Level 2	0*	72	70	2	70	2	70	2	69	3	69	3
R35	Apt W1 Level 3	1	72	72	0	71	1	70	2	70	2	70	2
R36	Apt W1 Level 4	0*	72	72	0	72	0	72	0	71	1	70	2
R37	Apt W2 Ground	0*	67	65	2	65	2	65	2	65	2	65	2
R38	Apt W2 Level 2	2	71	70	1	69	2	69	2	69	2	69	2

Receptors No.	Location	Units Represented	Future Noise Levels, dBA										
			No Barrier	6 FT Barrier		8 FT Barrier		10 FT Barrier		12 FT Barrier		14 FT Barrier	
			Leq	Leq	I. L.	Leq	I.L.	Leq	I.L.	Leq	I.L.	Leq	I.L.
R39	Apt W2 Level 3	2	71	71	0	70	1	70	1	69	2	69	2
R40	Apt W2 Level 4	0*	71	71	0	71	0	71	0	70	1	70	1

Notes: * No frequent human use area

Bold letters denote 5 dBA or more noise reduction

A soundwall situated on the State right-of-way line next to the off-ramp was analyzed and received no further consideration. The study shows that it would provide more than 5 dBA of reduction for one receptor, but it would not meet the 7 dBA design goal for the reasonableness consideration.

Cost consideration in determining the reasonableness of noise abatement is evaluated by comparing the reasonable allowance with the projected construction cost of the abatement. The reasonable allowances for SW-1 are calculated based on the 2011 allowance of $55,000 per benefited receptor.

Table 27. Barrier Feasibility and Reasonable Allowances

Barrier	Length, ft	Height, ft	Insertion Loss, dBA	Feasibility	7 dBA. Reduction Goal	Line-of-Sight	Benefited Receptors	Reasonable Allowance
SW-1	563	8	0 - 6	Yes	No	No	3	$165,000
		10	0 - 8	Yes	Yes	No	3	$165,000
		12	0 - 9	Yes	Yes	No	4	$220,000
		14	0 - 10	Yes	Yes	Yes	9	$495,000

If the exterior patios upon completion of the building were found to be situated at different locations than those analyzed in the study, traffic noise impacts and reasonable allowances may have to be re-assessed. If project conditions are substantially changed during final design, the abatement will be subject to re-

evaluation. A final decision of the construction of the noise abatement will be made upon completion of the project design**.**

BIOLOGICAL ENVIRONMENT
Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

The proposed project is in a highly urbanized area of San Mateo County that includes dense residential and commercial areas of the City of San Mateo. The vegetation in the interchange roadway shoulders in the project area consists of ruderal grass, low-growing annual/perennial vegetation, and a variety of trees and shrubs. The trees and shrubs in the project area and near the adjacent Right-of-Way (ROW) areas are primarily highway landscaping and may also contain a small number of volunteer plants. There are no streams or wetlands within or adjacent to the project site. There are no regional species or habitats of concern within one mile of the project site and therefore no such species will be affected by the project.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed below in the Threatened and Endangered Species section. Wetlands and other waters are also discussed below.

Wetlands and Other Waters

A concrete-lined channel runs along, and just outside of, the Caltrans ROW on the southwest portion of the Biological Study Area (BSA) and enters an underground culvert near SR 82 (Natural Environment Study, Minimal Impacts (NESMI), Figure 5 and Photos 4 and 5). The nearest 'blue line' hydrologic features include two drainage ditches that either terminate or enter underground culverts at the Caltrain railroad tracks approximately, 1,800 feet east-southeast and 2,000 feet east-northeast, respectively, of the project site. These ditches run approximately 5,400 feet and 7,650 feet, respectively, east to Seal Slough (NESMI Figure 4). The nearest natural streams/creeks include an unnamed 'blue line' creek that drains into the concrete-lined channel running along the southwest right of way boundary approximately 3,000 feet west of the BSA, San Mateo Creek approximately 6,600 feet north-northwest of the BSA, and Laurel Creek approximately 6,800 feet south-southeast of the BSA. It is likely that the unnamed creek that drains to the concrete-lined channel that runs along the southwestern boundary of the ROW and enters an underground culvert connects to the ditch that runs eastward from approximately 1,800 feet east-southeast of the project site to Seal Slough. Ground-level surveys found no surface streams exhibiting ordinary high water marks or wetlands exhibiting hydrophytic vegetation within the project limits. There are no streams or wetlands within the project site footprint.

Plant Species

Caltrans Biologists evaluated a combined list of the special-status plant species that occur in the region from the United States Fish and Wildlife Service (USFWS) and California Native Plant Society (CNPS) lists, and Calfornia Natural Diversity Dababase (CNDDB) records. The biological resources in the immediate vicinity of the BSA are very limited except for a small number of trees and some landscaping in the on-ramp/off-ramp configuration. Most of the BSA is developed and has paved surfaces including roads, sidewalks, curbs, and the overpass. The paved areas are mostly devoid of vegetation because the pavement and road surfaces support only hardy weeds that commonly grow in sidewalk and asphalt cracks. Caltrans biologists identified three habitat or land use types in or adjacent to the BSA: developed, non-native ruderal grassland, and ornamental woodland. Caltrans Biologists surveyed the project site and found that there are no federally or state-listed plant species or special-status plant species were identified within the BSA for the project.

Animal Species

The developed areas in the BSA are of limited use to wildlife species because of the frequent human disturbance, the high likelihood of injury or mortality from vehicular traffic, and a lack of cover or food due to a lack of vegetation. The developed areas in the BSA may be used as movement corridors by non-native mammalian species such as the non-native domestic cat (*Felis catus*) and the domestic dog (*Canis lupus familiaris*), which prey on smaller wildlife species. Native mammals that can persist in highly urbanized settings, such as striped skunks (*Mephitis mephitis*) and raccoons (*Procyon lotor*), may also traverse the developed areas of the BSA. Native avian species such as Brewer's blackbird (*Euphagus cyanocephalus*) and mourning dove (*Zenaida macroura*), as well as non-native species such as the rock pigeon (*Columbia livia*), often forage and roost within developed habitats. The SR 92 overpass was examined for its suitability to provide roosting habitat for bats, and no crevices or other features that could support day roosts for bats were observed. Cliff swallows (*Petrochelidon pyrrhonota*) and black phoebes (*Sayornis nigricans*) may nest on the SR 92 overpass, although no old nests of these species were observed within the BSA during the ground-level surveys.

Because the project site consists of an interchange between a busy four-lane divided state route and a busy six-lane divided state route in a highly urbanized area, terrestrial animals are most likely discouraged from seeking forage, cover or other habitat requirements within the project area. There are no surface water features present within the project area, making the site unsuitable for aquatic species, species that have aquatic stages, and terrestrial species seeking to ingest water.

Threatened and Endangered Species

Caltrans biologists evaluated the special-status wildlife species occurring in the region based on the USFWS and CDFW threatened and endangered species list and CNDDB records. Ruderal grasslands and urban forest mix are not preferred habitats for any of the 22 animal species that are listed as federally threatened or endangered within the San Mateo topo quad or the 17 animal species of concern that have known occurrences within five miles of the project site (NESMI Table 1). Most of the regionally occurring special-status species were rejected for potential occurrence in the BSA because the project area lacks suitable habitat and/or is outside the range of the species. No federal or state-listed special-status species were observed during the ground-level surveys. Nevertheless, there are recorded occurrences of federal and state-listed special-status species within five miles of the project site that have limited potential to be present in the BSA before or during construction. Impacts to these 17 wildlife species are avoidable through the use of Caltrans' Construction Best Management Practices.

Invasive Species

Although there are invasive, non-native plants in the BSA, there is a low potential for the project to cause these species to spread to nearby natural habitats because the area is highly disturbed and developed with no substantial connectivity to native habitats. Therefore, the spread of non-native plants is anticipated to be insubstantial.

Affected Environment

The proposed project is in a highly urbanized area of San Mateo County that includes dense residential and commercial areas of the City of San Mateo. The vegetation in the interchange roadway shoulders in the project area consists of ruderal grass, low-growing annual/perennial vegetation, and a variety of trees and shrubs. The trees and shrubs in the project area and near the adjacent ROW areas are primarily highway landscaping and may also contain a small number of volunteer plants. There are no streams or wetlands within or adjacent to the project site. There are not regional species or habitats of concern within one mile of the project site and therefore they will not be affected by the project.

Environmental Consequences

No special-status habitat types, riparian areas, or wetlands are present within the BSA, and therefore no impacts to these resources will result from the proposed project. It is unlikely that any species of special concern or state and/or federally threatened and endangered species will be present within the project site during implementation of the proposed project. Therefore, the project will have minimal and temporary impacts to biological resources.

The proposed project will result in the removal of an unknown number of medium-sized trees (4- to 12-inch-diameter at breast height) that were planted for landscaping purposes along the interchange. There are several well-established eucalyptus, blackwood acacia, and coast live oak trees distributed among the vegetated areas within the SR 92/SR 82 interchange that may be affected by the proposed project through removal or pruning. The number of removed or pruned trees is not expected to have a substantial biological effect on the area's urban forest or on the populations of animal species that use the trees because of the low habitat quality provided by sparsely scattered trees in this heavily urbanized area.

No native migratory birds were observed nesting during ground-level surveys, but the potential exists for migratory birds to nest in trees or shrubs or on the SR 92 overpass within the BSA. Project implementation could result in the destruction of active nests if present in vegetation when clearing or tree removal occurs. The project could also result in the abandonment of eggs or young if project activities occur near active nests, disturbing adult birds to the point of nest abandonment. Because of the relatively low number of pairs that could be affected by the project, the regional abundance of any given bird species that would nest in the BSA, and project compliance with the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code Sections 3503 and 3503.5, including the presence of biological monitor onsite during construction, the project will not have a substantial effect on regional populations of any species.

Avoidance, Minimization, and/or Mitigation Measures

No sensitive habitat or listed species occur within the Caltrans ROW and no impact to areas other than the existing Caltrans ROW is anticipated, therefore no mitigation will be required. There will be no impacts to sensitive biological resources, no state or federal permits will be required. Adherence to Caltrans BMPs will be sufficient to protect the limited biological resources that occur in the vicinity of the project site. The primary biological resources of concern with the potential to occur in the vicinity of the project site are migratory birds.

CDFW Code sections 3503 and 3503.5 mandate protection of birds' nests and the MBTA of 1918 as amended (16 U.S.C. §§ 703–711) protects migratory birds from unlawful activities such as "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any . . .bird, or any part, nest or egg.". Any work within the project limits during the nesting season will require protection for migratory nesting birds.

If construction occurs during the anticipated nesting season, i.e., between February 15 and September 1, a qualified Caltrans-supplied biologist(s) will install bird exclusion materials and conduct nesting bird surveys to comply with the CDFW Code and MBTA. The biologist(s) will receive a two-week notice prior to project implementation to schedule nesting bird surveys. The surveys will be conducted within 48 hours before any ground-disturbing activities occur, including vegetation removal, and will be valid for 3 days, after which new surveys will be conducted. This survey schedule will allow the biologist(s) to remove nests that are started

between surveys, well prior to the start of egg-laying. Ground-disturbing activities will not begin until the Caltrans biological monitor has given clearance.

CONSTRUCTION IMPACTS

Regulatory Setting

Caltrans shall follow the *Design Information Bulletin 85: Guidance for the Consideration of Material Disposal, Staging and Borrow Sites* and FHWA policies and guidelines when developing the construction implementation plan to minimize temporary impacts from the project.

Affected Environment

During project construction there may be temporary impacts in the following areas: construction phasing/schedule/work hours, noise, air quality (dust), access issues (pedestrian, cyclists, equestrians, etc.), utilities, detours, traffic delays, and emergency vehicle access and impacts associated with the staging and storage of equipment. These issues will be addressed during the Plans, Specification & Estimates (PS&E) phase of the project.

Environmental Consequences

A Traffic Management Plan (TMP) will be developed in detail during the design phase. A TMP typically includes information regarding project impacts and transportation management measures. Project impacts include lane closures and modified access and transit, pedestrian and bicycle impacts. Transportation management measures include the following components: public information, motorist information, incident management, construction strategies and demand management strategies. This Interchange is located in the heart of City of San Mateo. Caltrans shall coordinate with the City of San Mateo to develop a TMP to minimize delays and any inconveniences to the public and businesses nearby.

Noise

It is possible that the high levels of noise generated by construction equipment may annoy residents, but it will likely be short-lived at each location. Construction equipment should be required to conform to the provisions in Section 14-8.02 Noise Control, of the latest Standard Specifications. These requirements are meant to minimize the impact from short duration construction noise.

Avoidance, Minimization and/or Mitigation Measures

Noise

In addition to the aforementioned Standard Specifications, construction noise impacts can be minimized by implementing some or all of the following measures:

- Avoiding construction activities during the nighttime and on weekends.
- Constructing noise barriers as the first order of work.

- Using stockpiled dirt as earth berms where possible.
- Keeping noisy equipment and haul roads away from sensitive receptors.
- Keeping the community informed of upcoming especially noisy construction activities and establish a field office to handle noise complaints.

CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

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 (s, s, s, 2-tetrxafluoroethane), and HFC-152a (difluoroethane).

In the U.S., 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)[6].

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. [7]

[6] http://climatechange.transportation.org/ghg_mitigation/
[7] http://www.fhwa.dot.gov/environment/climate_change/mitigation/

Regulatory Setting

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 (EO) S-3-05 (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 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 2020.

Senate Bill 97 (SB 97) Chapter 185, 2007, Greenhouse Gas Emissions: This bill required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (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 California Air Resources Board (CARB) to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization (MPO) 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.

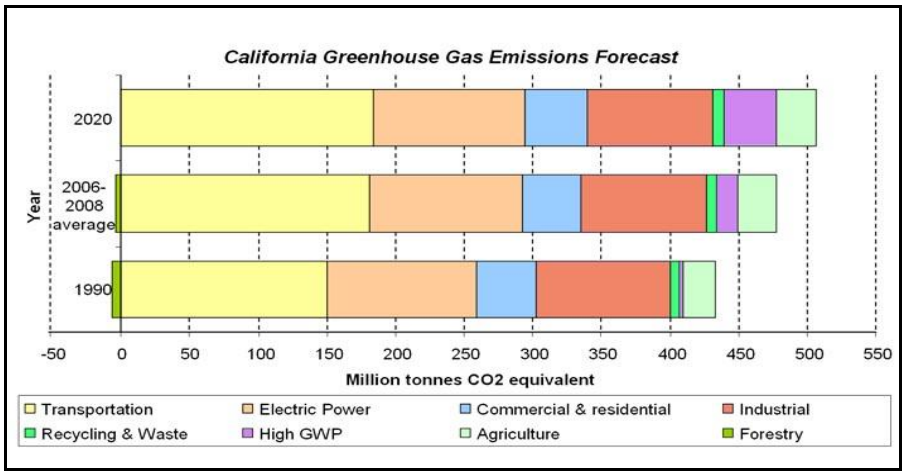
Project Analysis

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.[8] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (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.

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). 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.

[8] 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).

Figure 16. 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 that was published in December 2006.[9]

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 carbon dioxide (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 17 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.

[9] 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

Figure 17. Possible Effect of Traffic Operation Strategies in Reducing On-Road CO_2 Emission[10]

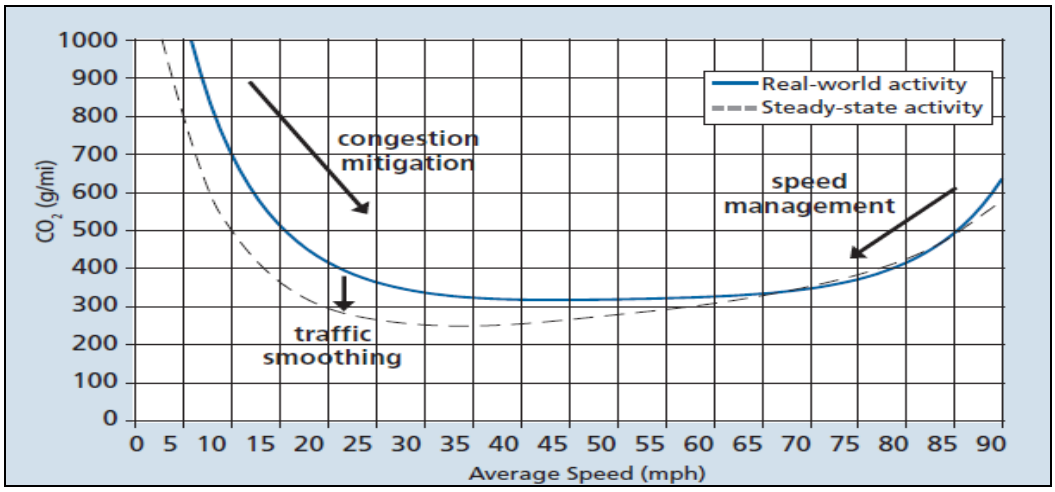


Table 28 shows that in anticipation of increased VMT in future years, implementation of the proposed Partial Cloverleaf alternative is expected to improve traffic operations at the SR 92/El Camino Real interchange ramp terminal intersections and reduce vehicle queue spillback to westbound SR 92 during the typical weekday AM and PM peak periods. According to the Fehr and Peers 2013 traffic study, the majority of the improvements are in the overall reduction in vehicle delay and improvement of the Level of Service on ramps servicing the project area as compared to no-build scenarios (Fehr and Peers, July 2013). The Partial Cloverleaf alternative would improve operations at the SR 92/El Camino Real interchange beginning in the opening year (2018) and the benefits from the Project would continue through the design year (2038).

A comparison between the existing and projected CO_2 emissions from the project area, under build and no-build conditions, is presented in Table 28 below. While VMT is projected to increase and LOS is expected to improve in build over no-build conditions, total CO_2 emissions are not expected to have significant changes between scenarios or years. In future years, the lower emission factors anticipated from great vehicle efficiencies and lower carbon fuel intensities, due to the Pavley Clean Car Standards and Low Carbon Fuel Standards, offset the emissions due to greater VMT. Emissions are expected to decrease slightly in 2018 and increase again in 2038 but below existing levels. Thus, the project is not expected to result in a significant increase in emissions compared to no-build conditions.

[10] **Traffic Congestion and Greenhouse Gases:** Matthew Barth and Kanok Boriboonsomsin (TR News 268 May-June 2010)<http://onlinepubs.trb.org/onlinepubs/trnews/trnews268.pdf>

Table 28. Projected CO_2 Emissions

		2012	2018		2038	
		Existing[a]	No-Build	Build	No-Build	Build
VMT per day[b]		70,992	77,644	77,644	93,070	93,070
Average Speed (mph)[c]	Peak AM	35	34	36	35	30
	Peak PM	29	26	28	27	25
	Non-Peak	53	52	52	50	50
Average grams CO2 per mile[d]		70,992	77,644	77,644	93,070	93,070
CO_2, tons/day		34.0	31.1	30.6	32.1	32.2

a. Existing VMT was calculated by expanding the peak hour data to get the four hour peak period VMT whereas the traffic operations model calculates the peak period VMT based on data from each hour of the peak period model.

b. VMT per day is the sum of the peak and non-peak VMT per day summed across 8 links impacted by the project: SR 92 eastbound west link, SR 92 eastbound east link, SR 92 westbound east link, SR 92 westbound west link, SR 82 northbound south link, SR 82 northbound north link, SR 82 southbound north link, and the SR 82 southbound south link. Peak VMT from the Fehr and Peers traffic study was not used. This is because the VMTs provided in the TOAR encompass roadways in a much larger area than the project area. The climate change study focused on comparing $CO_{2\ outputs}$ within the project limits and the VMTs are limited to vehicle movements on roadway segments within said project area.

c. Speed averaged over link volume and weighted by peak or non-peak scenarios.

d. The calculations used per mile emission factors from EMFAC 2011 based on average vehicle speed, year, location, aggregated vehicle types, season, and location. The EMFAC 2011 model reflects the emissions benefits of ARB's recent rulemakings including on-road diesel fleet rules, Pavley Clean Car Standards and the Low Carbon Fuel Standard. Average emission factors here are based off of the individual emission factors and weighted across the different VMT and average speeds by link, year, and peak period.

The project is included in the current Regional Transportation Plan (the Transportation 2035 plan[11], reference number 230424) and Transportation Improvement Program (TIP). The results of the project's CO_2 analysis is consistent with the Final EIR of the regional RTP, which also anticipated lower CO_2 emissions rates. Regarding the Transportation 2035 plan, which includes this project, the Final EIR states:

> As operational CO_2 emissions rates are projected to be reduced below existing levels through the horizon year of the proposed Project, and as the anticipated increase in VMT over the planning period is primarily due to regional growth and development outside the scope of Transportation 2035 Plan projects, the proposed Project's contribution to the significant cumulative impact of global climate change is not cumulatively considerable.

[11] http://www.mtc.ca.gov/planning/2035_plan/

Construction Emissions

Greenhouse gas emissions for transportation projects can be divided into those produced during construction and those produced during operations. 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 will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

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 longer intervals between maintenance and rehabilitation events. Measures to reduce construction emissions may result due to co-benefits from measures listed in the avoidance, minimization and/or mitigation measures of the Air Quality section of this chapter. These measures include maintenance of construction equipment and vehicles, limiting construction vehicle idling time, and scheduling and routing of construction traffic to reduce engine emissions.

CEQA Conclusion

While the project will result in an increase in GHG emissions during construction, it is anticipated that the project will not result in any increase in operational GHG emissions. It is Caltrans determination that in 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 impact and its contribution on the cumulative scale to climate change. Caltrans is firmly committed to implementing measures to help reduce GHG emissions. These measures are outlined in the following section.

Greenhouse Gas Reduction Strategies

Caltrans continues to be involved on the Governor's Climate Action Team as the ARB works to implement Executive Orders 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 then-Governor Arnold Schwarzenegger's Strategic Growth Plan for California. The Strategic Growth Plan 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 18: The Mobility Pyramid.

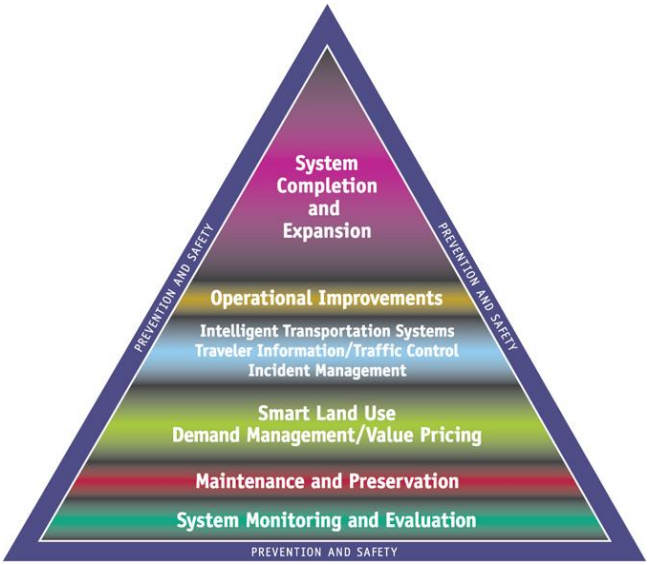


Figure 18. Mobility Pyramid

Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing 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 assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting ongoing 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 regional transportation plans under Senate Bill (SB) 375 (Steinberg 2008), SB 391(Liu 2009) requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill (AB) 32.

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce greenhouse gas (GHG) emissions. The CTP 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 CTP 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 CTP 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs.

Table 29 on the next page, summarizes Caltransal and statewide efforts that Caltrans is implementing to reduce GHG emissions. More detailed information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Table 29 Climate Change/CO_2 Reduction Strategies						
Strategy	**Program**	**Partnership**		**Method/Process**	Estimated CO_2 Savings Million Metric Tons (MMT)	
		Lead	**Agency**		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	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 (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	0.07	2.17
Mainstream Energy & GHG 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, CalEPA, ARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.045 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 25% fly ash cement mix > 50% fly ash/slag mix	1.2 0.36	4.2 3.6
Goods Movement	Office of Goods Movement	Cal EPA, ARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.18

Table 29. Climate Change/CO_2 Reduction Strategies

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

Caltrans Activities to Address Climate Change (April 2013)[12] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce greenhouse gas 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. Caltrans and the California Highway Patrol are working with regional agencies to implement Intelligent Transportation Systems (ITS) to help manage the efficiency of the existing highway system. ITS commonly consists of electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

2. In addition, City/County Association of Governments San Mateo provides ridesharing services and park-and-ride facilities to help manage the growth in demand for highway capacity.

3. Landscaping reduces surface warming and, through photosynthesis, decreases CO_2. The project proposes planting in the intersection slopes, drainage channels, and seeding in areas next to frontage roads as well as planting a variety of different-sized plant material and scattered skyline trees where appropriate but not to obstruct the view of the mountains. Caltrans has committed to planting at least 40 trees. These trees will help offset any potential CO_2 emissions increase.

4. The project would incorporate the use of energy-efficient lighting, such as LED traffic signals. LED bulbs cost $60 to $70 each, but last five to six years, compared to the one-year average lifespan of the incandescent bulbs previously used. The LED bulbs themselves consume 10 percent of the electricity of traditional lights, which will also help reduce the project's CO_2 emissions.[13]

5. According to Caltrans Standard Specifications, the contractor must comply with all local Air Pollution Control District's (APCD) rules, ordinances, and regulations for air quality restrictions.

[12] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml
[13] Knoxville Business Journal, "LED Lights Pay for Themselves," May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

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; increasing 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 to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the White House Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011[14], outlining the federal government's progress in expanding and 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 to 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 (Resources Agency) was directed to coordinate with local, regional, state and federal public and private entities to develop The California Climate Adaptation Strategy (Dec 2009)[15], which summarizes the best-known science on climate change impacts to 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.

[14] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation
[15] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

The strategy outline is in direct response to EO S-13-08 that specifically asked the 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[16] to recommend how California should plan for future sea level rise. The report was released in June 2012 and included:

- 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.
- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts to 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 (CO-CAT) as well as Caltrans as a method to initiate action and discussion of potential risks to the states infrastructure due to projected sea level rise. Subsequently, CO-CAT 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.

The San Francisco Bay includes approximately 1000 miles of shoreline and thus is vulnerable to a range of natural hazards, including storms, extreme high tides, and projected rising sea levels. According to several sea level rise projection maps*, sea level rise (SLR) in the next century may potentially inundate the land uses and roadway infrastructure within the Bay. The potential for projected SLR within the

[16] *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.

proposed Project vicinity in the 2050 and 2100 years may exacerbate existing natural hazards within the project area that will need to be addressed on a regional level through collaboration between Caltrans and local agencies with land use authority. The existing interchange is outside of the area shown on the attached map of direct impacts due to existing flooding potential or projected sea level rise inundation. This project proposes to modify an existing structure with an approximated design life of approximately 20 years. A comprehensive planning and adaptation plan approach will be required through collaboration efforts between Caltrans and the local land use planning agencies to ensure future plans for infrastructure and the surrounding land uses consider sea level rise.

Caltrans will continue to collaborate with the County of San Mateo, the Metropolitan Transportation Commission, and other regional planning agencies to develop a SLR adaptation plan that addresses adaptation plans and strategies to address future sea level rise. Caltrans reviewed the several available maps of the area surrounding the project, including maps from the Pacific Institute[17], San Francisco Bay Conservation and Development Commission (BCDC)[18], and the USGS[19]. The BCDC sea level rise map, showing the sea level rise at 16 and 55 inches in the project vicinity, is included in Appendix X.

Executive Order 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.

[17] http://www.pacinst.org/reports/sea_level_rise/hazmaps/San_Mateo.pdf
[18] http://www.bcdc.ca.gov/planning/climate_change/maps/16_55/cbay_west.pdf
[19] http://cascade.wr.usgs.gov/data/Task2b-SFBay/index.shtm

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CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) EVALUATION

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project. Please see the checklist beginning on page 9 for additional information.

☒	Aesthetics	☐	Agriculture and Forestry	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☒	Geology/Soils
☐	Greenhouse Gas Emissions	☐	Hazards and Hazardous Materials	☐	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	☒	Noise
☐	Population/Housing	☐	Public Services	☐	Recreation
☒	Transportation/Traffic	☐	Utilities/Service Systems	☐	Mandatory Findings of Significance

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an

	earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required

Signature:	Date:
Printed Name:	For:

Appendices

Appendix A. CEQA Checklist

04-SM-SR 92/82	SR 92-11.2/11.2 SR 82-10.3/10.7	23552
Dist.-Co.-Rte.	P.M/P.M.	E.A.

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects indicate no impacts. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
I. AESTHETICS: Would the project:				
a) Have a substantial adverse effect on a scenic vista	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact

II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
	☐	☐	☐	☒
III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
IV. BIOLOGICAL RESOURCES: Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

V. CULTURAL RESOURCES: Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

VI. GEOLOGY AND SOILS: Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

VII. GREENHOUSE GAS EMISSIONS:
Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	An assessment of the greenhouse gas emissions and climate change is included in the body of environmental document. While Caltrans has included this good faith effort in order to provide 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.			

VIII. HAZARDS AND HAZARDOUS MATERIALS: Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

IX. HYDROLOGY AND WATER QUALITY:
Would the project:

a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow	☐	☐	☐	☒
	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
X. LAND USE AND PLANNING: Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b)Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
XI. MINERAL RESOURCES: Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

XII. NOISE: Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
XIII. POPULATION AND HOUSING: Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIV. PUBLIC SERVICES:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	☐	☐	☐	☒
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒

Other public facilities?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
XV. RECREATION:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
XVI. TRANSPORTATION/TRAFFIC: Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

XVII. UTILITIES AND SERVICE SYSTEMS: Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Appendix B – California Natural Diversity Database (CNDDB)

CNDDB species occurrences within the nine USGS 7.5-minute topographic quadrangles around the project site (San Francisco South, Hunters Point, San Leandro, Montara Mountain, San Mateo, Redwood Point, Hal Moon Bay, Woodside and Palo Alto).

Species Name	Common Name	Status
Animals		
Ambystoma californiense	California tiger salamander	FT, ST
Antrozous pallidus	pallid bat	SSC
Ardea herodias	great blue heron	CDF_S
Asio flammeus	short-eared owl	SSC
Athene cunicularia	burrowing owl	SSC
Callophrys mossii bayensis	San Bruno elfin butterfly	FE
Charadrius alexandrinus nivosus	western snowy plover	FT, SSC
Circus cyaneus	northern harrier	SSC
Elanus leucurus	white-tailed kite	CFP
Emys marmorata	western pond turtle	SSC
Eucyclogobius newberryi	tidewater goby	FE, SSC
Euphydryas editha bayensis	Bay checkerspot butterfly	FT
Falco pregrinus anatum	American peregrine falcon	SFP
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	SSC
Laterallus jamaicensis coturniculus	California black rail	ST, SFP
Melospiza melodia pusillula	Alameda song sparrow	SSC
Mylopharodon conocephalus	hardhead	SSC
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	SSC
Nyctinomops macrotis	big free-tailed bat	SSC
Oncorhynchus mykiss irideus	steelhead, central California coast distinct population segment	FT
Plebejus icariodes missionensis	Mission blue butterfly	FE
Rallus longirostris obsoletus	California clapper rail	FE, SE
Rana draytonii	California red-legged frog	FT, SSC
Reithrodontomys raviventris	salt-marsh harvest mouse	FE, SE, SFP
Riparia riparia	bank swallow	ST
Rynchops niger	black skimmer	SSC
Sorex vagrans halicoetes	salt-marsh wandering shrew	SSC
Speyeria callippe callippe	Callippe silverspot butterfly	FE
Speyeria zerene myrtleae	Myrtle's silverspot	FE

Species Name	Common Name	Status
Animals (cont.)		
Sternula antillarum browni	California least tern	FE, SE
Scapanus latimanus parvus	Alameda Island mole	SSC
Taxidea taxus	American badger	SSC
Thamnophis sirtalis tetrataenia	San Francisco garter snake	FE, SE, SFP
Plants		
Acanthomintha duttonii	San Mateo thornmint	FE, SE, CNPS
Allium peninsulare var. *franciscanum*	Franciscan onion	CNPS
Amsinckia lunaris	Bent-flowered fiddleneck	CNPS
Arctostaphylos andersonii	Anderson's manzanita	CNPS
Arctostaphylos franciscana	Franciscan manzanita	CNPS
Arctostaphylos imbricata	San Bruno Mountain manzanita	SE, CNPS
Arctostaphylos montana ssp. ravenii	Presidio manzanita	FE, SE, CNPS
Arctostaphylos montaraensis	Montara manzanita	CNPS
Arctostaphylos pacifica	Pacific manzanita	SE, CNPS
Arctostaphylos regismontana	Kings Mountain manzanita	CNPS
Astragalus pycnostacyus var. *pycnostachyus*	Coastal marsh milk-vetch	CNPS
Astragalus tener var. *tener*	alkali milk-vetch	CNPS
Carex comosa	Bristly sedge	CNPS
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	CNPS
Centromadia parryi ssp. parryi	Pappose tarplant	CNPS
Chloropyron maritimum ssp. *palustre*	Point Reyes bird's-beak	CNPS
Chorizanthe cuspidate var. *cuspidata*	San Francisco Bay spineflower	CNPS
Chorizanthe robusta var. *robusta*	Robust spineflower	FE, CNPS
Cirsium andrewsii	Franciscan thistle	CNPS
Cirsium fontinale var. *fontinale*	fountain thistle	FE, SE, CNPS
Cirsium occidentale var. compactum	compact cobwebby thistle	CNPS
Cirsium praeteriens	lost thistle	CNPS
Collinsia multicolor	San Francisco collinsia	CNPS
Dirca occidentalis	western leatherwood	CNPS
Eriophyllum latilobum	San Mateo woolly sunflower	FE, SE, CNPS
Eryngium aristulatum var. *hooveri*	Hoover's button-celery	CNPS

Species Name	Common Name	Status
Plants (cont.)		
Fritillaria biflora var. *ineziana*	Hillsborough chocolate lily	CNPS
Fritillaria liliacea	fragrant fritillary	CNPS
Gilia capitata ssp. chmissonis	blue coast gilia	CNPS
Grindella hirsutula var. maritima	San Francisco gumplant	CNPS
Helianthella castanea	Diablo helianthella	CNPS
Hemizonia congesta ssp. congesta	white seaside tarplant	CNPS
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax	CNPS
Hesperolinon congestum	Marin western flax	FT, ST, CNPS
Horkelia cuneata var. sericea	Kellog's horkelia	CNPS
Horkelia marinensis	Point Reyes horkelia	CNPS
Lasthenia conjugens	Contra Costa goldfields	FE, CNPS
Layia camosa	beach layia	FE, SE, CNPS
Leptosiphon croceus	Coast yellow leptosiphon	CNPS
Leptosiphon rosaceus	Rose leptosiphon	CNPS
Lessingia arachnoidea	Crystal Springs lessingia	CNPS
Lessingia germanorum	San Francisco lessingia	FE, SE, CNPS
Malacothamnus aboriginum	Indian Valley bush-mallow	CNPS
Malacothamnus arcuatus	arcuate bush-mallow	CNPS
Malacothamnus davidsonii	Davidson's bush-mallow	CNPS
Malacothamnus hallii	Hall's bush-mallow	CNPS
Monolopia gracilens	woodland woollythreads	CNPS
Pentachaeta bellidiflora	white-rayed pentachaeta	FE, SE, CNPS
Plagiobothrys chorisianus var. *chorisianus*	Choris' popcornflower	CNPS
Polemonium cameum	Oregon polemonium	CNPS
Polygonum marinense	Marin knotweed	CNPS
Potentilla hickmanii	Hickman's cinquefoil	FE, SE, CNPS
Sanicula martima	adobe sanicle	SR, CNPS
Silene verecunda ssp. *verecunda*	San Francisco campion	CNPS
Streptanthus albidus ssp. peramoenus	Most beautiful jewel-flower	CNPS
Stuckenia filiformis	slender-leaved pondweed	CNPS

Species Name	Common Name	Status
Plants (cont.)		
Suaeda californica	California seablite	FE, CNPS
Trifolium amoenum	showy rancheria clover	FE, CNPS
Trifolium hydrophilum	saline clover	CNPS
Triphysaria floribunda	San Francisco owl's-clover	CNPS
Triquetrella californica	Coastal triquetrella	CNPS
Habitats		
Common Name		**Status**
Bay checkerspot butterfly (*Euphydryas editha bayensis*) – Critical Habitat		Designated
Northern Coastal Salt Marsh		CNPS
Northern Maritime Chaparral		CNPS
Serpentine Bunchgrass		CNPS
Valley Needlegrass Grassland		CNPS
Valley Oak Woodland		CNPS

CDF_S = California Division of Forestry Sensitive

CFP = California state fully protected

CNPS = California Native Plant Society listed rare

Designated = Critical Habitat Designation

FE = federally endangered

FSC = federal species of concern

FT = federally threatened

NL = not listed

SCE = California state candidate endangered

SE = California state endangered

SSC = California state species of special concern

ST = California state threatened

SR = California state rare

SWL = state watch list

Appendix C – Title VI Policy Statement

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

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NON-DISCRIMINATION
POLICY STATEMENT

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Additionally, if you need this information in an alternate format, such as in Braille or in a language other than English, please contact the California Department of Transportation, Office of Business and Economic Opportunity, 1823 14th Street, MS-79, Sacramento, CA 95811. Telephone: (916) 324-0449, TTY: 711, or via Fax: (916) 324-1949.

MALCOLM DOUGHERTY
Director

"Caltrans improves mobility across California"

Appendix D: List of Acronyms

ARB	Air Resource Board
BEES	Basic Engineering Estimating System
BMP	Best Management Practice
BNHM	Berkeley Natural History Museum
CalEPA	California Environmental Policy Act
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CO	Carbon Monoxide
CSMP	Construction Site Monitoring Program
dBA	A-weighted decibels Decibels
DSA	Disturbed Soil Area
EA	Environmental Assessment
ESAs	Environmentally Sensitive Areas
FCAA	Federal Clean Air Act
FHWA	Federal Highway Administration
FTA	Federal Transportation Administration
GHG	Green House Gas
GIS	Geographic Information System
ITS	Intelligent Transportation System
LOS	Level of Service
MPO	Metropolitan Planning Organization
MSL	Mean Sea Level
MTC	Metropolitan Transportation Commission
NAAQA	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
OSHA	Occupational Safety & Health Act
PS&E	Plans, Specifications and Estimates
R/W	Right of Way
RCRA	Resource Conservation and Recovery Act of 1976
REAP	Rain Event Action Plan
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SDC	Seismic Design Criteria
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TOAR	Transportation Operations Analysis Report
TSCA	Toxic Substances Control Act
UCMP	UC Paleontology Museum Database
USDOT	United States Department of Transportation
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds

List of Technical Studies

1. District Preliminary Geotechnical Report for 92/82 Interchange, December 2012.
2. Natural Environmental Study for State Routes 92/82 Interchange Improvements, July 2013.
3. Paleontological Identification Report for the State Routes 92/82 Interchange Improvement Project, December 2012.
4. Technical Information for Location Hydraulic Study and Floodplain Evaluation Summary
5. Traffic Operations Analysis Report for the State Route 92/82 Interchange
6. Visual Impact Assessment for SM- 92/82 Interchange, July 2013.