Chapter 2 – Affected Environment, Environmental Consequences, and Avoidance, Minimization, and Mitigation Measures

As part of the scoping and environmental analysis conducted for the 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.

LAND USE

Construction of the project would occur predominately within the existing freeway right-of-way (ROW) for I-580. As such, no residential, commercial, or other land uses would be directly affected (displaced) by the project. Because the project involves construction of an HOV lane within the existing median of I-580, no indirect land use impacts are anticipated to occur from the project.

FARMLAND/TIMBERLANDS

In the few areas where additional ROW would be required to accommodate the project, the land is not used for, designated as, or zoned as agricultural. Therefore, no farmland would be affected.

COMMUNITY IMPACTS AND RELOCATIONS

The project would widen an existing major transit corridor and provide improved traffic conditions for the area, but would not create any new physical barrier that would change existing access. The project would require the acquisition of land from portions of 10 parcels located adjacent to the project area. The land to be acquired is currently vacant and immediately adjacent to the existing freeway. As a result, there would be no effect on any neighborhoods, public facilities, businesses or non-profit organizations. All project area residents would equally share any project benefits of new HOV capacity and reduced traffic congestion.

No minority or low-income populations have been identified that would be adversely affected by the proposed project. Therefore, this project is not subject to the provisions of E.O. 12898.

EMERGENCY SERVICES

The City of Dublin, City of Livermore, and City of Pleasanton Police Departments, the Alameda County Sheriff's Department, and the California Highway Patrol (CHP) provide police protection and traffic enforcement in the project area. The Alameda County and Livermore-Pleasanton Fire Departments provide fire protection services to the project area.

Implementation of the project is anticipated to reduce congestion within the project area, improving safety for motorists and maintenance workers, and thereby decreasing the amount of accidents these service providers would have to respond to. Moreover, in the instances where police and fire personnel would need to use the freeway as a response route, the reduction in congestion would help rescue crews reach their destinations faster. Construction of the project may induce a

temporary increase in delays and congestion within the project area; however, these impacts are considered temporary, and are not expected to be significant adverse effects.

2.1 Human Environment

2.1.1 Consistency with State, Regional and Local Plans

AFFECTED ENVIRONMENT

Planning goals and policies of the cities and county affected by the I-580 Westbound HOV Lanes project are described below.

Alameda County General Plan - East County Area Plan

The Alameda County General Plan includes planning goals, objectives, and policies for the 14 cities and unincorporated subareas within the County. As the cities within the County have the primary authority and planning responsibility within their jurisdiction, policies related to developable land areas and development trends relevant to the project are described in the general plans for the cities of Dublin, Pleasanton, and Livermore.

The *East County Area Plan*, adopted May 1994, provides policies regarding the future development and resource conservation within East County. Seven major planning goals are identified to "create and maintain a balanced, multi-modal transportation system that provides for the efficient and safe movement of people, goods, and services." The *East County Area Plan* includes several policies that are applicable to the project, including:

- The County shall allow development and expansion of transportation facilities (e.g., streets and highways, public transit, bicycle and pedestrian paths, airports, etc.) in appropriate locations inside and outside the Urban Growth Boundary consistent with the policies and Land Use Diagram of the *East County Area Plan*
- The County shall assign priority in funding decisions to arterial and transit improvements that would improve local circulation, and to improvements that would facilitate movement of commercial goods; improvements that would expand the capacity of the Altamont Pass and Vasco Road gateways leading into the planning area from San Joaquin and Contra Costa Counties would be inconsistent with the policies of this plan; this policy shall not preclude the County from supporting or approving any rail projects or improvements required for roadway safety
- The County shall cooperate with cities and regional agencies to design transportation facilities and programs to accommodate *East County Area Plan* land uses
- Other relevant transportation goals within the *East County Area Plan* include:
- Reduce East County traffic congestion
- Complete County-planned street and highway improvements that are attractively designed to integrate pedestrian and vehicle use

- Preserve and enhance views within scenic corridors

Consistency with Alameda County General Plan Policies

The project would involve the construction of an additional HOV lane on westbound I-580, resulting in an expansion and improvement to a transportation facility to improve local circulation and reduce congestion. The project's eastern limit is the Greenville interchange and thus would not expand the capacity of the Altamont Pass. The project planning has involved the cities of Livermore, Dublin, and Pleasanton, the Alameda County Congestion Management Agency (ACCMA), and the California Department of Transportation (Caltrans). As discussed in section 2.1.6, Visual/Aesthetics, the project would not impact designated scenic corridors within the project area. Thus, the I-580 Westbound HOV Lane Project is consistent with the planning goals and policies in the *East County Area Plan*.

City of Dublin General Plan

The Circulation and Scenic Highways Element of the *City of Dublin General Plan*, adopted February 1985, includes goals and policies relating to the project. Transportation planning goals, objectives, and policies include:

Designing non residential streets to (1) accommodate forecasted average daily traffic demand on segments between intersections; and (2) minimize congestion conditions during peak hours of operation at intersections and serve a balance of vehicles, bicycles, pedestrians, and transit.

Specific projects include:

- Improving freeway access
- Improving I-580 interchanges to serve planned growth
- Providing an integrated multi-modal circulation system that provides efficient vehicular circulation, while encouraging pedestrian, bicycle, transit, and other nonautomotive transportation alternatives
- Cooperating with Caltrans and other affected jurisdictions to pursue the widening of I-580 to 10 total lanes (eight through lanes and two auxiliary lanes) between Tassajara Road and Airway Boulevard
- Supporting the development of a community that facilitates and encourages the use of local and regional transit systems

Consistency with City of Dublin General Plan Policies

While the project would not involve improvements to existing interchanges or access to and from the freeway, it would improve vehicular circulation on I-580 and promote the use of transit by providing an HOV lane that buses would use to improve travel time through the I-580 corridor. As a result, the project is consistent with the policies and objectives of the *City of Dublin General Plan*.

City of Pleasanton General Plan

The land use goals, as identified in the *City of Pleasanton General Plan*, adopted August 1996, seeks to achieve and maintain a complete, well-rounded community of desirable neighborhoods, a strong employment base, and a variety of community facilities. The Circulation Element of the general plan includes goals and policies relating to the project, namely:

- Develop a safe, convenient, and uncongested circulation system
- Develop and manage a street and highway system that accommodates future growth while maintaining acceptable levels of service
- Provide a multi-modal transportation system that encourages efficient use of existing and future facilities

Consistency with City of Pleasanton General Plan Policies

The provision for an HOV lane on westbound I-580 would reduce congestion on I-580 and support the implementation of multi-modal transportation systems because buses would be able to utilize the HOV lane to reduce travel time through the I-580 corridor. Therefore, the project would be consistent with the stated goals and policies of the *City of Pleasanton General Plan.*

City of Livermore General Plan

The land use goals, as identified in the *City of Livermore General Plan*, adopted February 2004, are intended to protect the unique qualities of Livermore. The Circulation Element of the general plan includes goals and policies relating to the project, specifically:

- Supporting state and regional efforts to improve I-580 within the Tri-Valley Area with HOV lanes, auxiliary lanes, and ramp metering
- Identifying and developing a circulation system consistent with the Land Use Element
- Recognizing that increasing capacity on major streets leading to I-580 could increase regional cut-through traffic and should maintain a balance between serving local and regional needs
- Encouraging vehicle trip reduction by encouraging ridesharing (carpools and van pools) and coordinating with Caltrans and transit providers to identify and implement park-and-ride sites with convenient access to public transit
- Maintaining adequate levels of service for all areas of the City

Consistency with City of Livermore General Plan Policies

The project would not interfere with the goal of the *City of Livermore General Plan* to protect the unique qualities of Livermore. The construction of the westbound HOV lane on I-580, in coordination with Caltrans, would improve I-580 within the Tri-Valley Area as specified in the City's general plan. The westbound HOV lane also would encourage vehicle trip reduction and transit

usage by reducing travel times through the I-580 corridor for transit and rideshare users. The project is therefore consistent with the *City of Livermore General Plan*.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Because the I-580 Westbound HOV Lanes project is consistent with local planning goals and policies to improve traffic circulation along I-580 no minimization, or mitigation measures are needed.

2.1.2 Parks and Recreation

AFFECTED ENVIRONMENT

There are approximately 18 parks and three golf courses/clubs within the project vicinity. The majority of the parks are operated by the City of Livermore. Two of the parks are operated by the City of Pleasanton, four are operated by the East Bay Regional Park District (EBRPD), and one park is operated by the City of Dublin. The golf courses/clubs are privately operated and would not be affected by the project.

The project work is located almost entirely within the existing I-580 ROW, and no direct effects to parks are anticipated with development of the project. Potential noise impacts of the project area are discussed in **Section 2.2.7** and conclude that the project would not result in a noise impact at any of the parks in the project vicinity**.**

Based on a review of the EBRPD maps and city bikeway maps, there are two trails that terminate near the project; the Iron Horse Regional Trail and Alamo Canal Trail. The Iron Horse Regional Trail is located north of I-580 and runs from the cities of Concord and Walnut Creek to Dublin. The trail splits just south of Amador Valley Boulevard. The end of the western branch terminates just north of the I-580/I-680 interchange near the City of Dublin Civic Center and Library, and the eastern branch runs southeast, and terminates approximately 550 feet north of I-580. The Alamo Canal Trail is a paved multi-use trail located south of I-580. The trail runs along the east side of Alamo Canal and I-680. The northern terminus of the trail is located just south of the I-580/I-680 interchange.

Currently neither the Iron Horse Regional Trail nor the Alamo Canal Trail cross I-580; however, there are plans to create a trail connection (underpass) between these two trails through the I-580/I-680 interchange. A feasibility study for the connection project has been completed. The cities of Pleasanton and Dublin, and EBRPD will soon begin the design and environmental phases of the project.

ENVIRONMENTAL CONSEQUENCES

The project would be constructed predominately within the existing freeway right-of-way for I-580 and would not directly impact any of the existing parks and trails within the project vicinity would occur.

Temporary Construction Impacts

During construction, the project would temporarily affect the sidewalks that connect the Iron Horse Regional Trail to the north side of the Dublin/Pleasanton BART Station. At present, the trail terminates at the station sidewalks. Construction work would include pavement and concrete sidewalk demolition, bridge demolition, bridge abutment wall demolition, excavation, utility relocations, lighting modifications, signal installation, formwork, falsework, rebar and concrete installation for retaining walls and bridge construction, paving, and concrete curbs and sidewalks. During construction, access between the trail and the station would be maintained at all times. Staging and scaffolding may be necessary to protect pedestrians and bicyclists. Some construction work may also be performed during non-revenue BART hours to avoid impacts to users of the station area.

As indicated above, the project would not result in the use of any park nor would construction work impact the Iron Horse Regional Trail. As a result, the project would not impact a park facility requiring protection under Section 4(f).

2.1.3 Growth

REGULATORY SETTING

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (NEPA), require evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

This evaluation of growth effects examines the relationship of the project to economic and population growth in the project vicinity. Also assessed is the project's potential to open previously inaccessible areas, facilitate or accelerate growth beyond planned or projected developments, or induce growth from elsewhere in the region.

AFFECTED ENVIRONMENT

The Metropolitan Transportation Commission (MTC) anticipates an increase in congestion and delay on the I-580 corridor due to regional growth and planned projects in the project vicinity. It is anticipated that the number of commuters to and from the Bay Area will nearly double over the next 20 years, with the largest increases coming from the Central Valley via San Joaquin, Stanislaus, and Merced counties. As discussed in **Section 2.1.5**, Traffic and Transportation, average travel time on the westbound I-580 corridor is anticipated to be greatly increased by the year 2035.

According to the Association of Bay Area Governments (ABAG), the cities within the project area, such as Livermore, Dublin, and Pleasanton, are projected to have increasing growth rates in regards to population, housing, and employment. Estimated population and housing growth within the cities of Livermore, Dublin, and Pleasanton are expected to range from 35 to 85 percent between 2005 and 2030, with the highest growth rate projected for the City of Dublin. Employment within this region is anticipated to increase by 35 to 119 percent during the same period. ABAG also anticipates an 18 percent population and housing increase, and a 35 percent employment increase in Alameda County for the same 25 year period.[1]

Additionally, a growth inducement study prepared for the I-580 Eastbound HOV Lane Project, which will occur within the same project area, found that Central Valley residential communities, including Tracy, Stockton, Manteca, Ripon, Escalon, Oakdale, and Modesto, are planning for substantial growth, with population increases ranging from 51 percent to 233 percent between the years 2000 and 2030.[2] This anticipated regional growth is expected to result in a large increase in the number of commuters using the I-580.

ENVIRONMENTAL CONSEQUENCES

While highway improvements in general have the ability to enhance accessibility within local communities, the proposed I-580 westbound HOV lane would be constructed along the existing westbound I-580 corridor and almost entirely within the freeway's right-of-way and would not include the construction of new interchanges or modify existing interchanges. As a result, the project would not provide access to areas previously inaccessible or improve access in ways that would foster local development beyond that which is already planned.

Although the Build Alternative would involve the construction of an additional lane on westbound I-580, project implementation is not anticipated to induce unplanned growth within the area. The HOV lane would serve to reduce congestion on the westbound I-580 corridor, as it would provide an increased incentive to carpool. As previously discussed, westbound I-580 is currently heavily congested during the peak hours and is forecasted to worsen independent of the construction of an eastbound or westbound HOV lane. Even with the proposed HOV lane, motorists on westbound I-580 would continue to encounter substantial amounts of congestion and delay. While the westbound HOV lane would alleviate some of this congestion, the HOV lane would not improve accessibility between the Central Valley and the Bay Area because it would not increase capacity through the Altamont Pass area of I-580.

Construction of the HOV lane would not result in the conversion of substantial amounts of land adjacent to the I-580 corridor, as the westbound HOV lane would be constructed almost entirely within the existing right-of-way for I-580. No residential or commercial structures would be constructed as part of the project and no such structures would be displaced by project construction. Thus, no adverse direct growth effects would result through project implementation.

[1] ABAG Projections, 2007.
[2] Growth Inducement Analysis for I-580 Eastbound High-Occupancy Vehicle Lane Project, Parsons, 2006.

Temporary Construction Impacts

Construction would result in a short-term increase in construction-related job opportunities in the Livermore, Dublin, and Pleasanton areas. However, the opportunities provided by construction of the westbound HOV lane would not likely result in the permanent relocation of construction workers to the project area. In addition to the temporary nature of the construction jobs, the increase of construction jobs as a result of the HOV lane would be small in nature in comparison to the overall employment growth rates for the region. The project would not create new housing opportunities, as it involves the construction of an HOV lane on an existing freeway. Thus, no adverse indirect growth effects would occur.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

No avoidance, minimization, or mitigation measures would be required beyond the implementation of local and regional growth policies and regulations.

2.1.4 Utilities

AFFECTED ENVIRONMENT

Utility facilities in the project vicinity include:

- Overhead electric, television, and telephone wires;
- Underground electric, gas, sanitary sewer, water and reclaimed water lines; television, and fiber optic cables and
- Water lines, electric, telephone, and television cable on existing structures.

Pacific Gas & Electric (PG&E) is the primary provider of gas and electricity service in the project area. AT&T and Sprint provide the local telephone service, and Comcast provides cable service. AT&T and Comcast offer broadband Internet services over telephone and cable lines, respectively.

Water service is provided to cities in the project area as follows: to the City of Dublin by the Dublin San Ramon Services District (DSRSD); to the City of Pleasanton by the City of Pleasanton Water Division; and to the City of Livermore by the City of Livermore Water Resources Division and California Water Service (Zone 7). Zone 7 provides water to Livermore and Amador Valley residents as well. Storm water and sanitary sewer systems are maintained locally. The City of Livermore also provides reclaimed water service.

ENVIRONMENTAL CONSEQUENCES

The project would relocate a total of approximately 1,400 feet of DSRSD water line, 412 feet of DSRSD water utility line, and 613 feet of DSRSD sewer line. Where existing utility crossings occur at locations of proposed mainline widening (to the outside) due to the HOV and auxiliary land additions, utility casings may have to be extended.

Temporary Construction Impacts

Tempory utility conflicts may occur where retaining walls are proposed, depending on the location of the utility line in relation to the retaining wall footings.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION

Design, construction, and inspection of required utility work would be completed in accordance with Department statutes. Where feasible, relocations would be undertaken in advance of project construction. The Department and ACCMA would coordinate with the affected service provider in each instance to ensure that all utility work is performed in accordance with appropriate requirements and criteria.

Coordination with the utility providers would be initiated during the preliminary engineering phase of the project and would continue through final design and construction. Coordination efforts would include planning for utility relocations, identification of any other potential conflicts, and formulation of strategies for overcoming problems that may arise to ensure minimum disruption of utility service or operation during the utility work and project construction.

2.1.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

This traffic section discusses the project's impacts on motor vehicle traffic and circulation, both during construction (construction impacts) and after completion of the project. A traffic analysis was conducted to evaluate the existing conditions of the project area and to predict future conditions through the year 2035 (approximately 20 years from the projected completion of the project) that would occur under both the Build and No-Build Alternatives.

With the addition of the project roadway improvements (Build Alternative), freeway operations in the westbound direction would improve compared with the No-Build Alternative conditions.

REGULATORY SETTING

The Department 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 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.

The Department is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

AFFECTED ENVIRONMENT

The traffic analysis for the project describes driving conditions (congestion, delay, peak hours) and includes an evaluation of the existing conditions, as well as future year 2035 conditions for both the Build and No-Build Alternatives. Approximately 17 miles of freeway corridor are assessed in the traffic analysis, from west of the North Flynn Road interchange to west of the San Ramon Road interchange. Within the traffic study area, there are 12 freeway interchanges serving local traffic, and one freeway-to-freeway system interchange serving Interstate 680 (I-680). These interchanges include:

1. I-580/San Ramon Road/Foothill Road interchange;
2. I-580/I-680 Freeway to Freeway interchange;
3. I-580/Dougherty Road/Hopyard Road interchange;
4. I-580/Hacienda Drive interchange;
5. I-580/Tassajara Road/Santa Rita Road interchange;
6. I-580/Fallon Road/El Charro Road interchange;
7. I-580/Airway Boulevard interchange;
8. I-580/Portola Avenue interchange;
9. I-580/Livermore Avenue interchange;
10. I-580/First Street interchange;
11. I-580/Vasco Road interchange; and
12. I-580/Greenville Road/Northfront Road interchange.

The detailed lane configuration of the existing conditions is shown in **Figure 2.1.5-1**.

Pedestrian and Bicycle Facilities

While there are no bicycle or pedestrian facilities on the I-580 freeway corridor, there are two highway crossings (interchanges) that are equipped with bike lanes, both of which are located in Livermore. The Airway Boulevard overpass and the Greenville Road underpass are both currently equipped with bike lanes. According to the 2008 Livermore Bikeways map, there are future bike lane and/or bike trail extensions planned for the following I-580 crossings: Portola Avenue, Las Positas Road, First Street, Vasco Road, and the future Isabel Interchange.

Other bikeway facilities near the project include approximately 400 feet of bike lanes along the northern side of Constitution Drive between Collier Canyon Road and Independence Drive,

adjacent to the north of I-580. These bike lanes are an extension of a bike trail that runs along Collier Canyon Creek towards Las Positas College.

As discussed previously in **Section 2.1.2**, the Iron Horse Regional Trail and Alamo Canal terminate near the project area. These trails include paved bikeways.

EXISTING CONDITIONS

Existing peak hour mainline and ramp volumes were obtained from the Department. Original counts were collected between 2001 and 2002 for the project. Subsequent data were collected and compiled between 2005 and 2007. The newer traffic counts were applied where appropriate in the traffic forecasting models, based on the evaluation and review of Department staff.

The morning commute is predominantly in the westbound direction of the I-580 corridor. There are two distinct peaks of the westbound morning commute. The first peak begins as early as 5:00 a.m. when traffic from the Central Valley (e.g., Stockton, Tracy) passes through the corridor. Westbound mainline volumes coming from the Altamont Pass comprise the majority of the traffic stream, while local ramp volumes are relatively low during the early hours. A second peak condition occurs around 7:00 a.m., when much higher local volume is accessed from the on-ramps, while the mainline volume from the beginning of the project corridor decreases slightly. After assessment of overall volumes and traffic survey data, the second peak, from 7:00 a.m. to 8:00 a.m. was used as the AM peak hour, as it is found to be more critical through the entire length of the corridor, because it carries higher traffic volumes and experiences higher levels of congestion. The PM peak hour used for the analysis is 5:00 p.m. to 6:00 p.m.

Levels of Service

Freeway segments and intersections were evaluated in terms of "level of service" (LOS), which is a measure of driving conditions and vehicle delay. LOS grades range from A (best) to F (poorest). **Tables 2.1.5-1, 2.1.5-2, and 2.1.5-3** depict the conditions under which freeway segments and interchanges can be ranked in terms of LOS.

Table 2.1.5-1 Freeway Level of Service (LOS) Criteria

Level of Service (LOS)	Density (Passenger Cars/Mile/Lane)
A	<11.0
B	>11.0-18.0
C	>18.0-26.0
D	>26.0-35.0
E	>35.0-45.0
F	>45.0

Source: Dowling Associates, 2008.

Table 2.1.5-2 Level of Service (LOS) Criteria – Signalized Intersections

Level of Service (LOS)	Average Delay (Seconds/Vehicle)	Description
A	<10	Very low delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	>10 and ≤ 20	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	>20 and ≤ 35	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (to service all waiting vehicles) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	>35 and ≤ 55	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55 and ≤ 80	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	>80	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with over-saturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at nearly saturated conditions with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Source: Dowling Associates, 2008.

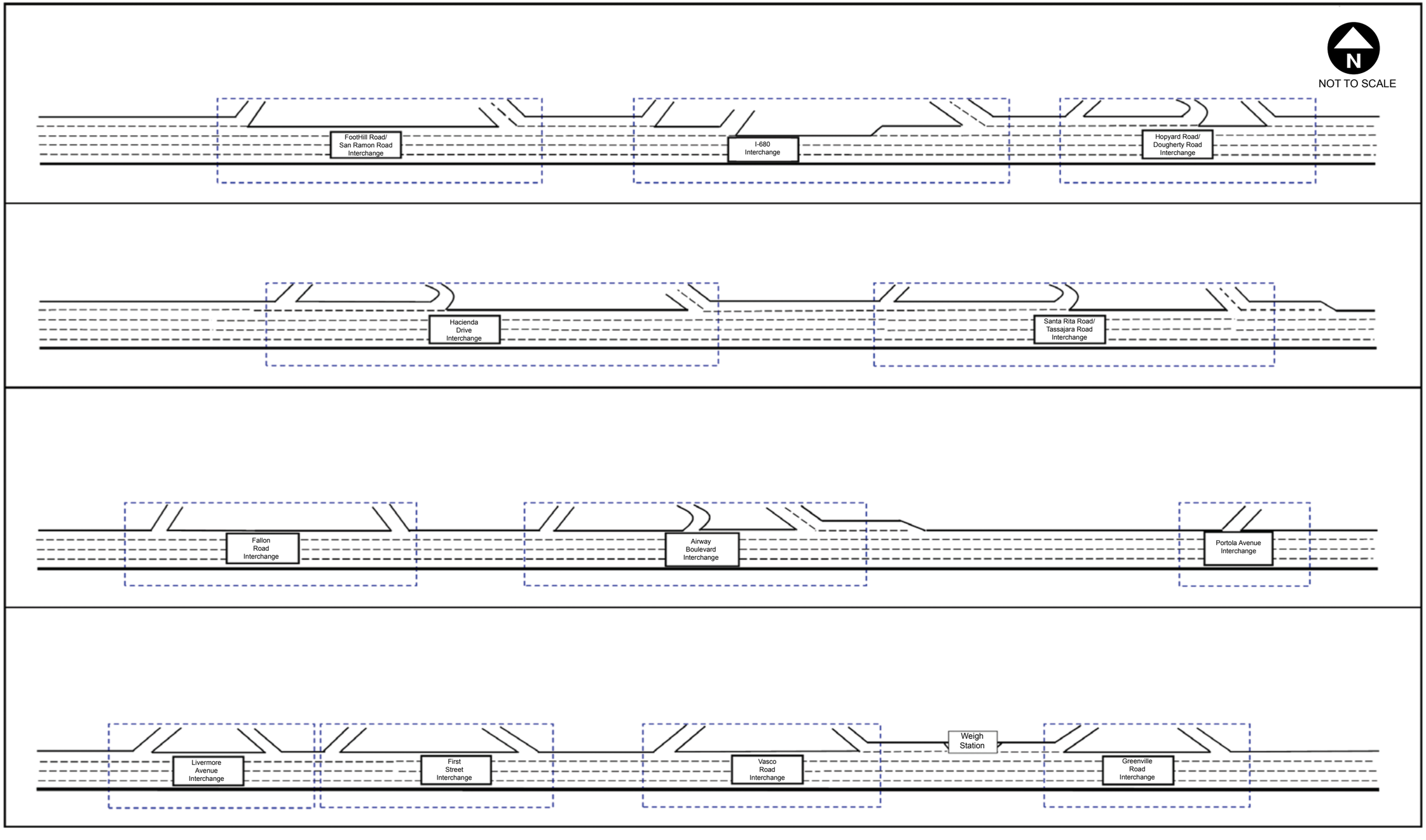
Table 2.1.5-3 Level of Service (LOS) Criteria – Stop-controlled (non-signalized) Intersections

Level of Service (LOS)	Average Control Delay (seconds/vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: Dowling Associates, 2008.

Ramp Termini Intersection Operations

Existing intersection operations were evaluated based on the most recent available weekday a.m. and p.m. peak hour traffic volumes with existing intersection lanes and controls. The intersection LOS and average control delays are summarized in **Table 2.1.5-4**. As shown in the table, all intersections currently operate at LOS C or better, except for the I-580 westbound off-ramp intersection at Northfront Road (the Greenville Road interchange), where it operates at LOS F during the AM peak hour, with an average delay of 2.5 minutes. This intersection is currently unsignalized with a stop sign control at the off-ramp approach of the intersection.



I-580 Westbound HOV Lane Project EA/IS

Existing Freeway Conditions

FIGURE 2.1.5-1

Source: Dowling Associates, Inc., 2008

Table 2.1.5-4 Intersection Levels of Service for Existing Conditions

Intersection	Traffic Control	Peak Hour	Existing Conditions	
			LOS[1]	Delay[2]
I-580 WB Ramps at Northfront Rd	Minor Stop-Controlled	AM	F	153.0
		PM	A	5.5
I-580 WB Ramps at Vasco Road	Future	AM	Unsignalized/Free-Flow	
		PM		
WB Ramps at First St	Signal	AM	C	23.9
		PM	C	21.6
WB Ramps at Livermore Ave	Signal	AM	C	23.7
		PM	C	29.8
WB Ramps at Isabel Ave	Future	AM	Future Intersection	
		PM		
WB Ramps at Airway Blvd	Signal	AM	B	16.5
		PM	B	11.3
WB Ramps at Fallon Rd	Minor Stop-Controlled	AM	A	5.3
		PM	A	3.5
WB Off-Ramp at Tassajara Rd	Signal	AM	B	16.4
		PM	B	13.8
WB Off-Ramp at Hacienda Dr	Signal	AM	B	16.5
		PM	A	9.0
WB Off-Ramp at Hopyard Rd	Signal	AM	B	15.8
		PM	B	14.2
WB Off-Ramp at San Ramon Rd	Signal	AM	B	10.5
		PM	A	8.7

Source: Dowling Associates, Inc., 2008.
[1] LOS = Level of Service
[2] Weighted average control delay in seconds

AM Peak Hours

During the morning peak hours, the westbound corridor operations typically break down and operate with unstable conditions from the Greenville Road interchange to the Fallon Road interchange, as the existing traffic demand exceeds freeway capacity. The average westbound travel time through the entire length of the corridor during the peak hour is approximately 43 minutes, of which approximately 26 minutes is the average delay time. A majority of the freeway sections operate at LOS F between the Greenville Road and Fallon Road interchanges, with speeds of 10 miles per hour (m.p.h.) to 40 m.p.h., except for the section between the Vasco Road on-ramp and the First Street on-ramp, where the freeway operates at LOS D. West of Fallon Road to the I-580/I680 interchange, the freeway operates mostly at or near capacity at LOS D or LOS E. Weaving activities between the Tassajara Road on-ramp and the Hacienda Drive off-ramp, as well as the Dougherty Road on-ramp and the I-680 off-ramp generate some turbulence to freeway operations, and slightly reduce overall travel speeds through these sections. West of the I-580/I-680 interchange, the freeway mainline currently operates at LOS C with near free-flow conditions.

PM Peak Hours

During the evening peak hours, westbound travel is the non-peak direction of travel. There are currently no operational deficiencies along the corridor. All freeway sections would operate at LOS D or better. With the freeway operating at near free-flow conditions, the average travel time through the entire length of the corridor is approximately 16 minutes.

Table 2.1.5-5 provides details of the performance measures of the freeway corridor for the existing conditions. Freeway segments highlighted in **bold text** are those with an LOS F rating.

ENVIRONMENTAL CONSEQUENCES

No-Build Alternative

The No-Build Alternative includes all currently planned and funded projects in the I-580 corridor through the year 2035, with the exception of the project. Under the No-Build Alternative, the freeway has the same number of lanes as the existing conditions, and has ramp metering at all on-ramps along the corridor from the I-580/I-680 interchange to and including the Greenville Road interchange, with the exception of the Portola Avenue westbound on-ramp. As the traffic analysis includes projections to 2035 (approximately 20 years from the projected completion of the project), this document takes other current and future roadway projects into consideration. **Table 2.1.5-6** depicts the key projects that have been assumed to be in place by 2005, 2015, and 2035. Key project network assumptions associated with non-related planned projects in the I-580 corridor are listed under the heading "Not Project Related." Project-related assumptions were not included when forecasting No-Build conditions. Other regional projects outside of the Tri-Valley Area not shown in the table include the Caldecott Tunnel widening in 2030.

Under the No-Build Alternative, the westbound direction would continue to be the peak direction of traffic on I-580 during the morning period. By year 2035, traffic operations are expected to worsen due to increased travel demand. **Table 2.1.5-7** shows the details of the freeway mainline operations under the future No-Build project conditions. A majority of the freeway corridor would operate at LOS E or LOS F from North Flynn Road through Fallon Road, with speeds of 30 m.p.h. or less. West of Fallon Road to Dougherty Road, the freeway would operate near capacity with LOS D or LOS E. The bottleneck effect between Dougherty Road and I-580/I-680 interchange would result in LOS F operations back to the vicinity of the Dougherty Road interchange. West of the I-580/I-680 interchange, the freeway would operate at LOS D or better with average speeds of 53 m.p.h. or higher. Average travel time for the entire study area (North Flynn Road to San Ramon Road) would be approximately 50 minutes, of which approximately 34 minutes would be due to delays from freeway congestion.

During the evening peak hours, a majority of the freeway corridor would operate at free-flow conditions (50 m.p.h. or higher) and LOS D or better. Minor congestion would occur through several locations of the corridor. Average travel time for the entire study area would be approximately 18 minutes, of which approximately 3 minutes would be due to delays from freeway congestion.

Table 2.1.5-5 Existing Freeway Traffic Operations

Freeway Segment	AM Peak Hour			PM Peak Hour		
	Speed (MPH)	Density[1]	LOS	Speed (MPH)	Density	LOS
N. Flynn Rd to Greenville Rd off-ramp	49	32.1	D	63	10.0	A
Greenville Rd off-ramp to Greenville Rd on-ramp	52	24.6	C	63	10.0	A
Greenville Rd on-ramp to Vasco Rd off-ramp	33	37.5	E	63	9.2	A
Vasco Rd off-ramp to Vasco Rd on-ramp	**20**	**55.1**	**F**	63	10.8	A
Vasco Rd on-ramp to First St off-ramp	40	32.3	D	58	18.5	C
First St off-ramp to First St on-ramp	44	27.7	D	62	16.1	B
First St on-ramp to Livermore Ave off-ramp	**9**	**147.9**	**F**	62	18.3	C
Livermore Ave off-ramp to Livermore Ave on-ramp	**13**	**92.9**	**F**	62	16.7	B
Livermore Ave on-ramp to Portola Ave on-ramp	**10**	**129.1**	**F**	61	17.2	B
Portola Ave on-ramp to Airway off-ramp	**18**	**91.6**	**F**	60	20.8	C
Airway off-ramp to Airway NB on-ramp	**14**	**100.3**	**F**	62	19.3	C
Airway NB on-ramp to Airway SB on-ramp	**22**	**66.3**	**F**	60	18.9	C
Airway SB on-ramp to Fallon Rd off-ramp	**20**	**89.9**	**F**	60	23.5	C
Fallon Rd off-ramp to Fallon Rd on-ramp	**30**	**63.8**	**F**	61	23.8	C
Fallon Rd on-ramp to Tassajara off-ramp	57	30.7	D	61	24.0	C
Tassajara off-ramp to Tassajara NB on-ramp	60	26.8	D	62	21.0	C
Tassajara NB on-ramp to Tassajara SB on-ramp	59	25.0	C	62	19.0	C
Tassajara SB on-ramp to Hacienda Dr off-ramp	45	35.4	E	61	19.4	C
Hacienda Dr off-ramp to Hacienda Dr NB on-ramp	57	32.9	D	61	23.1	C
Hacienda Dr NB on-ramp to Hacienda Dr SB on-ramp	59	26.3	D	60	22.0	C
Hacienda Dr SB on-ramp to Dougherty Rd off-ramp	59	27.0	D	60	24.0	C
Dougherty Rd off-ramp to Dougherty Rd NB on-ramp	57	31.6	D	60	27.0	D
Dougherty Rd NB on-ramp to Dougherty Rd SB on-ramp	49	30.6	D	58	26.6	D
Dougherty Rd SB on-ramp to I-680 off-ramp	41	38.3	E	51	31.5	D
I-680 off-ramp to I-680 NB on-ramp	58	20.0	C	59	21.5	C
I-680 NB on-ramp to I-680 SB on-ramp	57	22.9	C	56	27.7	D
I-680 SB on-ramp to San Ramon Rd off-ramp	55	23.5	C	52	29.9	D
San Ramon Rd Off-ramp to San Ramon Rd on-ramp	60	23.2	C	59	28.2	D
I-580 West of San Ramon Rd on-ramp	54	24.4	C	51	32.2	D

[1] In vehicles per lane per mile of freeway
Source: Dowling Associates, 2008.

Table 2.1.5-6 Key Project Network Assumptions

Assumption	2005	2015	2035
Project Related			
I-580 Westbound HOV Lane Project	No	Completed	Completed
I-580 Auxiliary Lanes – Vasco to First St	No	Completed	Completed
I-580 Auxiliary Lanes - First St to N. Livermore	No	No	Completed
I-580 Auxiliary Lanes - N. Livermore to Isabel	No	Completed	Completed
I-580 Auxiliary Lanes - Airway to El Charro	No	Completed	Completed
Not Project Related			
I-580 Eastbound HOV Lane Project	No	Completed	Completed
I-580 Auxiliary Lanes - Isabel Av to Airway	No	Completed	Completed
West Dublin Bart	No Change	Completed	Completed
Hopyard interchange	No Change	No Change	No Change
Fallon/El Charro interchange	No Change Completed	Completed	Completed
Airway interchange	Completed	Completed	Completed
Isabel interchange	No	Completed	Completed
Portola interchange	No Change	Remove	Remove
North Livermore interchange	No Change	No Change	No Change
First St interchange	No Change	No Change	Completed
Vasco interchange	No Change	No Change	Completed
Greenville interchange	No	No	Completed
San Ramon/Foothill interchange	Existing	Completed	Completed
West Las Positas interchange	No	No	No
I-580 Ramp Metering	Some	Completed	Completed
I-580 Auxiliary Lanes - El Charro to Tassajara	No	Completed	Completed
Dublin Blvd. Extension	No	Completed	Completed
North Canyons Extension	No	No	Completed
Isabel Ave Widening	Existing	Completed	Completed
Portola Ave Extension	No	Completed	Completed
Jack London Extension	No	Completed	Completed
El Charro Rd Extension	No	No	Completed
Busch Rd Extension	No	No	Completed
Stoneridge Dr Extension	No	No	Completed
First St Narrowing	No	Completed	Completed
Greenville Rd Widening	No	No	Completed

Source: Dowling Associates, 2008; Caltrans

Build Alternative

Figure 2.1.5-2 shows a schematic summarizing 2035 lane configurations under Build Alternative conditions. Refer to Chapter 1 for a detailed description of the improvements included in the Build Alternative.

Pedestrian and Bicycle Facilities

Existing bike lanes located on the Airway Boulevard overpass and the Greenville Road underpass would not be impacted by the project. The project would require work underneath the Airway Boulevard overpass but would not affect the roadway surface or the existing bike lines and the limits of construction activity would stop approximately 300 feet to the west of Greenville Road. The project would not prevent or create a barrier to the development any of the planned future bike lanes within the project vicinity. Therefore, project improvements would not be subject to the rules and regulations of the Americans with Disabilities Act.

PROJECT IMPACTS

With the addition of the project roadway improvements (Build Alternative), freeway operations in the westbound direction would improve compared to the No-Build Alternative conditions. The number of freeway bottleneck locations, as well as the queue lengths associated with congestion, would be reduced. **Table 2.1.5-8** shows the details of the freeway mainline operations with project.

The Build Alternative generally provides improvements to the mainline operations in two ways. It provides a facility to accommodate high occupancy vehicles and, by moving the carpool vehicles to a dedicated lane, the mixed-flow lanes would have more capacity to serve single-occupancy vehicles and trucks.

Under the Build Alternative the mixed-flow lanes would operate at LOS E or LOS F from First Street through the I-580/I-680 interchange, with speeds of 30 m.p.h. or less, while the HOV lane would operate at free-flow conditions of 46 m.p.h. or higher, and LOS D or better. **Table 2.1.5-9** shows the details of the HOV lane operations at peak flow conditions. Average travel time for the entire study area would be approximately 37 minutes for mixed-flow lanes, of which approximately 21 minutes would be due to delays from freeway congestion. Vehicles utilizing the HOV lane would take approximately 19 minutes to travel the corridor with approximately three minutes of delay. A slight reduction in travel speed is expected on the HOV lane between the Tassajara Road on-ramp and the Hacienda Drive off-ramp, as many HOV vehicles are required to merge into the mixed-flow lanes in order to exit at the Dougherty Road, I-680, and San Ramon Road interchanges.

During the evening peak hours, a majority of the freeway corridor would operate at free-flow conditions at 50 m.p.h. or higher, with LOS D or better service levels. Average travel time for the entire study area would be approximately 20 minutes for mixed-flow lanes with four minutes of delay, and approximately 19 minutes with three minutes of delay for vehicles utilizing the HOV lane. **Table 2.1.5-8** shows the details of the freeway mainline operations for the evening peak flow conditions.

COMPARISON OF TRAFFIC OPERATIONS BETWEEN BUILD AND NO-BUILD ALTERNATIVES

AM Peak Hours

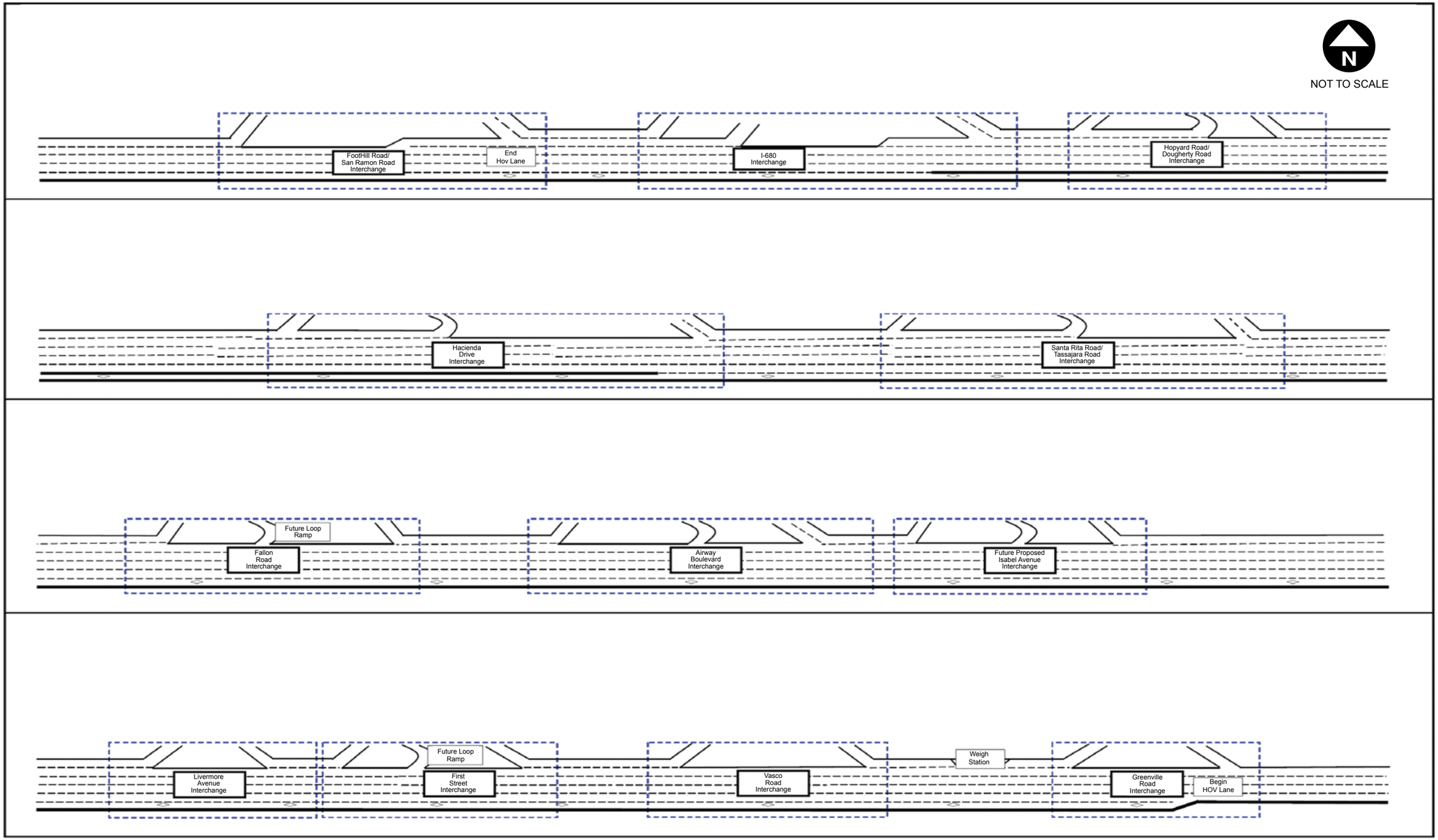
The addition of the westbound HOV lane would increase vehicle throughput along the I-580 corridor, therefore yielding higher vehicle miles traveled (VMT), while decreasing the total vehicle hours of travel (VHT). Westbound is the peak commute direction in the morning, and the project would improve corridor-wide average travel speed from approximately 21 m.p.h. to 28 m.p.h., an increase of over 30 percent. Vehicle hours of delay (VHD) would be reduced by 1,250 hours, which would translate into a significant amount of annual economic benefits for commuters in this corridor. In addition, the project would result in an average travel time saving of approximately 13.2 minutes through the corridor for the mixed-flow lanes. Carpool vehicles utilizing the HOV lane would result in approximately 31 minutes of travel time savings through the entire corridor. Compared to the No-Build conditions, the project would increase vehicle throughput by approximately 14 percent.

PM Peak Hours

The project would result in slightly worse overall performance, when compared to the No-Build conditions. The westbound direction is currently the off-peak direction of commute in the evenings; however, it currently operates near capacity at LOS D west of the San Ramon Road, as westbound climbs the uphill portion of the freeway. Under the 2035 future conditions, traffic demand is projected to increase. The freeway would operate at capacity with LOS E west of the San Ramon Road interchange under future No-Build conditions. Under the Build conditions, the total traffic demand on the freeway west of San Ramon Road would increase to 10,089 vehicles per hour, from the No-Build conditions' 9,896 vehicles per hour. With the proposed HOV lane, the corridor would have higher vehicle throughput up to the termination point of the proposed HOV lane at the San Ramon Road interchange vicinity, and would therefore result in slightly more congestion from the I-580/I-680 interchange to west of the San Ramon Road interchange. The project would increase the average travel time by less than two minutes compared to the No-Build conditions, which is relatively insignificant overall. The project would increase vehicle throughput by approximately 3 percent. A comparison of speed profiles are shown in **Figures 2.1.5-3a and -3b**.

2035 Freeway Ramp Termini Intersections

Ramp termini intersections were evaluated for Year 2035 conditions with and without the project. As signal timings are typically adjusted periodically to accommodate the change in traffic demand and travel pattern, when evaluating the 2035 No-Build and Build conditions, it was assumed that the signal timings were optimized at the intersection level. A majority of the intersection operations would be similar between the No-Build and Build conditions, and would operate at LOS D or better.

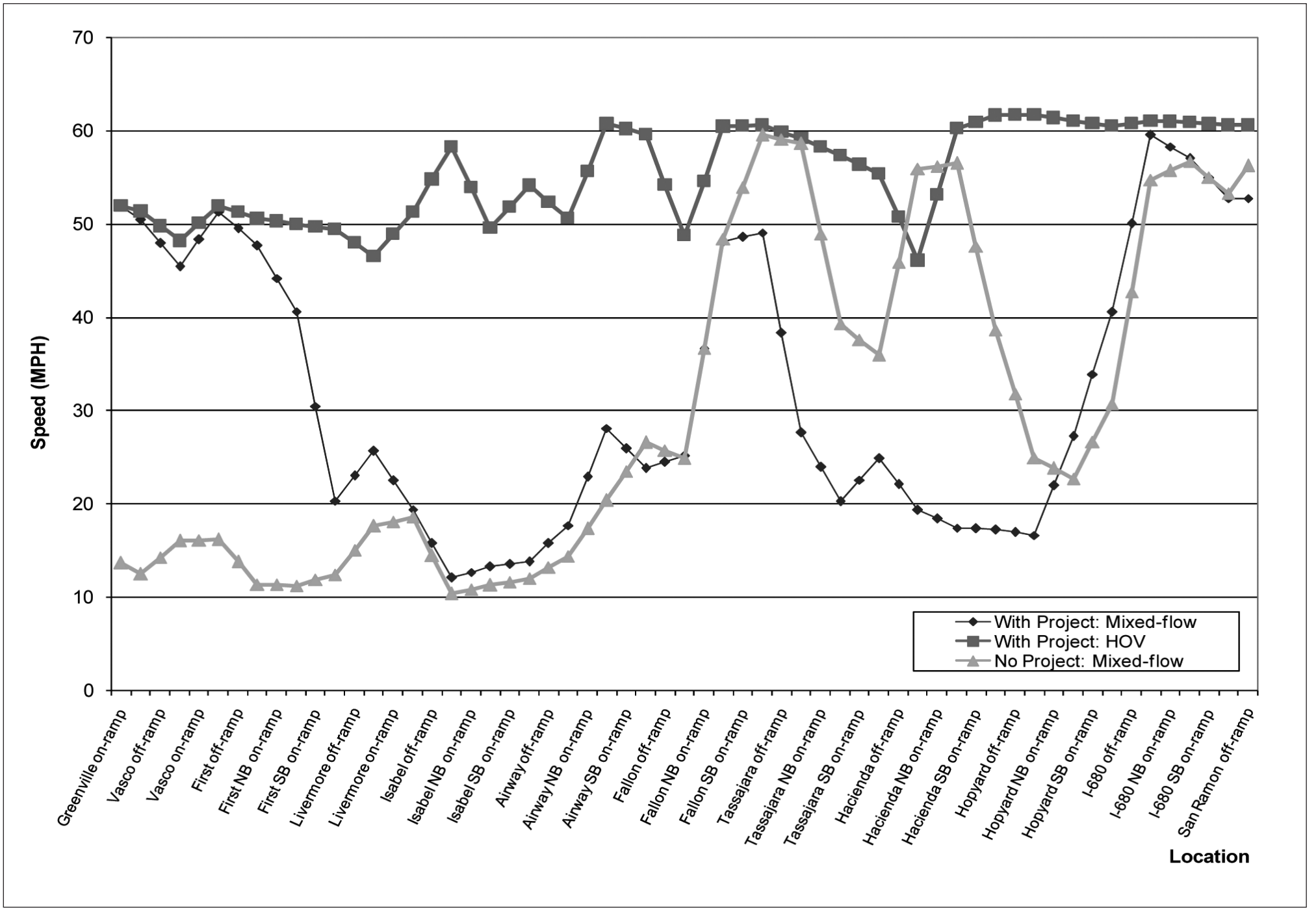


I-580 Westbound HOV Lane Project EA/IS

2035 Lane Configuration Under the Build Alternative

FIGURE 2.1.5-2

Source: Dowling Associates, Inc., 2008



I-580 Westbound HOV Lane Project EA/IS

Comparison of Freeway Mainline Speed Profile-AM Peak

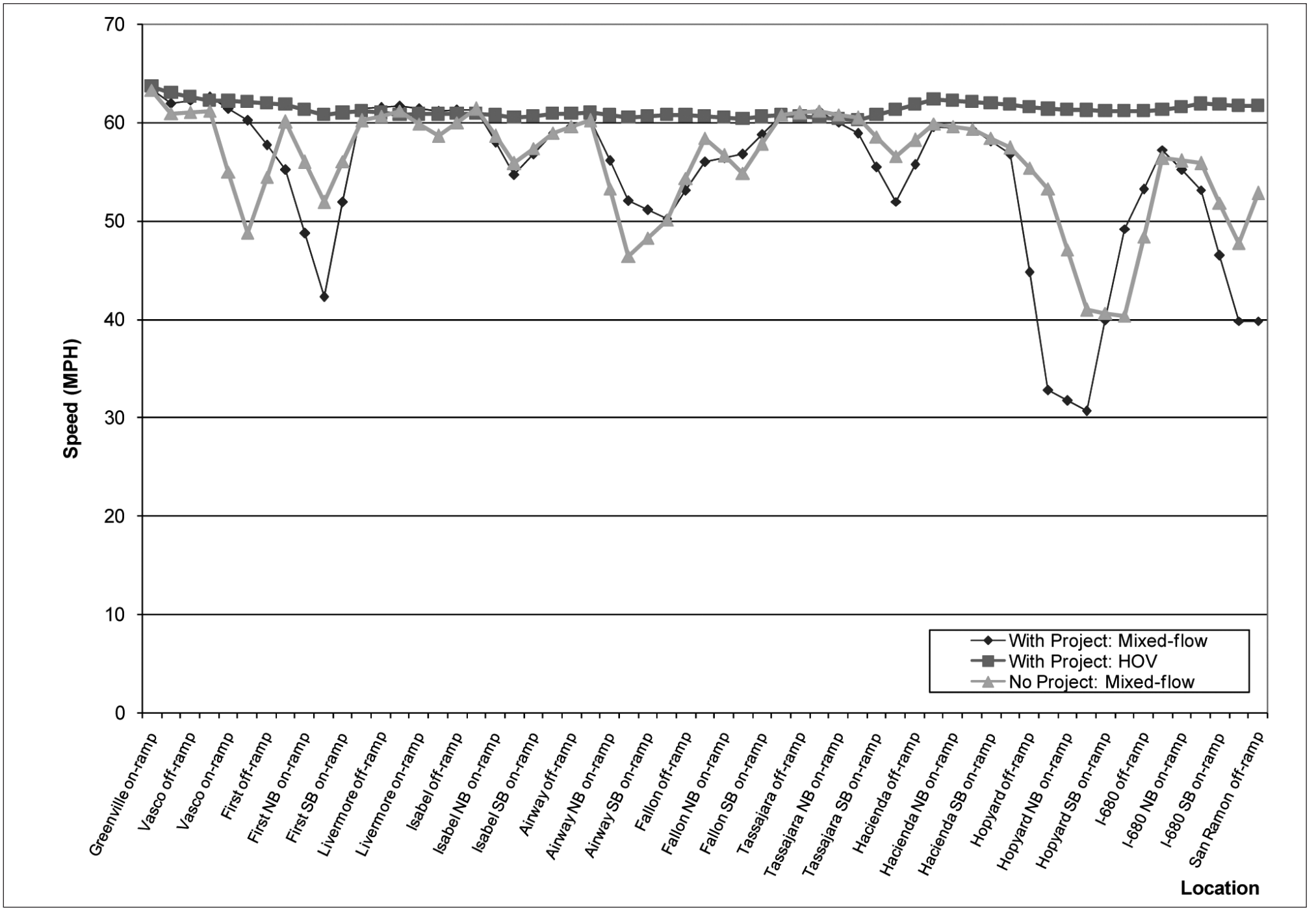
FIGURE 2.1.5-3a

Source: Dowling Associates, 2008.

Table 2.1.5-7: Future Freeway Traffic Operations Under Project No-Build Alternative – Year 2035

Freeway Segment	AM Peak Hour			PM Peak Hour		
	Speed (MPH)	Density (Veh/Ln/Mi.)	LOS	Speed (MPH)	Density (Veh/Ln/Mi.)	LOS
N. Flynn Rd to Greenville Rd off-ramp	**16**	**105.0**	**F**	64	11.1	B
Greenville Rd off-ramp to Greenville Rd on-ramp	**14**	**107.3**	**F**	63	10.8	A
Greenville Rd on-ramp to Vasco Rd off-ramp	**12**	**95.7**	**F**	61	12.1	B
Vasco Rd off-ramp to Vasco Rd on-ramp	**16**	**81.3**	**F**	61	14.6	B
Vasco Rd on-ramp to First St off-ramp	**16**	**90.9**	**F**	49	27.9	D
First St off-ramp to First St on-ramp	**11**	**120.4**	**F**	60	20.2	C
First St NB on-ramp to First St SB on-ramp[a]	**11**	**120.3**	**F**	52	26.5	D
First St on-ramp to Livermore Ave off-ramp	**12**	**125.2**	**F**	60	25.1	C
Livermore Ave off-ramp to Livermore Ave on-ramp	**18**	**89.1**	**F**	61	22.0	C
Livermore Ave on-ramp to Isabel Ave off-ramp	**19**	**81.3**	**F**	59	23.8	C
Isabel Ave off-ramp to Isabel Ave NB on-ramp[a]	**10**	**131.8**	**F**	61	19.9	C
Isabel Ave NB on-ramp to Isabel Ave SB on-ramp	**11**	**130.5**	**F**	56	24.6	C
Isabel Ave SB on-ramp to Airway off-ramp[a]	**12**	**107.5**	**F**	59	20.6	C
Airway off-ramp to Airway NB on-ramp	**14**	**100.5**	**F**	60	23.5	C
Airway NB on-ramp to Airway SB on-ramp	**20**	**69.5**	**F**	46	31.6	D
Airway SB on-ramp to Fallon Rd off-ramp	**27**	**70.9**	**F**	50	35.4	E
Fallon Rd off-ramp to Fallon Rd on-ramp	**25**	**70.4**	**F**	58	26.9	D
Fallon Rd NB on-ramp to Fallon Rd SB on-ramp[a]	48	36.2	E	55	29.8	D
Fallon Rd SB on-ramp to Tassajara off-ramp[a]	60	25.4	C	61	23.1	C
Tassajara off-ramp to Tassajara NB on-ramp	59	29.5	D	61	24.5	C
Tassajara NB on-ramp to Tassajara SB on-ramp	39	39.4	E	60	22.1	C
Tassajara SB on-ramp to Hacienda Dr off-ramp	**36**	**48.3**	**F**	57	24.8	C
Hacienda Dr off-ramp to Hacienda Dr NB on-ramp	56	36.0	E	60	27.7	D
Hacienda Dr NB on-ramp to Hacienda Dr SB on-ramp	56	29.4	D	59	25.6	C
Hacienda Dr SB on-ramp to Dougherty Rd off-ramp	**39**	**46.0**	**F**	57	28.3	D
Dougherty Rd off-ramp to Dougherty Rd NB on-ramp	**25**	**77.7**	**F**	53	33.5	E
Dougherty Rd NB on-ramp to Dougherty Rd SB on-ramp	**23**	**73.4**	**F**	41	39.5	E
Dougherty Rd SB on-ramp to I-680 off-ramp	**31**	**58.7**	**F**	40	41.9	E
I-680 off-ramp to I-680 NB on-ramp	55	24.1	C	56	25.2	C
I-680 NB on-ramp to I-680 SB on-ramp	57	26.1	D	56	29.2	D
I-680 SB on-ramp to San Ramon Rd off-ramp	53	26.8	D	48	33.7	D
San Ramon Rd Off-ramp to San Ramon Rd on-ramp	59	26.5	D	58	30.8	D
I-580 West of San Ramon Rd on-ramp	54	26.8	D	43	42.9	E

[a] Freeway segments included under the assumed future improvement plans not related to the project
Source: Dowling Associates, 2008.



I-580 Westbound HOV Lane Project EA/IS

Comparison of Freeway Mainline Speed Profile-PM Peak

FIGURE 2.1.5-3b

Source: Dowling Associates, 2008.

Table 2.1.5-8 Future Freeway Traffic Operations Under Project Build Alternative – Year 2035

Freeway Segment	AM Peak Hour			PM Peak Hour		
	Speed (MPH)	Density	LOS	Speed (MPH)	Density	LOS
N. Flynn Rd to Greenville Rd off-ramp	47	42.6	E	64	11.2	B
Greenville Rd off-ramp to Greenville Rd on-ramp	52	26.7	D	63	8.8	A
Greenville Rd on-ramp to Vasco Rd off-ramp	50	24.9	C	62	10.7	A
Vasco Rd off-ramp to Vasco Rd on-ramp	45	28.6	D	63	12.7	B
Vasco Rd on-ramp to First St off-ramp	51	25.1	C	60	17.0	B
First St off-ramp to First St on-ramp	48	30.4	D	55	20.6	C
First St NB on-ramp to First St SB on-ramp[a]	41	37.7	E	42	31.0	D
First St on-ramp to Livermore Ave off-ramp	**20**	**84.9**	**F**	61	18.4	C
Livermore Ave off-ramp to Livermore Ave on-ramp	**26**	**68.0**	**F**	62	20.1	C
Livermore Ave on-ramp to Isabel Ave off-ramp[a]	**19**	**79.8**	**F**	61	19.3	C
Isabel Ave off-ramp to Isabel Ave NB on-ramp[a]	**12**	**120.3**	**F**	61	18.8	C
Isabel Ave NB on-ramp to Isabel Ave SB on-ramp	**13**	**118.5**	**F**	55	24.1	C
Isabel Ave SB on-ramp to Airway off-ramp[a]	**14**	**99.8**	**F**	59	19.9	C
Airway off-ramp to Airway NB on-ramp	**18**	**85.8**	**F**	60	22.7	C
Airway NB on-ramp to Airway SB on-ramp	**28**	**53.8**	**F**	52	27.3	D
Airway SB on-ramp to Fallon Rd off-ramp	**24**	**72.1**	**F**	50	32.3	D
Fallon Rd off-ramp to Fallon Rd on-ramp	**25**	**68.5**	**F**	56	27.0	D
Fallon Rd NB on-ramp to Fallon Rd SB on-ramp[a]	48	35.9	E	57	27.7	D
Fallon Rd SB on-ramp to Tassajara off-ramp[a]	49	30.5	D	61	22.4	C
Tassajara off-ramp to Tassajara NB on-ramp	**28**	**60.1**	**F**	61	23.6	C
Tassajara NB on-ramp to Tassajara SB on-ramp	**20**	**69.7**	**F**	59	22.0	C
Tassajara SB on-ramp to Hacienda Dr off-ramp	**25**	**63.6**	**F**	52	26.5	D
Hacienda Dr off-ramp to Hacienda Dr NB on-ramp	**19**	**97.3**	**F**	60	27.5	D
Hacienda Dr NB on-ramp to Hacienda Dr SB on-ramp	**17**	**90.7**	**F**	59	25.2	C
Hacienda Dr SB on-ramp to Dougherty Rd off-ramp	**17**	**99.3**	**F**	57	28.4	D
Dougherty Rd off-ramp to Dougherty Rd NB on-ramp	**17**	**108.4**	**F**	**33**	**54.3**	**F**
Dougherty Rd NB on-ramp to Dougherty Rd SB on-ramp	**27**	**58.6**	**F**	**31**	**52.1**	**F**
Dougherty Rd SB on-ramp to I-680 off-ramp	41	41.5	E	49	34.0	D
I-680 off-ramp to I-680 NB on-ramp	60	26.4	D	57	27.8	D
I-680 NB on-ramp to I-680 SB on-ramp	57	23.8	C	53	30.5	D
I-680 SB on-ramp to San Ramon Rd off-ramp	53	25.2	C	40	40.2	E
San Ramon Rd off-ramp to San Ramon Rd on-ramp	49	27.9	D	**34**	**47.0**	**F**
I-580 West of San Ramon Rd on-ramp	52	28.3	D	**28**	**65.4**	**F**

[a] Freeway segments included under the assumed future improvement plans not related to the project
Source: Dowling Associates, 2008.

Table 2.1.5-9 Future HOV Lane Operations Under Project Build Alternative – Year 2035

Freeway Segment	AM Peak Hour			PM Peak Hour		
	Speed (MPH)	Density	LOS	Speed (MPH)	Density	LOS
N. Flynn Rd to Greenville Rd off-ramp	N/A	N/A	N/A	N/A	N/A	N/A
Greenville Rd off-ramp to Greenville Rd on-ramp	52	20.2	C	64	5.5	A
Greenville Rd on-ramp to Vasco Rd off-ramp	51	20.2	C	63	6.2	A
Vasco Rd off-ramp to Vasco Rd on-ramp	48	20.0	C	62	6.9	A
Vasco Rd on-ramp to First St off-ramp	52	18.6	C	62	7.2	A
First St off-ramp to First St on-ramp	51	19.3	C	62	7.3	A
First St NB on-ramp to First St SB on-ramp[a]	50	20.3	C	61	7.9	A
First St on-ramp to Livermore Ave off-ramp	49	22.9	C	61	8.7	A
Livermore Ave off-ramp to Livermore Ave on-ramp	47	24.4	C	61	8.1	A
Livermore Ave on-ramp to Isabel Ave off-ramp[a]	51	23.8	C	61	8.0	A
Isabel Ave off-ramp to Isabel Ave NB on-ramp[a]	58	17.8	B	61	6.8	A
Isabel Ave NB on-ramp to Isabel Ave SB on-ramp	50	22.6	C	60	6.7	A
Isabel Ave SB on-ramp to Airway off-ramp[a]	54	20.9	C	61	7.3	A
Airway off-ramp to Airway NB on-ramp	51	23.2	C	61	7.4	A
Airway NB on-ramp to Airway SB on-ramp	61	19.5	C	60	7.7	A
Airway SB on-ramp to Fallon Rd off-ramp	60	23.1	C	61	8.8	A
Fallon Rd off-ramp to Fallon Rd on-ramp	49	28.0	D	61	8.3	A
Fallon Rd NB on-ramp to Fallon Rd SB on-ramp[a]	60	22.5	C	60	8.4	A
Fallon Rd SB on-ramp to Tassajara off-ramp[1]	61	22.1	C	61	8.0	A
Tassajara off-ramp to Tassajara NB on-ramp	59	21.8	C	61	7.4	A
Tassajara NB on-ramp to Tassajara SB on-ramp	57	22.7	C	60	7.6	A
Tassajara SB on-ramp to Hacienda Dr off-ramp	55	24.1	C	61	6.6	A
Hacienda Dr off-ramp to Hacienda Dr NB on-ramp	46	21.5	C	62	4.9	A
Hacienda Dr NB on-ramp to Hacienda Dr SB on-ramp	60	13.1	B	62	4.9	A
Hacienda Dr SB on-ramp to Dougherty Rd off-ramp	62	12.8	B	62	4.9	A
Dougherty Rd off-ramp to Dougherty Rd NB on-ramp	62	12.7	B	61	5.0	A
Dougherty Rd NB on-ramp to Dougherty Rd SB on-ramp	61	12.8	B	61	5.0	A
Dougherty Rd SB on-ramp to I-680 off-ramp	61	12.9	B	61	5.0	A
I-680 off-ramp to I-680 NB on-ramp	61	12.1	B	61	6.4	A
I-680 NB on-ramp to I-680 SB on-ramp	61	11.1	B	62	6.0	A
I-680 SB on-ramp to San Ramon Rd off-ramp	61	11.4	B	62	6.3	A
San Ramon Rd off-ramp to San Ramon Rd on-ramp	N/A	N/A	N/A	N/A	N/A	N/A
I-580 West of San Ramon Rd on-ramp	N/A	N/A	N/A	N/A	N/A	N/A

[a] Freeway segments included under the assumed future improvement plans not related to the project
Source: Dowling Associates, 2008.

Temporary Construction Impacts

Construction of the project is anticipated to take between 24 to 36 months. During construction, no lane closures would be necessary during peak travel hours; however, lane widths could be reduced to accommodate construction activities. Lane closures may occur during off-peak hours to accommodate construction activities.

Planned construction would occur approximately 5 feet to the south of the eastbound bike lane along Constitution Drive. During construction, the project may temporarily affect the bike lanes along Constitution Drive due to the proximity of the planned construction. Construction activities may require the reduction of adjacent roadways or detours. However, the bike lanes would remain open during project construction and measures would be implemented during construction to ensure bike lanes safety along the potentially affected segment. Thus, the project would not have an adverse impact on these bike lanes.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Because the Build Alternative would result in pronounced benefits during the AM peak hour, the overall performance for AM and PM peak hours combined would result in a net improvement in freeway operations. The combined average speed through the two peak hours would be improved by approximately 19 percent. Therefore, the proposed project would result in a beneficial effect on freeway traffic operation along the I-580 corridor within the project area.

A Transportation Management Plan (TMP) would be prepared to address traffic delays during construction. Preparation of the TMP would be coordinated with local partners to develop the necessary strategies to reduce temporary traffic impacts.

2.1.6 Visual/Aesthetics

REGULATORY SETTING

The National Environmental Policy Act of 1969, as amended (NEPA), 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 U.S.C. 4331[b][2]). To further emphasize this point, the Federal Highway Administration (FHWA), in its implementation of NEPA (23 U.S.C. 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 actions necessary to provide the people of the state "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities." (CA Public Resources Code Section 21001[b])

AFFECTED ENVIRONMENT

This analysis summarizes information contained in the Visual Impact Assessment prepared for the project. The process used in preparing the visual impact assessment followed the guidelines

outlined in the publication, *Visual Impact Assessment for Highway Projects*, FHWA, March 1981. The VIA was prepared in accordance with the Department's *Visual Impact Assessment Guide* (ch. 27, Standard Environmental Reference Guide).

Visual Setting

The project lies on the east side of the hilly and steep mountain uplands of the Coast Range, which are characterized by northwest-trending ridges and valleys. Adjacent land uses include a mix of retail and commercial uses; single-family residential areas; recreational facilities; light-industrial uses, which are comprised of low- to mid-rise buildings; and rural areas primarily used as ranchlands. Commercial and retail development and light-industrial areas are typically found clustered near interchanges, while residential development occurs intermittently throughout the project corridor. Ranchland areas are concentrated mainly along the eastern portion of the project alignment between First Street and Tassajara Road on the north side of I-580. **Figure 2.1.6-1** provides representative views of and from the project corridor.

Viewer Groups

The predominant viewer groups associated with I-580 are those with views from the freeway, such as motorists (commuters, local residents, tourists) and those with views of the freeway, such as residents and employees and/or users of adjacent commercial and light industrial uses. Viewer activity can affect their sensitivity to the views available to and from I-580. Viewer sensitivity is defined both as the viewer's concern for scenic quality and the viewer's response to change in the visual resources that make up the view.

Views of the Project Corridor

Views of the I-580 freeway corridor vary within the project vicinity. In areas where commercial and retail land uses predominate, the freeway is quite prominent in the view because of minimal landscaping and the lack of sound walls to block views. In areas where residential uses predominate, the freeway is less visible due to the placement of landscaping and/or sound walls. These areas would be sensitive to changes that would open up or increase visual access to the freeway (e.g., landscape removal).

Views from the Project Corridor

Foreground views seen by westbound motorists traveling on I-580 are dominated by the paved roadway, as well as medians and median barriers, chain-link fencing on the north side, vegetation located on the road shoulder, and vegetation in the median.[3] Just east of the Hacienda Drive interchange west to the San Ramon Road interchange, westbound motorists' foreground views also include the BART alignment, trains, and associated facilities located within the median. Motorists' mid-range views depend upon the changing adjacent land uses, but typically vary between commercial buildings and retail centers, private residences, and rural open space areas and hillsides. Long-range views throughout the project area predominately include distant hillsides and mountain peaks. **Figure 2.1.6-1** provides a representative photograph of westbound motorists' views in the project area east of Tassajara Road.

[3] The existing median vegetation will be removed as part of the I-580 Eastbound HOV Lane Project (Contract Nos. 04-290834 and 04-290844), which will be constructed prior to construction of the Build Alternative.

Landscaping presently occurs in several areas in the median, as well as along the side of the roadway, within the project corridor. Median vegetation consists primarily of scattered areas of densely packed oleander shrubs (*Nerium oleander*). However, the existing median landscaping, as well as existing landscaping along the eastbound outside shoulder, will be removed as part of a separate project within the corridor (I-580 Eastbound HOV Lane Project, EA 04-290834 and 04-290844).

Existing Visual Quality

Visual quality is evaluated by identifying the vividness, intactness, and unity present in the viewshed. Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns. Intactness is the visual integrity of the natural and manmade landscape of the immediate environs and its freedom from encroaching elements. Unity is the visual coherence and compositional harmony of the landscape considered as a whole. These criteria are used to determine whether the existing visual setting has high, moderate, or low overall visual quality.

Overall, the existing visual quality for the project site is low to moderate. The natural features of the surrounding viewshed are vivid in places; however, the presence of substantial amounts of development along the project site and the existing freeway, associated interchanges, sound walls and signage decreases and substantially detracts from the overall visual quality for both motorists and surrounding residents and workers.

ENVIRONMENTAL CONSEQUENCES

The visual impacts of project alternatives are determined by assessing the visual resource change due to the project and by predicting viewer response to that change. Four landscaped areas would be disturbed as part of this project, three of which are located within areas classified by the Department as landscaped freeway, based on post mile estimates. The location of the landscape disturbance areas and representative photographs of each are provided in **Figures 2.1.6-2A** and **2.1.6-2B**. **Table 2.1.6-1** provides the location and length of the landscape disturbance areas in relation to the pictures and descriptions provided in **Figures 2.1.6-2A** and **2.1.6-2B**.

The project has the potential to affect intermittent vegetation, which occurs along the westbound shoulder of the roadway, and consists of various scattered areas of planted and naturally occurring shrubs and trees. Plants commonly seen along the westbound shoulder of I-580 include coyote brush (*Baccharis pilularis*), planted valley and scrub oak (*Quercus lobata* and *dumosa*), blue gum eucalyptus (*Eucalytus globulus*), and planted stands of oleanders. Oleanders in these areas are approximately 6.5 feet in height and are located in intermittent stretches along the entire length of the project. The oleanders have dark green foliage with occasional white blooms, are densely packed together, and generally prohibit views through the foliage.

The landscaping in this area provides visual shielding of the freeway for surrounding land uses which include several residences (approximately 110 feet to the north) as well as visual shielding of the westbound truck scales facility for motorists. As a result, the removal of these landscaped areas of oleanders could affect both motorists' and residents' views. However, the impact to residents' views in this area are expected to be minor because the landscaping is intermittent and sparse within this area and the majority of the residences have existing yard landscaping which block views of the freeway. For motorists, increased visibility of the truck scales facility would be noticeable, but would

not be out of character or unexpected given this type of facility is common along major freeway corridors.

Furthermore, seven segments of I-580 are classified by the Department as landscaped freeway within the project limits. A landscaped freeway is a section of freeway with planting that meets the criteria of the Department's Outdoor Advertising Regulations, which typically regulates and controls the use of outdoor advertising displays. Although there is no outdoor advertising proposed or any existing advertising that would be affected by development of the project, the loss of landscaped freeway status would result in outdoor advertising within the area to be regulated by local agencies instead of the state. Thus, the loss of this status has the potential to result in the installation of large off-premise billboards within the project corridor, if desired by local agencies.

Views of the Project Corridor

Views of the project corridor from surrounding areas of the freeway would not change substantially with project implementation. The addition of an HOV lane would not be readily perceptible to most people viewing the freeway from a distance. In residential areas where changes would be most sensitive, existing sound walls provide visual shielding and the project would not remove these walls. The project would not constitute an adverse effect to views of the project corridor.

Table 2.1.6-1: Landscape Disturbance Areas

Picture*	Vicinity	Location	Approximate Length of Disturbed Area (linear miles)
5	Vasco Road Westbound interchange Divider	0.15 mile east of the North Vasco Road interchange	0.06
6	Vasco Road Westbound interchange Divider	0.05 mile east of the North Vasco Road interchange	0.05
7	Vasco Road Westbound interchange Divider	0.05 mile west of the North Vasco Road interchange	0.09
8	Truck Scale Westbound Divider	0.57 miles west of the Greenville Road interchange	0.18
Total			**0.38**

*Picture locations are shown on Figures 2.1.6-2a and 2.1.6--2b

Source: CirclePoint, 2008.

Views from the Project Corridor

Beyond the areas of immediate landscape removal, the project would most directly affect the viewing experience of motorists traveling westbound on I-580. Specifically, the project would widen the roadway by adding an HOV lane. The addition of an HOV lane would not substantially change the motorists' view. The key visual elements within the motorists' view (roadway, sound walls, surrounding land uses, and viewshed) would not substantially change with the project.

Surrounding Land Uses

Westbound Motorists' Views

Source: CirclePoint, 2008

Potential Effects on Scenic Resources

Although some portions of I-580 have been designated by the Department as scenic highways, the segment for which the project is proposed does not have a scenic highway designation.[4] No scenic resources, such as trees (including ancestral trees and heritage trees), rock outcroppings, or historic buildings are located within the project corridor. Thus, the project would not affect an officially designated scenic resource or highway.

The existing visual quality of the project site is low to moderate and, because the project would not substantially alter the key visual elements and features of the project site as discussed above, the project would not result in a change in visual quality.

Potential Effects from the Construction of Retaining Walls

Implementation of the project would require the construction of 18 new retaining walls of varying heights and lengths.[5] The majority of the new retaining walls would be located along the westbound direction of the freeway, along the main travel lanes. However, several of the retaining walls that would be constructed as part of the project would be located on the eastbound direction of the freeway corridor, and others would be located along the freeway on- and/or off-ramps. As such, more than one retaining wall would be located within the same station mile locations, but on opposite sides of the freeway corridor. The descriptions of the proposed retaining walls in **Table 2.1.6-2** indicate where the walls would be located in relation to the direction of the freeway.

Along the length of the retaining walls, the height above ground will vary. **Table 2.1.6-2** contains the minimum and maximum heights of each wall. Heights every 50 feet were used to calculate the average height of each retaining wall. Retaining walls averaging under 4 feet high, with a maximum height below 6 feet, would not impact any views on and/or off the freeway corridor because most viewers would be able to see over these walls. Furthermore, all of these walls would be located immediately adjacent to either the freeway or local roadways, so they would not appear out of character for the area.

Retaining walls with an average height higher than 4 feet were assessed in terms of each walls' visibility from locations on or off the freeway, the potential to block an important view, and the extent to which a wall would substantially degrade the local visual quality due to the walls' location, height and length.

In compliance with the Department's aesthetic treatments guidelines for the region, walls greater than 6 feet in height that would be visible to motorists on the freeway or viewers at nearby developed land uses would be treated with a vertical fracture rib texture (a vertical row pattern). These walls would be consistent with other retaining walls in the area, and with many of the existing walls in locations where new walls are proposed. This would reduce adverse aesthetic effects of the walls and maintain visual consistency. Walls not visible to any motorists or other viewers and walls under 6 feet in height would have a smooth, concrete finish.

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[4] Caltrans, Officially Designated State Scenic Highways and Historic Parkways, Available: http://www.dot.ca.gov/hq/LandArch/scenic_highways/, Accessed: December 3, 2007.

[5] Some retaining walls are broken into segments of varying height, but are considered sections of a single wall (i.e. 14a, 14b, 14c, and 14d are all portions of Wall No. 14).

Table 2.1.6-2 lists each proposed retaining wall's location, length, height and assessment of visual impacts. None of the proposed retaining walls would result in a significant adverse visual impact.

Potential Effects from the Construction of Sound Walls

A Noise Abatement Decision Report prepared for the project concluded that there would only be one feasible and reasonable sound wall within the project area. This wall would be located at the edge of the shoulder along the I-580 westbound off-ramp to First Street (Sta. 753+50 to 760+50), and run for approximately 600 feet, at a height of 16 feet (see Figure 5). This wall would be an extension of an existing 16 foot sound wall (SWWB7) to the east. The new sound wall (SWWB6) would reduce noise levels by at least 5 dBA for approximately 12 residential units (apartments) along Sunburst Lane, and the DoubleTree Hotel swimming pool to the west of Las Flores Road. At this time, sound wall SWWB6 is not proposed as part of the project, as the final decision for its construction will be made upon completion of the project design and public involvement process. However, the potential visual affects from the construction of this sound wall were included as part of this VIA.

The residential units that would be affected by the construction of sound wall SWWB6 are single-story apartments that currently have limited views of the I-580 freeway, with commercial buildings beyond. Some of the units may have limited long distance views of the hills of the Del Valle Regional Park Hills (located approximately 5 miles south of the apartment units). An 8- to 10-foot hedge/tree-line along the north side of I-580 currently obstructs the majority of the apartment views, but ends at the southern foot of Las Flores Road.

Due to the fact that sound wall SWWB6 would be constructed as an extension of an existing 16-foot-tall sound wall and in an area where views to the south are already obstructed by tall vegetation, the wall would not result in substantial view blockage from the residences in this area or substantially degrade the existing visual character.

The hotel property currently has unobstructed views of the freeway and can be clearly seen by motorists traveling west on I-580. Construction of sound wall SWWB6 would block all views of the hotel property from the freeway corridor which would not be considered an adverse visual impact to motorists, but could be have an impact on the ability of the hotel to attract customers. Construction of the sound wall would not affect views from the hotel swimming pool, as the pool area is currently enclosed by a tall hedge/tree-line. Sound wall SWWB6 would block views of the I-580 freeway from the lower-level hotel rooms, which could be construed as beneficial to the hotel patrons staying in these rooms.

From an aesthetic standpoint, the construction of sound wall SWWB6 would not result in an adverse visual impact. It would not substantially block important views from both on or off freeway locations, nor would the wall substantially degrade the existing visual character of the area. The sound wall may result in improved aesthetics by blocking existing unpleasant views of the freeway from the residences and lower-level hotel rooms.

As part of the public involvement process, the hotel owners and other property owners would be contacted to see if they would find a sound wall in front of their property desirable.

Table 2.1.6-2: Retaining Wall Locations

Wall No.	Location (Station)/ Direction	Length (ft)	Height Above Ground (ft)			Location & Visual Assessment
			Min	Max	Average	
1	208+45 to 213+37/WB	521	2.0	4.0	2.5	This wall would be located at the outside shoulder of the I-580 westbound on-ramp from the I-680 southbound off-ramp. Less than 4 feet in height. No visual affect.
2	275+28 to 284+29/WB	901	0.0	5.5	2.4	Walls 2 and 3 would be located at the Dublin Pleasanton BART Station. Both walls would be located on the westbound direction of the freeway, on the north side of the travel lane. These walls would only be visible from locations off the freeway corridor from the parking areas near the BART Station, and from the BART Station platform. Although they would be viewed by a substantial number of people on a daily basis, the BART station in the area is an overhead station with high tiered retaining walls. As a result, these walls would not block an existing view. These new retaining walls would be located in slightly different locations than the existing walls. Therefore, there would not be a substantial change to the existing visual setting and no adverse visual effects are expected.
3	291+34 to 317+65/WB	2709	0.0	11.5	3.1	
4a	470+00 to 487+35 / WB	1735	0.0	1.4	1.3	This wall would be located on the right shoulder of I-580. Retaining walls 4A & C are visible only from WB I-580. Retaining wall 4B is only visible from Collier Canyon Road. Less than 4 feet in height. No visual affect.
4b	487+35 to 499+55 / WB	1220	0.0	2.9	2.0	
4c	499+55 to 503+89 / WB	546	0.0	1.7	1.2	

Wall No.	Location (Station)/ Direction	Length (ft)	Height Above Ground (ft)			Location & Visual Assessment
			Min	Max	Average	
5	509+45 to 516+68/WB	743	2.0	14.0	7.5	This wall would be located from the Airway Blvd./I-580 westbound on-ramp to the Airway Blvd. overpass This wall would only be visible to motorists on the freeway for short periods of time, as it would be relatively short in length. More distant views in this direction from the freeway corridor are currently obstructed by the existing hillside. Therefore, a new wall would not obstruct any important views. No other land uses would be affected and no adverse effects are expected.
6	587+88 to 592+96/ WB	534	2.0	6.0	4.0	This wall would be located East of the Arroyo Las Positas Creek culvert underpass, on the westbound direction of the freeway. Less than 4 feet in height. No visual affect.
7a 7b	619+10 to 622+14/WB 622+14 to 648+87/WB	303 2671	0.0 0.0	11.0 17.0	8.5 10.0	This wall would be located from the Portola Road overpass to the N. Livermore Ave. underpass, along Cayetano Court, on the westbound direction of the freeway. The first 303 feet of this wall would only be visible from locations off of the freeway corridor where no residential or commercial development exists. The remaining 2671 feet (0.5-mile) segment of the wall would be visible to motorists travelling at 55 mph for approximately 30 seconds. The walls would not result in any view blockage and, because of their location immediately adjacent the existing freeway and local roadway, and would not substantially degrade the existing visual character. No adverse effects are expected.

Wall No.	Location (Station)/ Direction	Length (ft)	Height Above Ground (ft)			Location & Visual Assessment
			Min	Max	Average	
8	628+09 to 638+07/EB	998	2.0	7.5	5.0	This wall would be located directly across from wall No. 7, located on the eastbound direction of the freeway, on the south side of the travel lane. This wall would only be visible from locations off the freeway corridor where no residential or commercial development exists. No adverse effects are expected.
9	645+00 to 649+59/EB	463	0.0	4.0	2.5	Wall Nos. 9, 10, and 11 are continuous for approximately 1,348 feet from the North Livermore Ave. underpass to the eastern terminus of the I-580 eastbound North Livermore Ave. on-ramp. Wall Nos. 9 and 11 are less than 4 feet in height. No visual affect. Wall No. 10 has an average height of 5 feet, and would only be visible from locations off of the freeway corridor where some commercial development exists approximately 250' south of the eastbound travel lane. The view of the retaining walls would be partially obstructed by the tall vegetation and trees that grow along Arroyo Las Positas Creek, between the commercial buildings and the freeway corridor. No adverse effects are expected.
10	651+19 to 654+00/EB	281	2.0	7.0	5.0	
11	653+50 to 659+50/EB	604	2.0	6.0	4.0	

Wall No.	Location (Station)/ Direction	Length (ft)	Height Above Ground (ft)			Location & Visual Assessment
			Min	Max	Average	
12a	659+75 to 672+15/WB	1240	2.0	15.5	8.0	This wall would be located from approximately 600 feet east of the N. Livermore Ave. underpass (westbound travel lane) to the Arroyo Las Positas Creek culvert underpass (1,000 feet west of Las Colinas overpass), along the westbound direction of the freeway. Portions of this wall visible from the freeway (12a and c) are relatively short and would be seen by motorists for only brief periods of time. Motorists travelling at 55mph see wall No.12a for approximately 15 seconds and wall No. 12c for about 5 seconds. More distant views from the freeway corridor in this direction are currently obstructed by the existing hillside. Therefore, a new wall would not obstruct any important views. No residential or commercial development exists in the area of this wall, so there would be no affected viewers of the portion of wall No. 12 that would be visible off the freeway. No adverse effects are expected.
12b	672+15 to 684+98/WB	1290	2.0	12.0	7.5	
12c	684+98 to 688+02/WB	308	2.0	13.5	9.0	
12d	688+02 to 692+65/WB	469	2.0	4.5	3.0	
13a	694+01 to 702+05/WB	811	2.0	12.5	8.5	This wall would be located from the end of wall No. 12 to First Street overpass, along the westbound direction of the freeway. This wall would be visible from locations both on and off the freeway corridor. No development presently exists in the area of the wall. The majority of the wall (3000 feet from Las Colinas overpass to Arroyo Las Positas Creek culvert underpass) is under an average of 5 feet in height, and no views of the corridor are expected to change along this segment. The last 943 feet of wall would be visible to motorists only for a short period of time (around 11 seconds at 55 mph), as this segment would be relatively short in length. More distant views in this direction from the freeway corridor are currently obstructed by the existing hillside. Therefore, a new wall would not obstruct any important views. No adverse effects are expected.
13b	702+05 to 708+84/WB	680	2.0	11.0	5.0	
13c	708+84 to 732+43/WB	2358	2.0	9.5	5.0	
13d	732+43 to 741+97/WB	943	2.0	7.0	5.0	

Wall No.	Location (Station)/ Direction	Length (ft)	Height Above Ground (ft)			Location & Visual Assessment
			Min	Max	Average	
14	694+02 to 701+08/EB	699	2.0	7.0	5.0	This wall would be located directly across from the first 699' feet of wall No. 13, along the eastbound direction of the freeway. This wall would only be visible from locations off the freeway corridor where no residential or commercial land uses exist. This wall would not block any existing views, and because it would be located immediately adjacent to the freeway, it would not substantially degrade the existing visual quality. No adverse effects are expected.
15	796+12 to 801+86/WB	734	0.0	3.5	2.0	Walls 15, 16, and 17 would be located on the northwest corner of the North Vasco Road and I-580 interchange. All walls average less than 4 feet in height. No visual affect.
16	798+14 to 801+05/WB	361	0.0	4.5	2.5	
17	802+85 to 805+43/EB	306	0.0	3.5	2.5	
18	862+21 to 865+52/EB	453	2.0	10.5	6.5	This wall would be located at the South Front Road/I-580 eastbound on-ramp, located on the south side of the freeway. This wall would be visible from locations off the freeway corridor where some commercial development exists. Existing development is located approximately 200 feet south of the proposed wall, with a somewhat obstructed view of the freeway because of the trees that surround the property. Several hundred feet of grassy hillside between the commercial building and freeway would be unchanged with the construction of this retaining wall. As such, the current views of the freeway from the commercial building are not expected to be significantly altered. No adverse effects are expected.

Source: BKF Engineers, 2008; CirclePoint, 2008.
Notes: EB = Eastbound; WB = Westbound

Temporary Construction Impacts

Temporary visual effects from the construction of the build alternative would typical of any major freeway improvement project, and are not considered to be significant.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

It is Department policy to replace highway planting that is damaged or removed by state highway construction activities. For this project, four areas of landscaping would be removed and could not be replaced on the roadway shoulder because of right-of-way constraints.

However, the effects to existing landscaping can be minimized by replacing landscaping at locations along the north side of the freeway, including interchange areas. The replacement landscaping would take place within the project limits. As discussed previously, the majority of the changes to existing landscaping within the corridor would occur as part of a separate project, the I-580 Eastbound HOV Lane Project (EA 04-290834 and 04-290844), which will result in the removal of all vegetation within the I-580 median, as well as the majority of the vegetation adjacent to the outside eastbound roadway shoulder. Due to the limited number of areas remaining within the corridor and within the freeway right-of-way, landscape replacement areas for the Build Alternative are limited to interchange areas.

The most feasible locations for replacement landscaping are located in the eastern portion of the project area at the interchanges of Greenville Road and Vasco Road. The area surrounding the Greenville Road interchange has been identified as containing sensitive habitat for special-status (endangered or threatened) species. Therefore, it was determined that the most feasible location for landscape replacement is within the Vasco Road interchange. This proposed landscape replacement area encompasses the areas surrounding the westbound I-580 off-ramp to Vasco Road and the on-ramp from Vasco Road to I-580 westbound. The configuration of this area allows for several options in which landscape replacement may occur. **Figure 2.1.6-2a** provides the location of the proposed landscape mitigation area, as well as representative photographs of the existing landscape in this area (Pictures 1, 2, 3, and 4). Alternative or additional landscape replacement area locations may be investigated and proposed, as appropriate. ACCMA will work closely with the Caltrans District Landscape Architect to identify other replacement locations. The highest consideration will be given to residential receptors affected by the loss of highway planting.

According to standard Department landscape replacement values, the unit cost for replacement of linear planting areas is $140,000 per linear mile. Based on the calculated total in Table 2.1.6-1, of 0.38 linear miles, a total replacement cost of $53,200 would be required for the project. The cost of landscaping has generally increased substantially in recent years and these figures represent an estimate of the total replacement cost. Actual costs will be determined by ACCMA and the Department during future project design phases.

Livermore

1

2

3

4

5

6

7

Vasco Rd

Legend

- Potential Mitigated Planting Area
- Disturbed Planting
- Existing Caltrans ROW

Picture	Vicinity	Disturbance (linear feet)
1	Vasco Rd WB On Ramp	
2	Vasco Rd WB Off Ramp (SB)	
3	Vasco Rd WB Off Ramp (NB)	
4	Vasco Rd WB On Ramp	
5	Vasco Rd WB Interchange Divider	393.90
6	Vasco Rd WB Interchange Divider	301.20
7	Vasco Rd WB Interchange Divider	488.90
8	Truck Scale WB Divider*	1,008.10
9	Greenville Rd WB On Ramp*	
10	Greenville Rd EB On Ramp*	
		TOTAL 2,192.10

* Shown on Figure 2.1.6-2B

N

1 inch equals 500 feet

Meters
0 100 200

Feet
0 270 540

Source: BkF, 2007

I-580 Westbound HOV Lane Project EA/IS

Proposed Landscape Disturbance and Mitigation Areas(1)

FIGURE 2.1.6-2A

Source: Geografika Consulting, 01.24.08

Northfront Rd

Greenville Rd Interchange

Southfront Rd

8

9

10

Legend

- Potential Mitigated Planting Area
- Disturbed Planting
- Existing Caltrans ROW

Picture	Vicinity	Disturbance (linear feet)
1	Vasco Rd WB On Ramp*	
2	Vasco Rd WB Off Ramp (SB)*	
3	Vasco Rd WB Off Ramp (NB)*	
4	Vasco Rd WB On Ramp*	
5	Vasco Rd WB Interchange Divider	393.90
6	Vasco Rd WB Interchange Divider	301.20
7	Vasco Rd WB Interchange Divider	488.90
8	Truck Scale WB Divider	1,008.10
9	Greenville Rd WB On Ramp	
10	Greenville Rd EB On Ramp	
		TOTAL 2,192.10

* Shown on Figure 2.1.6-2A

N

1 inch equals 500 feet

Meters
0 100 200

Feet
0 270 540

Source: BkF, 2007

I-580 Westbound HOV Lane Project EA/IS

Proposed Landscape Disturbance and Mitigation Areas(2)

FIGURE 2.1.6-2B

Source: Geografika Consulting, 01.24.08

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2.1.7 Cultural Resources

REGULATORY SETTING

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act of 1966, as amended, (NHPA) 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 CFR 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Office (SHPO), and the Department went into effect for Department 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 the Department. The FHWA's responsibilities under the PA have been assigned to the Department as part of the Surface Transportation Project Delivery Pilot Program (23 CFR 773) (July 1, 2007).

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties.

Historical resources are considered under CEQA as well as under the California 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 the Department to inventory state-owned structures in its rights-of-way.

AFFECTED ENVIRONMENT

A historic property survey report (HPSR) was prepared for the project. This report followed the requirements of the January 2004 *Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding 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). The HPSR determined a CEQA finding of no impact to historic properties and a Section 106 determination of no historic properties affected.

As part of the HPSR, the area of potential effect (APE) for the project was established as a narrow corridor from the interstate center line, northward to the edge of the right-of-way limits and south of the ROW in seven locations. The APE includes construction staging areas and any locations where noise abatement would be feasible.

A records search for the project APE identified 70 projects in the vicinity with existing archaeological surveys. Field methods used to prepare the surveys were reviewed in the HPSR and

found to be consistent with modern standards. Areas not covered in the existing surveys (about 54 acres) were surveyed by cultural resource specialists. These efforts determined that no known archaeological sites are present within the project APE.

Field inspections were conducted by an architectural historian to identify architectural historical resources within the project APE. No architecturally historic buildings were identified. Three transportation resources originally constructed before 1963 were identified. These resources are California Historic Bridge Inventory Category 5 structures, which have been determined not eligible for listing in the National Register of Historic Places and are exempt from further evaluation under Section 106 PA.

ENVIRONMENTAL CONSEQUENCES

The research and studies conducted for the project determined that there are no historical or cultural (archaeological) resources within the project APE and therefore the project would not affect or impact any historical or cultural resources. Based on this finding, the project would not result in the use (direct or indirect) of a historic property qualifying for protection under Section 4(f).

Temporary Construction Impacts

Although no known historical or cultural (archeological) resources exist within the project area, construction activities could unearth previously unidentified resources.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will 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 shall be contacted. Pursuant to Public Resources Code 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 contractor who discovered the remains will contact Caltrans Office of Cultural Resource Studies, District 4, Environmental Division 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.

2.2 Physical Environment

2.2.1 Hydrology and Floodplain

Information for this analysis comes primarily from the Project Report for the proposed project and the Environmental Assessment/Initial Study for the I-580 Eastbound HOV Lane Project. These documents rely on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM); Flood Insurance Studies (FIS) for the cities of Dublin, Livermore, and Pleasanton, and unincorporated Alameda County; United States Geological Survey (USGS) topographic maps;

and the Zone 7 System Map prepared for the Alameda County Flood Control and Water Conservation District.

REGULATORY SETTING

Floodplain and Storm water-Related Flooding

Executive Order 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 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; and
- 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."

AFFECTED ENVIRONMENT

Regional Hydrology

The project lies within the San Francisco Bay Area, a region with a predominately Mediterranean climate consisting of warm, dry summers, and mild, wet winters. The project site is located inland from the San Francisco Bay in the Amador and Livermore valleys. The valley floors are generally flat and covered with a layer of clay soils that frequently prevents drainage to deeper subsurface alluvial soils. As a result, during the region's winter rainy season, localized flooding is common in the vicinity of the project area.

The project is located within the greater Arroyo Mocho watershed. The watershed has a drainage area of 175 square miles. Several creeks cross the project area including the Tassajara Creek, Arroyo Mocho, Arroyo Las Positas, and Arroyo Seco. Project area runoff eventually drains to these creeks. Tassajara Creek drains from north of the project site southward. Arroyo Las Positas flows east to west and drains into Arroyo Mocho. The Arroyo Mocho flows northwest from Mount Mocho, located near the Alameda County/Santa Clara County lines. Arroyo Mocho drains into the Arroyo de la Laguna, which flows into Alameda Creek and eventually to the San Francisco Bay and Pacific Ocean.

During the winter rainy season, frequent and substantial flooding occurs in the vicinity of the project area (the greater Amador and Livermore valleys). Storms vary in the amount of precipitation, as well as the severity and duration. Intense precipitation can contribute to rapid runoff rates, exacerbating creeks' flows where flooding or inundation may occur on the valley floor. The most severe flooding occurred in January, 1952 when Arroyo Seco inundated the then Western Pacific Railroad trestle and the valley, damaging railroad lines, bridges, utility lines, and buildings.

Frequent rainfall of lesser volume over several days can also cause localized flooding, as was experienced in the project area in 1955 and 1958. Frequent and/or intense precipitation has frequently overtopped stream channels in the project area and has sometimes resulted in some localized flooding in Dublin, Pleasanton, and Livermore.

Project Area Hydrology

Storm water drainage in the project area is typically channeled through a swale or ditch system situated along the outside shoulders of I-580.

Some storm water currently drains into the existing median in areas where it is planted with grasses, oleander, or other vegetation. With implementation of the Eastbound I-580 HOV Lane Project, the median will be removed and drainage will be generally redirected to the shoulders of the roadway. The I-580 Eastbound HOV Lane Project IS/EA documented that existing drainage patterns in the project area would be generally maintained and that there would be no direct or indirect impacts to offsite or cross-drainage facilities requiring mitigation.

FIRM and FIS maps, as documented in the Project Report, indicate that water volumes during a 100-year storm exceed the capacity of natural and man-made stream channels and storm water conveyance structures in the project area streams at the following locations:

- Arroyo Mocho Tributary (Line G-3) crosses I-580 at approximately 0.28-mile east of the Tassajara Road/Santa Rita Road interchange. Flooding occurs along the developed areas north and south of 1-580, east of the Santa Rita Road interchange (Line G-3), and at Fallon Road. Flow is conveyed through culverts 14 feet by 9feet, which could back up the creek during a 100-year storm and cause localized flooding.
- Arroyo Las Positas (Line H) crosses I-580 at three locations within the project area at approximately 1.15 miles east of the Airway Boulevard interchange, at the Cayetano Creek confluence (Line N), at 0.7-mile east of the North Livermore Avenue interchange, and at 0.3-mile east of the Vasco Road interchange at Northfront Road. Flooding can occur approximately 1 mile west of the First Street Interchange in an area designated as Zone A8; south of I-580 and west of the North Livermore interchange designated as Zone A7, as well as upstream within an area designated as Zone A5. All of these locations are within the 100-year floodplain. Flooding that occurs downstream of I-580 (east of the Airway Boulevard interchange) is not anticipated to impact I-580 and the Arroyo Las Positas channel is anticipated to be able to convey 100-year storm water flows through the project area.
- Arroyo Seco (Line P) crosses I-580 at approximately 0.37-mile west of the Livermore Boulevard interchange: The creek is adequately conveyed within culverts 14 feet by 9 feet. Immediately downstream of I-580, Arroyo Seco is designated with the Zone

AE 100-year floodplain where a drop structure at the confluence of Arroyo Seco and Arroyo Las Positas can cause a backup of storm water drainage at the downstream end of the I-580 crossing. Arroyo Seco channel is anticipated to be able to convey 100-year storm water flows through the project area.

- The initial FIRM map for Tassajara Creek, dated 1984, showed flooding along the north side of I-580 at the Tassajara Creek crossing. Creek improvements were made in 1998 through 2000 to improve creek conveyance under I-580. The original FIRM was revised in November 2002, and the Tassajara Creek is now contained within the channel banks. According to FIRM maps, flooding does not occur on the south side of I-580 in Pleasanton. The Tassajara Creek Bridge is calculated to be of sufficient span to permit the unimpeded flow of the creek during a 100-year storm.

Floodplain Inundation Potential

The project area is above the existing FEMA 100-year water level for the entire project length with three exceptions.

- In the vicinity of Station 175+00 near the San Ramon Road/ Foothill Road Interchange, the 100-year water level is up to 0.6 feet above the proposed shoulder edge of pavement.
- In the vicinity of Station 260+00 near the Dougherty Road/Hopyard Road Interchange, the 100-year water level is up to 1.9 feet above the proposed shoulder edge of pavement.
- In the vicinity of Station 380+00 near Tassajara Road, the 100-year water level is up to 2.9 feet above the proposed shoulder edge of pavement.

This could inundate portions of the freeway but would not overtop the median. Berms and/or barriers will be constructed in order to limit the roadway inundation during the FEMA 100-year event. At remaining locations, the FEMA 100-year water level is below the edge of pavement.

In the project vicinity, inundation of overbank areas during a 100-year flood (the maximum base flood elevation that could occur in a 100-year period) was evaluated in the IS/EA for the I-580 Eastbound HOV Lane Project, which determined the following:

- Downstream of the Arroyo Las Positas crossing of I-580, east of Kitty Hawk Road, a 100-year flood has the potential to inundate an area of approximately 19.3 acres.
- Upstream of the Arroyo Las Positas crossing of I-580, a 100-year flood would be contained in the channel; there is potential that a small area in the southwest quadrant of the I-580/North Livermore Avenue interchange would be inundated, however, Zone 7 owns this channel and it is not anticipated that flooding would impact the roadway or other areas of the floodplain.
- Upstream of the Arroyo Las Positas crossing of I-580, east of the I-580/North Livermore Avenue interchange, a 100-year flood has the potential to inundate an area of approximately 21.8 acres.

- Downstream of the Arroyo Seco crossing of I-580, the base flood has the potential to inundate an area of approximately 4.8 acres.

The 1998 through 2000 Tassajara Creek improvements eliminated the overbank flooding that FEMA had previously shown on the FIRM for the area immediately upstream of the I-580 crossing.

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ENVIRONMENTAL CONSEQUENCES

Implementation of the Build Alternative would place new structures (primarily bridge supports and culvert extensions) within the FEMA designated floodplain.

Floodplain Encroachment

The following bridges are proposed for modification under the Build Alternative:

- Arroyo Seco Bridge, # 33-0066, at Post Mile 11.04 in the westbound direction;
- Arroyo Las Positas Bridge, # 33-0085, at Post Mile 11.72 in the west and eastbound directions;
- Arroyo Las Positas Bridge, # 33-0203, at Post Mile 13.13 in the west and eastbound directions; and
- Tassajara Creek Bridge, # 33-0015, at Post Mile 18.32 in the west and eastbound directions.

Regulations governing the National Flood Insurance Program (23 CFR 650, Subpart A, Section 650) were used, in part, as guidance for the evaluation of floodway impacts. Section 650.111 of the regulations calls for location hydraulic studies to be performed with detailed engineering design drawings, and it lists five location considerations to be examined for floodplain encroachments (which coincide with the policies of FHWA):

1. Risks associated with implementation of the action.
2. Impacts on the natural and beneficial floodplain values.
3. Avoid support of incompatible floodplain development.
4. Measures to minimize impacts associated with the action.
5. Measures to restore and preserve the natural and beneficial floodplain values affected by the action.

Risks Associated with Implementation of the Action

As defined by FHWA, a significant encroachment is a highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction or flood-related impacts: 1) a significant potential for interruption or termination of a transportation

facility that is needed for emergency vehicles or that provides a community's only evacuation route; 2) a significant risk; or 3) a significant adverse impact on the natural and beneficial floodplain values.

Based on available information, the project would not have a significant impact on any of the waterways that cross the roadway within the project limits. Bridge modification and widening would be necessary to accommodate the proposed HOV lane and provide standard shoulder and median widths. Bridge widening would require placing additional support piers within the floodplain. These piers would be placed in the same alignment as existing bridge support piers to reduce to the extent possible obstructions to water flows under the bridge. As a result, the widening of the bridges is not anticipated to significantly change the water surface elevations as currently defined on the FEMA FIRMs.

Project drainage facilities would be designed to mitigate the small increase in runoff from the increase in paved areas. There would be no adverse effects to emergency vehicle access, or to natural or beneficial floodplain values. There would be no significant floodplain risk.

Impacts on Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values include, but are not limited to, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agricultural, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge. There is approximately 0.242 acre of wetlands within the vicinity of the project area. Natural communities, habitat for special-status species, and impacts to wetlands and other waters of the U.S. are described in **Section 2.3**, Biological Environment.

Support of Incompatible Floodplain Development

Although portions of the project would be located on the fringe of a floodplain, the project would not support incompatible floodplain development. While the bridge widenings would occur in the 100-year floodplain, they would not provide access to the existing floodplain nor create the potential for incompatible development within the floodplain. The proposed highway improvements would maintain local and regional access to existing land uses and would not create new access to developed or undeveloped lands.

Measures to Minimize Floodplain Impacts Associated with the Action

In the existing condition, 100-year flood flows are contained within the creek channels for the creeks adjacent to the proposed widened bridge structures, passing through reinforced concrete box culverts and the soffits of the bridges. It is not anticipated that the project would cause base flood elevations to overtop the freeway or other roadways such that there would be an interruption in traffic or the ability of emergency service providers to respond to an emergency, or that would result in an impact on the natural and beneficial floodplain values (support of biological species).

Measures to Restore and Preserve the Natural and Beneficial Floodplain Values Impacted by the Action

There are no identified significant impacts to natural and beneficial floodplain values. No non-routine measures would be required. Any environmental impacts would be the result of

construction activities and would be mitigated with standard measures, such as revegetation, Best Management Practices (BMPs), and project permit requirements.

Temporary Construction Impacts

Construction activities between existing creek top of banks would occur during the dry-season and therefore would not result in impacts to flooding in the project area or vicinity.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The existing onsite drainage pattern would be maintained, with new drainage facilities constructed to replace the existing drains and matching the new roadway improvements. Drainage facilities would be designed to accommodate the increase in runoff from the increase in paved areas; therefore, no adverse effects would occur to natural or beneficial floodplain values would occur.

The ACCMA would obtain all necessary permits and approvals from USACE; Alameda County Flood Control and Water Conservation District, Zone 7; CDFG; USFWS; and the RWQCB.

2.2.2 Water Quality and Storm Water Runoff

Information for this analysis comes primarily from the sources and agencies identified in **Section 2.2.1**.

REGULATORY SETTING

Section 401 of the Clean Water Act (CWA) requires water quality certification from the State Water Resources Control Board (SWRCB) or from a Regional Water Quality Control Board (RWQCB) when the project requires a CWA Section 404 permit. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers (Corps) to discharge dredged or fill material into waters of the United States.

Along with CWA Section 401, CWA Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) permit for the discharge of any pollutant into waters of the United States. The Federal Environmental Protection Agency has delegated administration of the NPDES program to the SWRCB and nine RWQCBs. The SWRCB and RWQCB also regulate other waste discharges to land within California through the issuance of waste discharge requirements under authority of the Porter-Cologne Water Quality Act.

The SWRCB has developed and issued a statewide NPDES permit to regulate storm water discharges from all Department activities on its highways and facilities. Department construction projects are regulated under the statewide permit, and projects performed by other entities on Department right-of-way (encroachments) are regulated by the SWRCB's Statewide General Construction Permit. All construction projects of over 1 acre of disturbed soil area require a Storm Water Pollution Prevention Plan (SWPPP) to be prepared and implemented during construction. Department activities of less than 1 acre require a Water Pollution Control Program.

AFFECTED ENVIRONMENT

The project is within the jurisdiction of the San Francisco Bay RWQCB, which implements water quality protection through the issuance of permits for projects found to be in compliance with the San Francisco Basin Plan. The Basin Plan documents that in the project area, beneficial use of surface water is primarily for groundwater recharge (as opposed to water recreation or development or support of wildlife habitat). The stream corridors within the project area are generally under the jurisdiction of the Alameda County Flood Control and Water Conservation District, Zone 7 Water Agency, which also tracks and regulates groundwater quality and aquifer levels.

Zone 7 has documented that groundwater quality in the project area is generally good, with Total Dissolved Solids (TDS) being measured at approximately 500 milligrams per liter in the municipal wells. Zone 7 has a Salt Management Plan to prevent excess salt loading in groundwater that could reduce water quality.

The existing drainage facilities in the project area are generally older and do not have many best management practices (BMPs). As a matter of law, implementation of the Build Alternative would require upgrading these facilities to incorporate permanent BMPs, as well as incorporation of construction BMPs to prevent impacts to water quality during construction (such as excessive erosion or sedimentation). These BMPs are outlined in the Department's Statewide Storm Water Management Plan (SWMP).

ENVIRONMENTAL CONSEQUENCES

Under the No-Build Alternative, drainage facilities would not change and no additional impervious surface would be added. However, because traffic volumes are anticipated to increase, there could be impacts to water quality from runoff polluted by vehicle emissions and other related toxins (such as heavy metals from tire and brake wear). The increase in vehicle traffic could result in an increase in the amount of vehicle-related toxins entering groundwater and local stream channels.

The Build Alternative would result in widening of the westbound I-580 roadway surface to accommodate the new HOV lane and auxiliary lanes. Additionally, bridges and interchange on-ramps would be widened in both eastbound and westbound directions to accommodate the freeway widening and HOV bypass lanes on the ramps. Preliminary estimates are that the project would add approximately 32 acres of impervious area which would in turn reduce the amount of rain falling directly onto permeable soils and increase storm water runoff velocity volume.

Temporary Construction Impacts

Earth-moving and other construction activities could cause erosion and runoff of topsoils into the project area drainage systems. Soil erosion and increased runoff during construction could temporarily affect water quality in local waterways.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The existing onsite drainage pattern would generally be maintained with new drainage facilities incorporating temporary and permenant BMPs intended to stabilize soil and prevent contaminants

and soil from entering drainage facilities. Permanent Treatment BMPs treat storm water runoff and remove contaminants and sediments that have entered the runoff. The project's Section 401 NPDESS permit will likely stipulate that Permanent Treatment BMPs to control pollutant discharges be considered and implemented for all new or reconstructed facilities. The use of detention basins and biofiltration swales/strips will be the primary Permanent Treatment BMPs proposed for this project.

Additional runoff from the increase in impervious area would be handled by a series of roadside ditches and drainage systems. These ditches and drainage systems would be mostly sized to account for on-site runoff. Peak runoff volumes would be calculated for the new drainage systems with proposed discharge locations. Drainage facilities would be designed to accomodate the increase in runoff from the increase in paved areas; therefore, no adverse effects would occur from project-related storm water runoff.

Construction activities would adhere to the Department's Statewide NPDES permit which regulates storm water discharges from activities on its freeways and highways. Additionally, the project engineer or construction contractor would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in compliance with the Basin Plan prepared by the RWQCB and the SWMP. Incorporation of these BMPs and any measures outlined in the SWPPP would ensure that the Build Alternative would not adversely affect water quality in local waterways or groundwater quality. It is anticipated that these measures would improve runoff quality to some extent as these facilities are upgraded.

2.2.3 Geology/Soils/Seismic/Topography

Information in this section is primarily based on information from previously prepared geotechnical reports for the I-580 Eastbound HOV Lane Project. This report synthesizes published and unpublished geologic, and soil and groundwater data. A separate geotechnical report was not prepared for the project as the I-580 Eastbound HOV Lane Project located along nearly the same section of I-580.

REGULATORY SETTING

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

This section 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 highway and highway-related structures. The cities of Dublin, Pleasanton, and Livermore, and Alameda County, each have policies in their general plans related to protecting public safety during seismic events. This is accomplished through planning developments that would be used by large numbers of people (such as housing, roads, public buildings) in locations that are less susceptible to earthquake-related ground failure and by ensuring that any new development is appropriately engineered to withstand a sizable seismic event. The Department's Office of Earthquake Engineering is responsible for assessing the seismic hazard for state highway and freeway projects. The current policy is to design facilities to withstand the calculated anticipated Maximum Credible Earthquake

(MCE) from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

AFFECTED ENVIRONMENT

The terrain of the project area gradually slopes downwards from the eastern project boundary at Greenville Road, which is at an approximate elevation of 177 feet above mean sea level, to the western project boundary at San Ramon Road/Foothill Road at an approximate elevation of 113 feet. Within the project area, the highest elevation is approximately 177 feet and the lowest is approximately 101 feet. No natural landmarks or other examples of a major geologic feature (such as a scenic rock outcropping) occur in the project area.

Subsurface Geology/Site Soils

The regional geology of the project area is similar to other parts of the Northern California Coast Ranges, consisting of a complex series of northwest-trending synclines and anticlines (folded rock layers) with a number of northwest-trenching faults.

The region consists of marine and non-marine sedimentary strata whose age ranges from Tertiary Oligocene-Miocene formations of the Contra Costa Group and the San Pablo Group to Holocene aged alluvial soils. The region has been cut by a complex series of high-angle thrust and strike slip faults. This folding and the faulting have produced the northwest trending ridge and valley systems. These valleys have been filled with Pleistocene to Holocene alluvium, derived from the surrounding ridges.

The project is located in the Livermore Valley, which is underlain by water-bearing unconsolidated alluvial, stream channel, and basin sediments, which were deposited beginning in the late Pleistocene era. Early in the period of alluvial deposition, large streams draining the Livermore Valley from east to west converged in the northwest corner of the valley and flowed northward through the San Ramon Valley to the current Suisun Bay area. Sheets of clean gravel gradually accumulated over much of the valley floor and continuous sheets of silt and clay were deposited on top of the previously deposited gravel layers, particularly in the western portion of the valley. At least four thick clay layers, separated by extensive gravel beds, are known to be present in the western portion of the valley. According to published geologic maps (Helley and Graymer, 1997), the majority of the surficial material are in floodplain deposits, alluvial terrace deposits, and alluvial fan deposits (Qpaf), and the subsoil conditions generally consist of stiff to hard lean clay/sandy lean clay interbedded with medium dense clayey/silty sand.

Groundwater

The groundwater level in the project area is expected to vary over time due to seasonal groundwater fluctuations, flows in the creeks, surface and subsurface storm water and groundwater flows, and other environmental factors such as the amount of precipitation in a given month. Based on data from the National Oceanic and Atmospheric Administration (NOAA), average total annual precipitation is around 14.5 inches in the project area. Most of the rainfall is recorded in January, with an average total monthly precipitation of 3.0 inches; July is the driest month. As documented in the Geotechnical Report for the I-580 Eastbound HOV Lane Project, groundwater was encountered at a depth of 25 to 30 feet below the ground surface at the I-580/El Charro Road and

proposed I-580/Isabel Avenue Interchanges. At the Vasco Road interchange, groundwater was encountered at a depth of 7 to 20 feet below the ground surface.

Potential Geologic Hazards

The project area is in a seismically active region of the state and there is a potential for damage to highway-related structures (e.g., bridges, culverts, sound walls, retaining walls) during a major earthquake due to ground shaking, surface fault rupture, and liquefaction. The project area is located in the Greenville Fault Zone, a mapped Alquist-Priolo Earthquake Fault Zones (EFZ)[6], where strong ground shaking is possible and where the potential for fault rupture is considered relatively high. Based on the California Seismic Hazard Map (Mualchin, 1996), the controlling faults in the area are the Calaveras-Pacines-San Benito Fault and the Greenville Fault.

MCE magnitudes for the major faults in the project area are summarized in **Table 2.2.3-1**. These MCE magnitudes represent the largest earthquakes that could occur on the given fault based on the current understanding of the regional tectonic structure.

ENVIRONMENTAL CONSEQUENCES

Fault Rupture and Ground Shaking

The potential for fault rupture across the fault or shear zone is considered relatively high and the possibility of the project site to experience strong ground shaking may be considered moderate to high. Without proper seismic engineering, this could result in damage or collapse of culverts, retaining walls, and other structures currently existing or planned under the Build Alternative.

Table 2.2.3-1 Characteristics of Faults in Project Area

Fault Name	Fault Type	Estimated Closest Distance to the Project Area (km/mi)[1]	MCE Magnitudes (Mw)	Peak Bedrock Acceleration[2]
Greenville	Strike-slip	6.8	7.25	0.49
Calaveras-Pacines-San Benito	Strike-slip	12.5	7.5	0.38
Coast Ranges-Sierran Block	Reverse including thrust	12.5	7.0	0.38
Verona-Williams	Unknown type	9.4	6.0	0.29
Hayward	Strike-slip	23	7.5	0.24

Source: Parikh Consultants, Inc., 2006.
[1] Mualchin, 1996
[2] Sadigh, 1997

Liquefaction

Due to the geologic composition of the project area, liquefaction is not considered likely in the soils that underlie the project area. Liquefaction is a phenomenon in which saturated cohesionless soils

[6] Alquist-Priolo Earthquake Fault Zones are regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. This indicates that an active fault is present within the zone and the fault may pose a risk of surface fault rupture to existing or future structures. In these zones, a fault study may be required before the parcel can be subdivided or before most structures can be permitted.

are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Although the groundwater table is relatively high, the clay-based soils that underlie the majority of the project area are generally not susceptible to liquefaction, which is more likely to occur in submerged cohesionless sands and silts of low relative density. Some sandy soils occuring in the area near the I-580/Vasco Road interchange could be susceptible to liquefaction and differential settlement.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Under the Build Alternative, any structures being modified would be constructed in compliance with the Department's standard design and construction guidelines. For older structures not being modified, some structural features may remain that could be susceptible to seismic damage.

2.2.4 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 or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78]). Under California law, paleontological resources are protected by CEQA, the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and Public Resources Code Section 5097.5.

AFFECTED ENVIRONMENT

As documented in the paleontological resource impact report (PRIA) that was prepared for the project, the general project vicinity has been mapped and described by many geologists. The information in these geologic maps and reports formed the basis of the evaluation contained in the PRIA, and, as follows, the analysis in this section. The project is located within the geologic Livermore Basin, a large structural trough with a Cenozoic deposition. The stratigraphic units that compose the basin are Mesozoic metamorphic and sedimentary rocks and Cenozoic sedimentary rocks. The PRIA identified four stratigraphic units that may be impacted during project construction activities. They include Quaternary alluvium, Livermore Gravel, Cierbo Sandstone, and Orinda Formation. Construction of the project will disturb the Quaternary alluvium and Livermore Gravel units. The thickness of the Cierbo Sandstone and Orinda Formation units located in the eastern portion of the project area is unknown and therefore, it is possible that these units will be disturbed during the construction of the project.

ENVIRONMENTAL CONSEQUENCES

Literature reviews and a records search conducted for the PRIA did not document previously recorded fossil sites within the project area. However, the four stratigraphic units identified in the project area have been known to contain significant and scientifically important paleontological resources at numerous sites in the San Francisco Bay Area. Three previously recorded fossil sites are documented within 1 mile of the project area and one previously unrecorded fossil site was identified within 1 mile of the project area during the field survey conducted as a part of the PRIA.

Excavations during project construction would be up to approximately 18 feet in depth, and augering for concrete piles could be greater than 45 feet in depth. Excavations deeper than approximately 4 feet (modern soil depth) have the potential to affect important scientific paleontological resources within in the project area.

While no known fossils directly underlie the project area, all four stratigraphic units have a high sensitivity for producing additional paleontological resources. Fossil remains salvaged during project construction activities could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in Alameda County and could result in a more accurate reconstruction of the geologic and paleobiologic history of the Livermore Valley, the greater San Francisco Bay Area, and the Central California Coast Ranges.

Potential impacts on paleontological resources resulting from construction of the project will primarily involve terrain modification (excavations and drainage diversion measures). Paleontological resources, including an undetermined number of fossil remains and unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata, could be adversely impacted by ground disturbance and earth moving associated with construction of the project. Direct impacts could result from vegetation clearing, grading, widening of road cuts, and any other earth-moving activities that disturb or bury previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation. Thus, any project-related ground disturbance could have adverse impacts on significant paleontological resources.

Temporary Construction Impacts

Although no known apleotological resources exist within the project area, construction activities could unearth previously unidentified resources.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The following avoidance measures would reduce the likelihood of potential adverse effects to paleontological resources. Implementation of these measures prior to and during construction activities will ensure protection of resources within the Ciebro Sandstone, Orinda Formation, Livermore Gravel, and Quaternary alluvium.

Prior to the start of construction, a qualified paleontologist shall be retained to conduct a field survey of the project right-of-way to identify exposures of sensitive stratigraphic units that may be disturbed during project construction.

The majority of the construction work would be the widening of the freeway within the existing right-of-way by building up the road surface to the north of the existing freeway. Additional surface widening would occur on ramps on both the north and south sides of the freeway, in areas that have been already disturbed. If no sensitive stratigraphic units are identified within these areas, no impacts to paleontological resources are anticipated and no monitoring of these areas would be required.

For any areas where surface expressions of sensitive stratigraphic units are identified, and for any areas where subsurface excavation is anticipated, the project paleontologist shall both design and

implement a monitoring and mitigation program for the project. The paleontological mitigation program (PMP) will be designed by the project paleontologist consistent with Society of Vertebrate Paleontology (SVP) guidelines (SVP 1995, 1996) and with the Department's Standard Environmental Reference (SER). The PMP will include at a minimum

- Preconstruction coordination;
- Construction monitoring;
- Data recovery;
- Fossil treatment;
- Curation procedures; and
- Reporting.

Measures contained in the PMP would reduce potential paleontological resource impacts to a less-than-significant level by allowing for the recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might be lost.

A PMP could result in beneficial effects on paleontological resources through the discovery of fossil remains that would not have been exposed without project construction activities. Salvage of fossil remains, as part of the PMP, could help provide information about the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the project area.

2.2.5 Hazardous Waste/Materials

This section assesses the potential environmental concerns associated with the past and/or present uses of the project area in regards to the presence of hazardous waste/materials. Information in this section is based upon the Phase I Initial Site Assessment (ISA) (2006) prepared for the project's Preliminary Environmental Analysis Report. Resources utilized in the preparation of the ISA include:

- Standard federal, state, and regional environmental "record sources" (e.g., the Federal Superfund List) pinpointing incidents of spills; soil and groundwater contamination; and hazardous materials transfer, storage, or disposal facilities within a 0.9-mile-wide band along the project corridor;
- Historical aerial photographs identifying previous land uses in the area; and
- Field reconnaissance of the project vicinity identifying the potential for proximate hazardous wastes sites and or associated land uses that might adversely affect the corridor.

REGULATORY SETTING

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating 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 for "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 and Health Act (OSHA);
- Atomic Energy Act;
- Toxic Substances Control Act (TSCA); and
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

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*. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

AFFECTED ENVIRONMENT

Based on a review of historical resources, the project area formerly consisted of mixed undeveloped and agricultural land uses from at least 1957 through 1963. By the late 1960s, the area now occupied by the I-580 corridor had developed into a highway, and soon afterwards into an operational freeway. Since the late 1960s, much of the agricultural and undeveloped land surrounding the I-580 corridor has gradually been developed into residential and commercial land uses. Changes to the project area over the past 40 years have been limited to structural improvements to the freeway, including the construction of various overpasses and interchanges.

An environmental regulatory database search was conducted for the project area and surrounding properties in order to identify nearby hazardous waste/material sites and/or unauthorized releases with the potential to impact the project. Sites were considered to warrant further consideration if they were: (1) located within 656 feet from the edge of the proposed right-of-way; (2) thought to be located hydrologically upgradient of the right-of-way with respect to anticipated groundwater flow; and/or (3) located hydrologically upgradient with respect to surface water flow/storm water runoff.

In addition to the regulatory database review, available regulatory agency records were reviewed for sites that were identified by the database and required further consideration. A site reconnaissance of the project area was conducted in October 2006 in order to further identify nearby sites or land uses that might contain hazardous materials that could adversely affect the project.

Identified Hazardous Waste/Materials Sites

The majority of hazardous waste/materials sites identified by the regulatory databases were located hydrologically downgradient and/or further than 220 yards from the project area. Therefore, the majority of the sites identified in the project vicinity were not considered to pose risks related to hazardous materials. The seven remaining sites that were identified as potential environmental concerns are as follows:

- Four sites in Livermore were identified with the potential to adversely impact the project area: Livermore Dublin Disposal (6175 Southfront Road), Caltrans Maintenance Yard (6153 Southfront Road), Union 76 gas station (115 South Vasco Road), and a property located at 6219 Southfront Road. Because substantial new right-of way is not expected to be required to construct the westbound HOV lane, these properties are not likely to be impacted by the project. Therefore, further investigation of these sites is not warranted.
- Bay-Cal Equipment, located at 5605 Southfront Road in Livermore, was identified by the regulatory database as a historical Underground Storage Tank (UST) site. A review of local regulatory files indicated that this site was formerly equipped with gasoline and waste oil USTs that were removed in 1989. No information regarding subsurface soil sampling during the removal of the USTs was on record with the local agencies. Due to the nature of the materials stored in the USTs, and due to the lack of documented sampling that occurred when the USTs were removed, there is a potential that a release of hazardous materials/petroleum products has occurred at this site. However the portion of the project in the vicinity of this property would not involve construction activities outside the existing I-580 right-of-way and therefore further investigation of this site is not warranted.
- Dublin Rock & Ready Mix, located at 6393 Scarlett Court in Dublin, was identified by the regulatory database as a Leaking Underground Storage Tank (LUST) site for the unauthorized release of petroleum hydrocarbons. Several subsurface investigations have occurred at this site; however, the extent of the groundwater contamination from this release has not been fully characterized. Due to the fact that this site is located hydrologically upgradient and within 656 feet of the project area, there is a potential that contaminated groundwater from this site has impacted the project area. Appropriate health and safety measures should be implemented if excavation activities related to the project are expected to be at depths where groundwater would be encountered. Due to the fact that groundwater levels surrounding this site are between approximately 1 and 7 feet below ground surface, potentially contaminated groundwater may be encountered during excavation activities necessary for the project near this site.
- Lucky Stores Inc., located at 6300 Clark Avenue in Dublin, was identified by the regulatory database for the unauthorized release of petroleum hydrocarbons. Due to

the fact that this site is located hydrologically upgradient and within 656 feet of the project area, there is a potential that contaminated groundwater from this site has impacted the project area. Appropriate health and safety measures should be implemented if excavation activities related to the project are expected to be at depths where groundwater would be encountered. Due to the fact that groundwater levels surrounding this site are between approximately 1 and 7 feet below ground surface, potentially contaminated groundwater may be encountered during excavation activities for the project near this site.

Agricultural Chemicals

The majority of the area surrounding the project has been historically utilized as farmland or land used for grazing and raising livestock. Agricultural land of this type commonly contains contaminants such as pesticides, herbicides, materials deposited in animal wastes, and other farming- and livestock-related chemicals.

Over time, agricultural chemicals in the soil can react in a variety of ways, breaking down and leaching into surface water runoff or groundwater, turning into a gaseous state, chemically binding with the soil, or become absorbed in plants or microorganisms. Exposure to pesticide/herbicide residues can potentially harm plants and animals and contaminate water resources. These chemicals can also pose human health hazards, such as respiratory, gastrointestinal, allergic, or neurological symptoms or diseases.

Aerially Deposited Lead

Until their use in the 1990s was banned, additives in gasoline expelled lead-based compounds from engine exhaust. Consequently, lead was aerially deposited as a particulate, frequently concentrating onto the adjacent road shoulders and in medians. Lead can be hazardous to humans as exposure can adversely affect the nervous, circulatory, and reproductive systems and can severely damage the brain and kidneys. The USEPA has determined that lead is a probable human carcinogen.

Historical aerial photographs show that the project area has supported vehicular traffic from the early 1950s. Due to this long-term vehicular activity, it is likely that the surface soils at intersections and along the roadways contain aerially deposited lead (ADL).

Asbestos and Lead Based Paint

Asbestos was commonly used in construction materials, such as insulation in buildings and piping, until the 1980s, when its use was phased out. Similarly, lead-based paints, such as the ones used to paint overpasses, were used up until 1978. Health effects related to lead were previously discussed under the discussion of aerially deposited lead. Inhaling asbestos fibers can result over time in respiratory damage and heart enlargement related to Asbestosis. The Department of Health and Human Services (DHHS), the World Health Organization (WHO), and the USEPA have determined that asbestos is a human carcinogen.

There are a number of structures in the project area within the proposed right-of-way of that could require replacement or modification. These structures include retaining walls, overpasses, and bridge structures and appear to be constructed prior to the 1980s. Many may contain asbestos, particularly in older concrete, and lead-based paint. Surveys for lead-based paint and asbestos

containing materials (ACMs) should be conducted prior to the modification or replacement of any structures within the right-of-way. Lead-based paint and ACMs should be properly abated in accordance with state and federal regulations.

ENVIRONMENTAL CONSEQUENCES

There is a potential that lead paint and asbestos are present in existing bridge structures, and other structures that would be modified or replaced with the implementation of the project. Bridge and other freeway related structures built prior to 1982 most likely contain both asbestos and lead-based paint. During demolition of these structures, construction workers may be exposed to asbestos and/or lead paint, which could result in significant health hazards.

As discussed previously, several sites in the project study area known to have active cases for the unauthorized release of various petroleum hydrocarbons. Due to the close proximity of these sites, and the fact that they are located hydrologically upgradient, construction activities such as grading and excavation could result in contamination from these sites being encountered during construction.

The dominant land use within the study area has historically been agriculture; it is possible that the soils are impacted with pesticides and herbicides as a result of historical and current farming operations. The amount and type of residue present is unknown at this time since soil testing has not been completed and it is possible that levels are above permitted State of California background levels. If potentially harmful levels of pesticides and/or herbicides are present, grading and earth-moving activities could expose the public or construction workers to contaminated soil that is hazardous to their health.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Section 19827.5 of the California Health and Safety Code prohibits local agencies from issuing demolition or alteration permits until the Department or its assignee has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos. Therefore, the following mitigation measure will ensure compliance with the safety code and will reduce impacts from lead and asbestos to a less-than-significant level.

Prior to the issuance of permits to construct, a project area Phase II Environmental Site Assessment report shall be completed by a qualified hazards specialist as approved by the Department. As part of the Phase II study, bridge and freeway-related structures to be modified or replaced shall be surveyed by a certified asbestos surveyor and tested for lead by an AHERA Accredited Building Inspector. A work plan for demolition will be developed and included in the Phase II report.

The recommendations of the Phase II study shall be incorporated into final project plans. Demolition shall comply with the California Department of Occupational Safety and Health (CAL/OSHA) requirements regarding asbestos and lead paint removal. Asbestos and lead-based paint shall be removed and appropriately contained off-site, prior to structure modification or replacement, by experts qualified to identify and remove these materials.

The Phase II study shall conduct soil and groundwater sampling around the areas of the identified release sites within the project right-of-way and remediate any concentrations of hazardous materials as appropriate. During the Phase II study, the project right-of-way shall be superimposed on property maps to identify and expand upon areas of potential concern. A sampling plan shall be prepared and shall be approved by the responsible agencies (health department or fire department) of Alameda County and the cities of Livermore, Dublin, and Pleasanton. Once the sampling plan is approved, a subsurface investigation will be conducted to determine the specifics of any soil and groundwater contamination within the project right-of-way and appropriate remediation measures. Results shall be included in the Phase II study. Recommendations of this study shall be implemented prior to issuance of the permit to construct. Measures may include the removal and off-site disposal of contaminated soil that may be affected by the project, and/or on-site capping of contaminated soil within the project right-of-way. State oversight and regulatory approval of cleanup shall occur as necessary.

The sampling and remediation plan shall also address the level of pesticides and herbicides in the soil from previous agricultural applications.

2.2.6 Air Quality

An air quality technical report was prepared in order to consider the potential air quality impacts of the project. This report was based in part on the analysis of a previous air quality study, the *Air Quality Impact Technical Report for the I-580 Eastbound High Occupancy Vehicle Lane Project*, which was prepared in October 2007 to assess similar potential air quality impacts from the I-580 Eastbound HOV Lane Project.

REGULATORY SETTING

The Clean Air Act, as amended in 1990, is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns. The criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 Clean Air Act Amendments, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the State Implementation Plan (SIP) for achieving the goals of the Clean Air Act requirements. Conformity with the Clean Air Act takes place on two levels—first, at the regional level and second, at the project level. The project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for CO, NO_2, and O_3. California is in attainment for the other criteria pollutants. At the regional level, regional transportation plans (RTP) are developed that include all of the transportation projects planned for a region over a period of years – usually for at least 20 years. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Metropolitan Transportation Commission (MTC) for

the San Francisco Bay Area and the appropriate federal agencies, such as the FHWA, make the determination that the RTP is in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project level also requires "hot spot" analysis if an area is categorized as "nonattainment" or "maintenance" for CO and/or PM. A region is a nonattainment area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called maintenance areas. There are specific standards for projects that require a "hot spot" analysis. In general, projects must not cause the CO standard to be violated and, in nonattainment areas, the project must not cause any increase in the number and severity of violations. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s).

More specifically, the Environmental Protection Agency (EPA) published a final rule establishing the transportation conformity criteria and procedures that determine which transportation projects must be analyzed for local air quality impacts caused by PM ($PM_{2.5}$ and PM_{10})[7] within nonattainment and maintenance areas (71 FR 12468). The Bay Area has met the federal PM_{10} standards and therefore the project is not subject to a hot spot analysis for PM_{10}.

The proposed project is included in the Transportation 2030 Plan for the San Francisco Bay Area (Amendment May 2007) which was found to conform by ABAG and MTC on February 23, 2005, and FHWA and FTA adopted the air quality conformity finding on March 17, 2005. The project is also included in the MTC financially constrained 2009 Regional Transportation Improvement Program (RTIP), page 222. The MTC 2009 Regional Transportation Improvement Program was found to conform by FHWA and FTA on November 17, 2008. The design concept and scope of the proposed project is consistent with the project description in the 2005 RTP, the 2009 RTIP and the assumptions in the MTC regional emissions analysis.

AFFECTED ENVIRONMENT

Meteorological conditions such as wind speed, atmospheric stability, and the altitude at which pollutants are mixing and dispersing with atmospheric conditions affect the region's air quality. Variations in long-term air quality conditions result from changes in the type and amount of air pollutant emissions. Temporary, short-term variations (like seasonal or daily conditions) result from frequent changes in atmospheric conditions.

For example, meteorological factors of the San Francisco Bay Area, such as clear skies and relatively warm temperatures (common during the summer months) mix with localized and/or transported pollutant emissions and decrease air quality conditions. However, the San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality.

[7] Particle pollution contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream. PM10 refers to particles that are 10 micrometers in diameter, and PM2.5 refers to particles that are 2.5 micrometers in diameter.

The Bay Area Air Quality Management District (BAAQMD) monitors air quality conditions at more than 30 locations throughout the Bay Area. The Livermore-Rincon Avenue Monitoring Station is the closest air monitoring station to the project area. The highest criteria air pollutant concentrations measured in any one year at the stations closest to the project measured: 0.016 ppm of 1-hour O_3 in 2002, 58 $\mu g/m^3$ for 24-hour PM_{10}, and 62 $\mu g/m^3$ 24-Hour $PM_{2.5,}$ and are shown in **Table 2.2.6-1**. The number of days that an ambient air quality standard was exceeded in Livermore near the project area was recorded mostly in 2002 and 2006 at 10 and 13 ozone occurrences, respectively. **Table 2.2.6-2** shows the occurrences for 2002-2006 in the Livermore area and the Bay Area.

O_3 is the pollutant of most concern in the project area as prevailing summertime wind conditions tend to cause a build-up of O_3 in Alameda County. The O_3 8-hour National Ambient Air Quality Standards (NAAQS) were exceeded on zero to six days annually, while the 1-hour California Ambient Air Quality Standards (CAAQS) for O_3 were exceeded from five to 13 times in 2002-2006. The highest number of O_3 exceedances occurred during an extreme mid-summer heat wave during 2006.

A second pollutant of concern in the project area is PM. PM_{10} was measured in Livermore, having exceeded the state 24-hour standard twice in 2002 and three times in 2006. $PM_{2.5}$ is not measured in Livermore or near the project area levels measured in Livermore have exceeded the NAAQS during the past two years.

In addition to the criteria pollutants, mobile source air toxics also are regulated by the EPA in order to meet air quality attainment goals.

Mobile Source Air Toxics (MSAT)

Air toxics can originate from human-made sources such as on-road and non-road mobile sources (motor vehicles and airplanes), air sources (dry cleaners), and stationary sources (factories or refineries). These mobile source air toxics (MSAT) are a subset of the 188 hazardous air pollutants identified by the Clean Air Act as harmful to human health. MSATs are emitted into the air as fuel evaporates or passes through engines unburned.

Toxic Air Contaminants

Toxic Air Contaminants (TAC) is a broad class of compounds known to cause mortality or adverse health effects, and are often considered to be carcinogens. TACs are emitted from residential wood combustion, industry, agriculture, fuel combustion, and commercial operations (dry cleaners) and are typically found in low concentrations, even near their source (e.g., benzene near a freeway). TACs are regulated at regional and state levels. TACs can include the criteria air pollutants. Examples of TACs include benzene, formaldehyde, and diesel exhaust.

Meteorological conditions also contribute to localized TAC concentrations as cold, stagnant air traps smoke at ground levels. Without wind, high TAC concentrations can persist for many hours resulting in reduced air quality.

Diesel Exhaust

Exhaust from diesel engines has been identified by the state as a TAC having adverse impacts on human health. Diesel exhaust is a combination of gases, vapors, and fine particles such as PM.

Table 2.2.6-1 Highest Concentrations of Measured Air Pollutants Near the Project Area

Pollutant	Average Time	Measured Air Pollutant Levels				
		2002	2003	2004	2005	2006
Livermore-793 Rincon Avenue Monitoring Station						
Ozone (O_3)	1-Hour	0.16 ppm	0.13 ppm	0.13 ppm	0.12 ppm	0.13 ppm
	8-Hour	0.11 ppm	0.09 ppm	0.08 ppm	0.09 ppm	0.10 ppm
Carbon Monoxide (CO)	8-Hour	2.5 ppm	1.9 ppm	1.8 ppm	1.8 ppm	1.8 ppm
	1-Hour	NA	NA	NA	NA	NA
Nitrogen Dioxide (NO_2)	1-Hour	0.08 ppm	0.07 ppm	0.06 ppm	0.07 ppm	0.06 ppm
Respirable Particulate Matter (PM_{10})	Annual	23 ug/m^3	23 µg/m^3	18 µg/m^3	19 µg/m^3	18 µg/m^3
	24-Hour	58 ug/m^3	52 µg/m^3	37 ug/m^3	49 ug/m^3	54 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	Annual	NA	NA	NA	NA	NA
	24-Hour	62 µg/m^3	42 µg/m^3	50 µg/m^3	56 µg/m^3	52 µg/m^3
Bay Area (Basin Summary)						
Ozone (O_3)	1-Hour	0.16 ppm	0.13 ppm	0.11 ppm	0.12 ppm	0.13 ppm
	8-Hour	0.11 ppm	0.10 ppm	0.08 ppm	0.09 ppm	0.11 ppm
Carbon Monoxide (CO)	8-Hour	4.5 ppm	4.0 ppm	3.4 ppm	3.1 ppm	2.9 ppm
	1-Hour	6.2 ppm	5.5 ppm	4.8 ppm	4.5 ppm	
Nitrogen Dioxide (NO_2)	1-Hour	0.08 ppm	0.09 ppm	0.07 ppm	0.07 ppm	0.11 ppm
Fine Particulate Matter (PM_{10})	Annual	25 µg/m^3	25 µg/m^3	26 µg/m^3	24 µg/m^3	
	24-Hour	80 µg/m^3	60 µg/m^3	65 µg/m^3	81 µg/m^3	106 µg/m^3
Respirable Particulate Matter ($PM_{2.5}$)	Annual	14 µg/m^3	12 µg/m^3	12 µg/m^3	12 µg/m^3	
	24-Hour	77 µg/m^3	56 µg/m^3	74 µg/m^3	55 µg/m^3	

Source: Illingworth & Rodkin, 2008.

Table 2.2.6-2 Days Exceeding Ambient Air Quality Standards Near the Project Area.

Pollutant	Standard	Monitoring Station	Number of Days Exceeding Standard				
			2002	2003	2004	2005	2006
Ozone (O_3)	NAAQS 1-hr	Livermore	2	1	0	--	--
		BAY AREA	2	1	0	0	1
	NAAQS 8-hr	Livermore	6	3	0	1	5
		BAY AREA	7	7	0	1	12
	CAAQS 1-hr	Livermore	10	10	5	6	13
		BAY AREA	16	19	7	9	18
Fine Particulate Matter (PM_{10})	NAAQS 24-hr	Livermore	0	0	0	0	0
		BAY AREA	0	0	0	0	0
	CAAQS 24-hr	Livermore	2	0	0	0	3
		BAY AREA	5	3	4	4	13
Fine Particulate Matter ($PM_{2.5}$)	NAAQS 24-hr*	Livermore	0	0	0	0	0
		BAY AREA	5	0	1	0	1
All Other (CO, NO_2, Lead, SO_2)	All Other	Livermore	0	0	0	0	0
		BAY AREA	0	0	0	0	0

Source: Illingworth & Rodkin, 2008.

Note: The 24-hour NAAQS for PM2.5 changed from 65 µg/m3 to 35 µg/m3 in 2006.

Methodology

Modeling was conducted for the mainline segment and ramp intersections on I-580 with the highest traffic volumes, greatest project traffic contribution, and highest level of congestion.

The following summarized protocols and guidance documents were used to estimate and calculate emissions and emissions models:

- CO hot spot analysis was conducted following guidance outlined in the Caltrans *Transportation Project-Level Carbon Monoxide Protocol*; CO concentrations were predicted using the California Air Resources Board's (CARB) Emissions Factors Model (EMFAC2007) and the California Line Source Dispersion Model, version 4 (CALINE4);
- The project region was found to be unclassified or attainment for PM10 and PM2.5 at the time this study was prepared; therefore, a conformity analysis in accordance with FHWA's PM2.5 /PM10 Qualitative Analysis Guidance dated March 2006 was not necessary. No quantitative analysis was conducted for this project; and
- Mobile Source Air Toxics (MSAT) were analyzed following the guidance found in the FHWA *Interim Guidance on Addressing MSAT* memo dated February 3, 2006, and *Estimating Mobile Source Air Toxic Emissions: A Step-By-Step Project Analysis Methodology* prepared by UC Davis, December 28, 2006.

Sensitive land uses with the potential for exposure to diesel exhaust were noted in this report; however criteria and quantitative methods for assessing diesel impacts are not yet developed at the regulatory level.

This analysis evaluates impacts against the 8-hour CO standard as it is the most stringent CO standard. Modeling results are found in **Tables 2.2.6-3** and **2.2.6-4** for both the 1-hour and 8-hour attainment goals. CO levels were modeled using traffic volumes, emissions, meteorology, and the roadway/receptor geometry. Forecast operational traffic conditions for the existing and future build conditions were taken from the traffic operations report for the project (See **Section 2.1.5**). Emission factors were adjusted (based on the CO Protocol modeling guidelines) to reflect the level of congestion anticipated for the area. This analysis used the Caline4 Line-Source dispersion model and procedures developed by the Department and approved by the EPA. Meteorological conditions were used that reflected high CO concentrations in Coastal Valley, peak-hour traffic conditions, and emission factors generated by the CARB emission factor model (EMFAC2007). Worst-case meteorological conditions included a wind speed of 1.6 feet per second, "F" stability, worst-case wind angle search, sigma theta (wind fluctuation) of 10°, and temperature of 41°F. Receptors were placed near the edge of the roadway or at the right-of-way line. The modeling assumptions were used for existing 2007 conditions, and to predict the worst-case 1-hour CO concentrations that could be associated with the project for the future No-Build and the Build Alternatives in 2015 and 2035. Modeled concentrations were added to background levels (average of annual maximum level measured in Bay Area over the last three years) to predict total CO concentrations. A persistence factor of 0.7 was applied to 1-hour concentrations to predict the 8-hour concentrations.

Table 2.2.6-3 Carbon Monoxide (CO) Concentrations Along Roadway Segments (1-hour)

Roadway Segment	Modeled Carbon Monoxide Emissions (1-Hour (PPM))			
	2015 No-Build	2015 Build	2035 No-Build	2035 Build
Hopyard Road at I-580 Westbound Off-Ramp	5.1	5.1	4.2	4.2
Santa Rita Road/Tassajara Road at I-580 Westbound Off-Ramp	4.6	4.6	3.9	3.9
Airway Boulevard at I-580 Westbound Off-Ramp	5.0	4.7	4.0	3.9
I-580 Mainline	5.5	5.4	4.2	4.2

Source: Illingworth & Rodkin, 2008.

MSAT emissions from vehicles traveling through the project area were estimated using the methodology prepared for the Department by the UC Davis-Caltrans Air Quality Project (Estimating Mobile Source Air Toxics Emissions: A Step-By-Step Project Analysis Methodology, December, 2006). The three primary steps to the methodology are: (1) deriving emission factors, (2) determining the traffic data, and (3) using the emission factors and traffic data to calculate the emissions.

The emission factors are the amount of MSAT emissions from a composite vehicle per distance traveled at a specified speed for exhaust emissions (i.e., tailpipe emissions), and per travel time for evaporative emissions (i.e., emissions from evaporating fuel). Separate emission factors are calculated for diesel and non-diesel vehicles. The traffic data required to calculate MSAT emissions includes traffic volume, distance traveled, speed, and percentage of trucks for peak period when congestion is at its highest, as well as for off-peak periods. Vehicle miles traveled (VMT) and travel times are calculated from the traffic volumes, speed, and travel distance. The total MSAT emissions

are calculated using the emission factors calculated in the first step and the traffic data calculated in the second step.

Table 2.2.6-4 Carbon Monoxide (CO) Concentrations Along Roadway Segments (8-hour)

Roadway Segment	8-Hour (PPM)			
	2015 No-Build	2015 Build	2035 No-Build	2035 Build
Hopyard Road at I-580 Westbound Off-Ramp	3.1	3.1	2.5	2.5
Santa Rita Road/Tassajara Road at I-580 Westbound Off-Ramp	2.8	2.8	2.3	2.3
Airway Boulevard at I-580 Westbound Off-Ramp	3.0	2.8	2.4	2.3
I-580 Mainline	3.3	3.2	2.5	2.5

Source: Illingworth & Rodkin, 2008.

The EMFAC2007 model was run using the procedures described in the UC Davis Methodology for the Alameda County portion of the BAAQMD. Composite emission factors for PM exhaust from diesel vehicles, total organic gas (TOG) exhaust emissions for diesel and non-diesel vehicles, and evaporative TOG emissions for non-diesel vehicles in operation were extracted from this data using the UC Davis spreadsheet. The emission factors for diesel particulate matter (DPM) are taken directly from the EMFAC2007 output. Emission factors for the other MSATs are estimated by multiplying the TOG emission factors by Speciation Factors. The Speciation Factors represent the fraction of TOG emissions of each MSAT. This results in an estimate of emissions for each of the MSATs – Diesel PM, Benzene, 1,3-Butadiene, Acetaldehyde, Acrolein, and Formaldehyde – per mile of travel for diesel and non-diesel vehicles (exhaust emissions), and per minute traveled for non-diesel vehicles (evaporative emissions). Due to the differences in diesel fuel and gasoline, diesel vehicles do not have considerable evaporative emissions.

There are several uncertainties that do not allow quantitative estimates of health effects from MSAT emissions in the project area. However, MSAT emissions in the project area have been analyzed and presented in **Table 2.2.6-5** and the estimated impacts of MSAT emissions under different scenarios are provided in the following **Environmental Consequences** section.

Emissions were calculated for each segment of I-580 between interchanges and then summed to estimate the total MSAT emissions from the project. In addition, for the built project scenarios for years 2015 and 2035, emissions were calculated separately for vehicles in the HOV lanes, as estimates of vehicle speeds in the HOV lanes are different. Estimates of peak period and off-peak period traffic volumes and speeds were derived from from traffic operations reports for the project (see **Section 2.1.5**).

Table 2.2.6-5 Summary of Project-Level DPM and MSAT Emissions (grams/day)

	Diesel PM	Benzene	1,3 Butadiene	Acetaldehyde	Acrolein	Formaldehyde
2007 Base Year	65,580	21,466	4,103	11,416	900	29,003
2015 No-Build	39,672	10,370	1,816	6,099	397	15,033
2015 Build	40,791	10,422	1,839	6,091	403	15,078
2035 No-Build	21,636	5,967	997	3,143	223	8,009
2035 Build	16,095	4,453	730	2,431	163	6,115

Source: Illingworth & Rodkin, 2008

ENVIRONMENTAL CONSEQUENCES

Temporary Construction Impacts

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities. Sources of airborne or fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate varying amounts of PM_{10}, $PM_{2.5}$, CO, SO_2, NOx (a generic term for mono-nitrogen oxides like NO and NO_2), and VOCs.

PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity, local weather conditions, soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Construction activities for large development projects are estimated by the EPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50 percent. The Department's Standard Specifications (Section 10) pertaining to dust minimization requires use of water or dust palliative compounds to reduce potential fugitive dust emissions during construction.

Roadway dust, a source of PM_{10}, is the primary source of traffic-related particulate matter emissions. An increase in vehicle travel and at faster speeds can lead to an increase in the amount of PM available to be entrained in roadway dust.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NOx, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) from equipment exhaust emissions. Additional O_3 could be formed through chemical reactions derived from NOx and VOCs mixing with sunlight and heat.

SO_2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 parts per million (ppm) of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur. However, under California law and Air Resources Board regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so SO_2 related issues due to diesel exhaust will be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving site(s). Such odors would be quickly dispersed below detectable thresholds as distance from the site(s) increases.

If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

COMPARISON OF AIR QUALITY IMPACTS BETWEEN BUILD AND NO-BUILD ALTERNATIVES

Traffic-Related Carbon Monoxide Impacts

High volume freeways, such as I-580, and congested highway interchanges with a large volume of traffic have the greatest potential to cause high-localized concentrations of CO. Modeling results indicate that current CO concentrations are below ambient air quality standards and are meeting attainment criteria. Future projected CO levels with or without the project are expected to remain below or within attainment levels because a decrease in future CO levels is predicted as vehicle fleet turnover will remove polluting, older vehicles and replace them with newer, less polluting vehicles. Therefore, the project would not cause or contribute to CO violations.

Mobile Source Air Toxics

Under the No-Build Alternative, all six MSAT emissions are projected to decrease considerably over existing conditions. DPM is projected to decrease approximately 67 percent by 2035. Other MSAT emissions are projected to decrease by between 72 percent and 76 percent.

DPM is projected to increase by 2.7 percent with the implementation of the project in 2015. This represents an increase of about 2.5 pounds per day over the entire project's length. The project increase is mostly the result of slightly higher speeds during the peak periods. This increase, however, would only occur temporarily. Compares to the No-Build conditions, by 2035, DPM emissions are projected to decrease by 27 percent. The other MSATs are projected to decrease between 23 and 27 percent with the Build Alternative than with the No-Build Alternative for the year 2035.

CARB has adopted a Diesel Risk Reduction Plan (DRRP) specifying control measures that would reduce the overall DPM emissions by approximately 85 percent from 2000 to 2020. As all of the reduction measures are not yet reflected in the EMFAC2007 emission factors used in the analysis above, it is expected that future DPM emissions would be reduced even more than modeled.

PM_{10} Hot Spot

The project area is considered in nonattainment for the more stringent CAAQS standards for PM_{10} and $PM_{2.5.}$ Particulate matter emissions would increase with growth in traffic volumes under both the No-Build and Build conditions; however, a slightly higher increase in particulate matter emissions is anticipated under Build conditions, as traffic volumes in the project area would be slightly higher as a result of implementation of the project. PM_{10} and, to some extent, $PM_{2.5}$, are almost directly related to vehicle miles traveled. Since the project would accommodate more traffic and an increase in peak traffic, period speeds and emissions of PM_{10} and $PM_{2.5}$ may increase.

Construction of standardized freeway shoulders under the Build condition would reduce the potential for re-entrained emissions to mix with roadway dust. The Department constructs and

maintains standardized freeway shoulders and, as a result of this practice, fugitive dust is not expected to be significant. Additionally, installation of HOV lanes is one of the recommended transportation control measures in the 2005 *Bay Area Ozone Strategy* to achieve air quality attainment goals.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Construction period effects to air quality are short-term in duration and, therefore, will not result in adverse or long-term conditions. Implementation of the following minimization measures will reduce air quality impacts resulting from construction activities:

The construction contractor shall comply with the Department's Standard Specifications Section 7-1.01F and Section 10 of the Department's Standard Specifications (2006).

- Section 7, "Legal Relations and Responsibility," addresses the contractor's responsibility on many items of concern, such as air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; and convenience of the public; and damage or injury to any person or property as a result of any construction operation; Section 7-1.01F specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances;
- Section 10 is directed at controlling dust; if dust palliative materials other than water are to be used, material specifications are contained in the Department Standard Specifications;
- Water all active construction areas at least twice daily and more often during windy periods; active areas adjacent to residences should be kept damp at all times;
- Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles;
- Pave, apply water at least twice daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas;
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads;
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (i.e., previously graded areas that are inactive for 10 days or more);
- Replant vegetation in disturbed areas as quickly as possible;
- Cover all trucks hauling soil, sand, and other loose materials, and maintain at least 2 feet of freeboard;
- Limit traffic speeds on any unpaved roads to 15 m.p.h.;
- Suspend construction activities that cause visible dust plumes to extend beyond the construction site;

- Opacity is an indicator of exhaust particulate emissions from off-road diesel-powered equipment; the project shall ensure that emissions from all construction diesel-powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour; any equipment found to exceed 40 percent opacity (or Ringleman 2.0) shall be repaired immediately; and
- Where applicable, enforce idling restrictions of 5 minutes for diesel vehicles, as mandated by state law.

2.2.7 Noise

REGULATORY SETTING

NEPA and 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.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA (and the Department, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations of Title 23, Code of Federal Regulations (CFR), Part 772 of FHWA standards (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. These 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 Activity Category B residences (67 dBA) is lower than the NAC for Activity Category C commercial areas (72 dBA). **Table 2.2.7-1** lists the noise abatement criteria of each activity category for use in the NEPA-23 CFR 772 analysis. **Figure 2.2.7-1** 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.

In accordance with the Department's Traffic Noise Analysis Protocol (Protocol), a noise impact occurs when the future noise level associated 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 would

be incorporated into the project plans and specifications upon the completion of the project design and public involvement process. This document discusses noise abatement measures that would likely be incorporated into the project design.

Table 2.2.7-1 Noise Abatement Criteria for Activity Categories (NEPA-23 CFR 772 Analysis)

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA $L_{eq}(h)$	Description of Activities
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	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above; this category would include commercial and industrial land uses
D	–	Undeveloped lands
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: Caltrans, 2008.

The Department's Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. The feasibility of a noise abatement measure is related to engineering concerns. A minimum 5 dBA reduction 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. Factors used in determining whether a proposed noise abatement measure is reasonable include residents' acceptance, the absolute noise level, environmental impacts of abatement, public and local agencies' input, newly constructed development versus development pre-dating 1978, and the cost per benefited residence.

AFFECTED ENVIRONMENT

Information in this section is largely derived from the Noise Study Report (NSR) prepared for the project. The project area was modeled in four independent sections with the break points selected primarily at major roadway interchange locations. The modeled segments are depicted in **Figure 2.2.7-2** and are listed below:

- Santa Rita Road to Foothill Boulevard;
- Airway Boulevard to Santa Rita Road;
- First Street to Airway Boulevard; and
- Greenville Road to First Street.

The existing noise environment throughout the project corridor varies by location, depending on site characteristics such as proximity to I-580 and other noise sources, the relative highway and local elevations and terrain, and any intervening structures or barriers. There is a mix of single-family and multi-family residential, commercial, industrial, and agricultural land uses throughout the project area. Category B land uses – in the form of single-family and multi-family residential land uses, open

space such as parks and golf courses, and public areas such as churches, hotels, and motels – border parts of the project alignment.

Six existing barriers in the form of sound walls or berms constructed to reduce I-580 traffic noise were identified in the study area and are summarized in **Table 2.2.7-2**.

There are commitments to construct two additional barriers as part of other projects in the I-580 corridor prior to construction of this project. Barrier G is proposed to be constructed as part of the Isabel Avenue Interchange Project (EA 28-171331) by the summer of 2010. Barrier H is proposed to be constructed as part of the I-580 Eastbound HOV Lane Project (EA's 04-290834 and 04-290844) by the winter of 2010.

Table 2.2.7-2: Existing and Planned Barriers

Barrier ID	Location	Noise Study Segments	Construction Material	Height (feet)
A	Along Almaden and Berryessa Road	4	Masonry	12
B	Along Sunflower Court	4	Masonry	12
C	Along Sundance Road	4	Masonry	16
D	Along Saddleback Circle	3	Earthen Berm	10-12
E	Along Annis Circle	2	Masonry	12
F	Along Pimlico Drive and Kirkcaldy Street	2	Masonry	Varies
G	Along East Airway Boulevard[1]	3	Masonry	12
H	Along Southfront Road[2]	4	Masonry	12

[1] Wall proposed to be constructed as part of the Isabel Avenue Interchange Project (EA 171331)

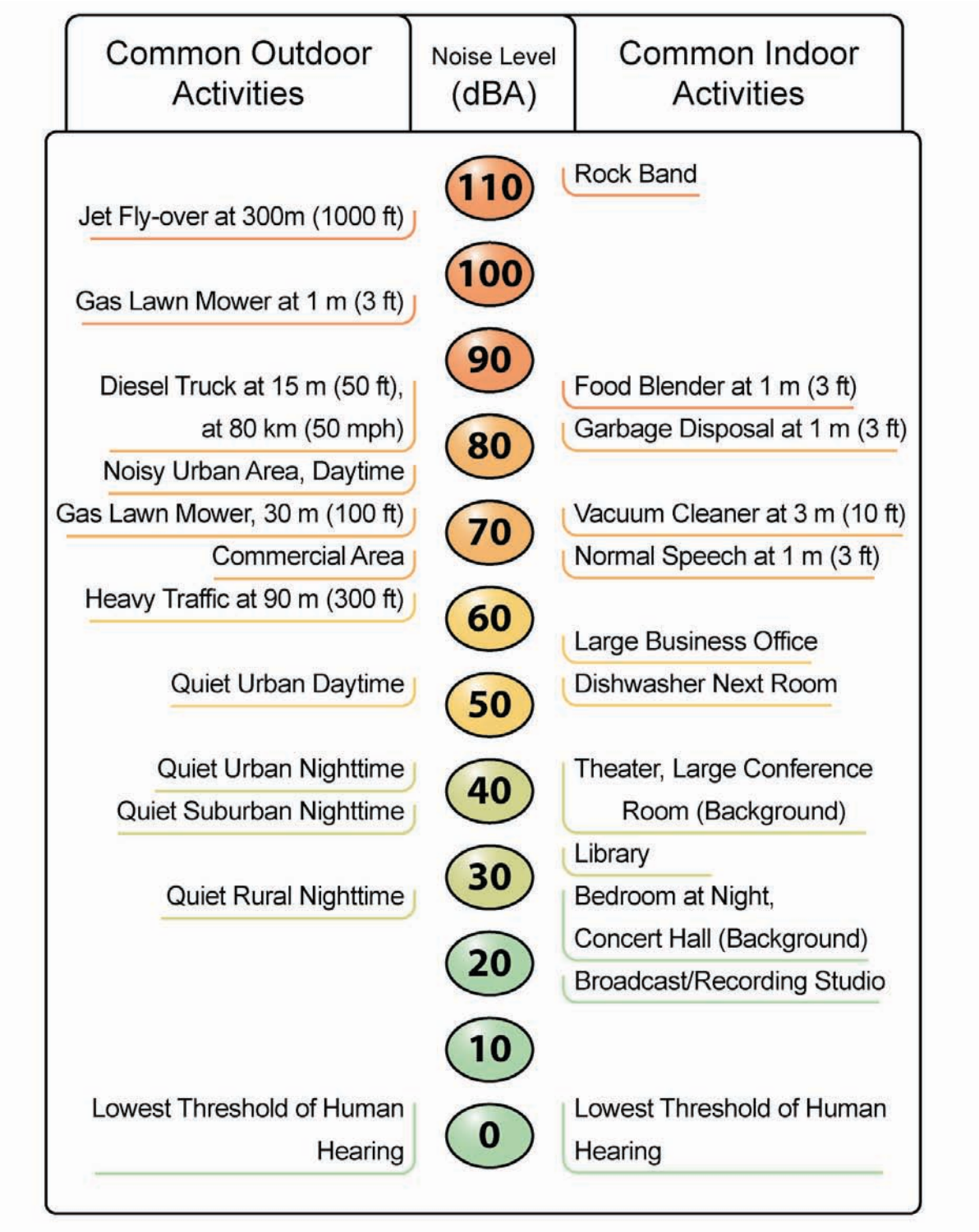
[2] Wall will be constructed as part of the I-580 Eastbound HOV Lane Project (EA 04-290844)

Source: Illingworth & Rodkin, 2008.

ENVIRONMENTAL CONSEQUENCES

Noise levels were predicted within the four segments identified in **Figure 2.2.7-2**, calculating anticipated noise levels under both the Build and No-Build Alternatives. Receiver locations for noise measurements are identified in **Figures 2.2.7-3a through 2.2.7-3f**. Noise impacts are identified for outdoor use areas, as well as the number of impacted residences. For outdoor land use areas such as schools and parks, 100-foot "frontage units" were totaled for use in consideration of cost effectiveness. Noise impacts at Category B land uses are presented by segment. Noise levels that approach or exceed 67 dBA at Category B land uses are considered to exceed the NAC. Where predicted noise levels equal or exceed 75 dBA $L_{eq\ (h)}$, Category B receptors would be considered to experience a severe noise impact.

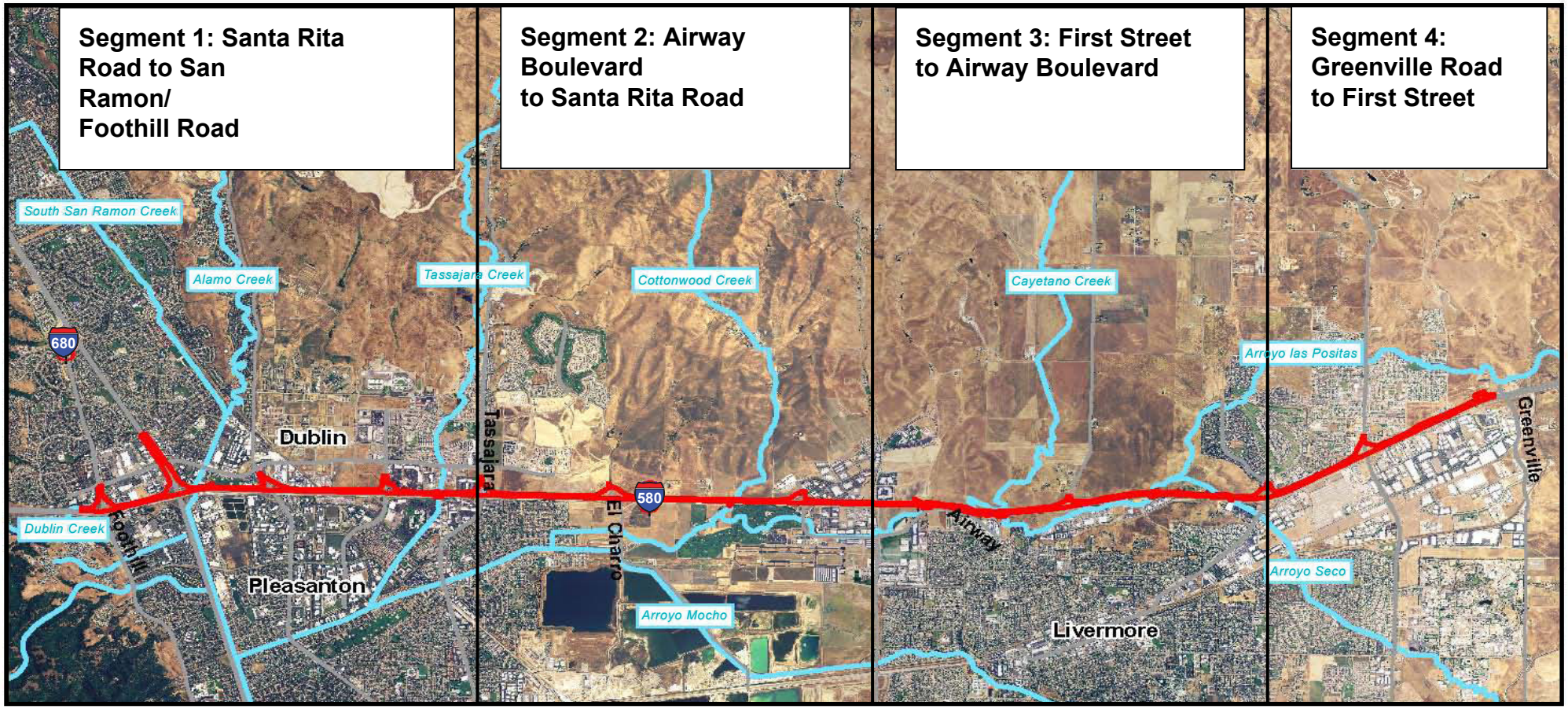
In general, noise levels on high-volume roadways such as I-580 are greatest when traffic is "free-flowing" and there are a large number of vehicles passing a receiver at high speeds. Therefore, to accurately determine maximum and average noise levels at received locations, noise levels for the



Source: Caltrans, 2006

I-580 Westbound HOV Lane Project EA/IS ***Noise Levels of Common Activities*** **FIGURE 2.2.7-1**

Source: Geografika Consulting 12.06.07



NOT TO SCALE

I-580 Westbound HOV Lane Project EA/IS

Project Noise Study Segments

FIGURE **2.2.7-2**

Source: Illingworth & Rodkin, Inc.

Build and No-Build Alternatives were modeled using high-volume free-flowing traffic volumes instead of using the anticipated future volumes of a given year, when traffic congestion might result in lower noise levels.

Segment 1: Santa Rita Road to Foothill/San Ramon Road

There are no residences near the project along this segment. Category B uses along this segment include hotels and recreational outdoor areas. No existing noise barriers are located within this segment. As shown in **Table 2.2.7-3**, the loudest-hour $L_{eq\ (h)}$ for the existing condition ranges from 45 to 79 dBA.

The Build Alternative is anticipated to increase the loudest-hour $\mathbf{L_{eq\ (h)}}$ noise levels in some areas within this segment by 0 to 1 decibels. Some areas may experience a slight decrease of 1 dBA or less. This change in noise levels is a result of the slight shifting of lane striping, which will occur as a result of the project, and will move traffic slightly nearer or further to some receivers. This noise level increase is not considered substantial, as the change would not exceed the existing loudest hour noise level by 12 dBA or more. However, most Category B receivers in this segment currently experience noise levels that approach or exceed the NAC of 67 dBA. Noise abatement in the form of sound walls was considered throughout this area. Predicted traffic noise impacts are shown in **Table 2.2.7-4**.

As shown in **Tables 2.2.7-3** and **2.2.7-4**, there would be noise impacts at six receiver locations under existing, Build and No-Build Alternatives. There would be a severe noise impact at one location, R17. In general, construction of the Build Alternative, prior to any noise abatement, in the form of sound walls, would slightly decrease noise levels or would not result in a perceptible increase in noise levels. Therefore, the project under consideration would not cause any new noise impacts, but could be required to abate noise levels in locations where noise levels are anticipated to or already approach or exceed the NAC.

Table 2.2.7-3: Noise Levels: Santa Rita Road to Foothill/San Ramon Road

Loudest Hour Noise Levels, Leq (h) dBA				
Receiver ID	**Existing/ No-Build dBA**	**Future Build dBA**	**Type of Development[1]**	**Barrier Shielding**
P-ST01	**73**	**72**	Park	No
P-ST02	**69**	**69**	Hotel	No
R14	45	45	Hotel	No
R15	**71**	**70**	Park	No
R16	**75**	**74**	Park	No
R17	**79**[2]	**78**[2]	Park	No
R18	56	56	Health Club	No
R18A	53	53	Health Club	No
R19	56	56	Hotel	No
R20	53	53	Hotel	No
R21	**66**	**66**	Pool	No

[1] SFR-Single Family Residence, MFR-Multi-Family Residence, MH-Mobile Home

[2] Possible Severe Noise Impact

Bold text indicates noise levels approaching or exceeding the NAC for the land uses at the receiver.

Table 2.2.7-4: Predicted Traffic Noise Impacts: Santa Rita Road to Foothill/San Ramon Road

Receiver ID	Existing/ No-Build Loudest-Hour, dBA	Future Build Loudest-Hour, dBA	Change in Noise Levels dBA[1]	Impact Type[2]	Number of Frontage Units Represented
P-ST01	73	72	-1	A/E	Duplicate -See R16
P-ST02	69	69	0	A/E	1
R15	71	70	-1	A/E	Duplicate -See R17
R16	75[3]	74	-1	A/E	7
R17	79[3]	78[3]	-1	A/E[3]	7
R21	66	66	1	A/E	1

[1] Discrepancies may occur due to rounding

[2] Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC

[3] Possible Severe Noise Impact

Segment 2: Airway Boulevard to Santa Rita Road

Category B land uses along this segment include residences located along Annis Circle, Kirkcaldy Street, and Pimlico Drive, and the Las Positas and Pro Valley Golf Courses located on the south side of I-580. There are two existing noise barriers within this section, Barrier E, shielding the residences along Annis Circle, and Barrier F, shielding the residences along Kirkcaldy Street and Pimlico Drive. As shown in **Table 2.2.7-5**, the loudest-hour $L_{eq\,(h)}$ for the existing condition ranges from 63 to 77 dBA. Under the No-Build Alternative conditions, noise levels at receiver locations are expected to range from 63 to 77 dBA. The Build Alternative is anticipated to increase the loudest-hour $L_{eq\,(h)}$ noise levels in this segment by 0 to 2 decibels, resulting in noise levels ranging from 64 to 78 decibels. This increase in noise levels is a result of the slight shifting of lanes, which will occur as a result of the project. This noise level increase is not considered substantial, as the change would not exceed the existing loudest hour noise level by 12 dBA or more. However, most residences are predicted to experience noise levels that approach or exceed the NAC of 67 dBA. Noise abatement in the form of sound walls was considered throughout this area. Predicted traffic noise impacts are shown in **Table 2.2.7-6**. The golf courses along the south side of I-580 experience high noise levels; however, according to the Department's Protocol, golf courses are generally transitory in nature and, because they do not experience frequent human use that would benefit from a lowered noise level, they are not considered to be "impacted."

As shown in **Tables 2.2.7-5** and **2.2.7-6**, there would be noise impacts at 12 receiver locations under existing, Build, and No-Build Alternatives. There would be a severe noise impact at one location, R13. Construction of the Build Alternative would not result in noise levels in excess of those anticipated under No-Build conditions. Construction of the Build Alternative, prior to any noise abatement in the form of sound walls, would slightly increase noise levels at the majority of the receiver locations, but these increases would be less than 3 dBA and would not be perceptible increases. Therefore, the project under consideration would not cause any substantial new noise impacts, but could be required to abate noise levels in locations where noise levels are anticipated to or already approach or exceed the NAC.

Table 2.2.7-5: Existing and Predicted Noise Levels: Airway Boulevard to Santa Rita Road

Loudest Hour Noise Levels, Leq (h) dBA					
Receiver ID	**Existing, dBA**	**Future No-Build, dBA**	**Future Build, dBA**	**Type of Development[1]**	**Barrier Shielding**
LT-3	74	74	74	MFR	Yes
Pleasanton GP LT37	**69**	**70**	**70**	SFR	Yes
P-ST03	**71**	**72**	**72**	MFR	Yes
P-LT01	**69**	**70**	**70**	SFR	Yes
R1	**68**	**69**	**70**	MFR	Yes
R2	**70**	**70**	**70**	MFR	Yes
R3	**71**	**71**	**71**	MFR	Yes
R4	**70**	**71**	**71**	SFR	Yes
R5	**70**	**71**	**71**	SFR	Yes
R6	**69**	**70**	**70**	SFR	Yes
R7	**70**	**70**	**70**	SFR	Yes
R8	**74**	**74**	**74**	SFR	No
R9	63	63	64	SFR	Yes
R10	64	65	65	SFR	Yes
R11	64	65	65	SFR	Yes
R12	63	64	64	SFR	Yes
R13	**77[2]**	**77[2]**	**78[2]**	SFR	No

[1] SFR-Single Family Residence, MFR-Multi-Family Residence, MH-Mobile Home
[2] Possible Severe Noise Impact
Bold text indicates noise levels approaching or exceeding the NAC for the land uses at the receiver.

Table 2.2.7-6: Predicted Traffic Noise Impacts: Airway Boulevard to Santa Rita Road

Receiver ID	Existing Loudest-Hour, dBA	Future Build Loudest-Hour, dBA	Change in Noise Levels [1]	Impact Type[2]	Number of Frontage Units Represented
Pleasanton GP LT37	69	70	1	A/E	Duplicate - See P- LT01
P-ST03	71	72	1	A/E	2
P-LT01	69	70	1	A/E	4
R1	68	71	2	A/E	4
R2	70	70	0	A/E	2
R3	71	71	0	A/E	6
R4	70	71	1	A/E	4
R5	70	71	1	A/E	4
R6	69	70	1	A/E	2
R7	70	70	0	A/E	4
R8	74	74	0	A/E	2
R13	77[3]	78[3]	1	A/E[3]	1

[1] Discrepancies may occur due to rounding.
[2] Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC
[3] Possible Severe Noise Impact

Segment 3: First Street to Airway Boulevard

Category B land uses along this segment include Boomers mini-golf and go karts park located along the south side of I-580 and Comfort Inn and Suites on the north side of I-580, east of Airway Boulevard. There is one existing berm within this section, Barrier C, which shields the residences along Saddleback Drive, and one future barrier, Barrier G (EA 171331), that is proposed to be constructed along Southfront Road east of Barrier C to just west of the Portola overcrossing. Future noise levels were predicted for the No-Build Alternative and Build Alternative that include both the presence and absence of Barrier G. Barrier G is anticipated to be constructed as part of the

Isabel Avenue Interchange Project prior to construction of this project. As shown in **Table 2.2.7-7**, the loudest-hour $L_{eq\ (h)}$ for the existing condition ranges from 51 to 78 dBA. Under the No-Build Alternative conditions, noise levels at receiver locations are expected to range from 51 to 78 dBA. The Build Alternative condition is anticipated to increase the loudest-hour $L_{eq\ (h)}$ noise levels in this segment by 0 to 2 decibels, resulting in noise levels of 51 to 78 dBA. This increase in noise levels is a result of the slight shifting of lanes, which will occur as a result of the project. This noise level increase is not considered substantial, as the change would not exceed the existing loudest hour noise level by 12 dBA or more. However, residences are predicted to experience noise levels that approach or exceed the NAC of 67 dBA. In some areas, future noise levels decrease due to construction of Barrier G; however, in some cases, receivers in these newly protected areas still experience noise levels that approach or exceed the NAC of 67 dBA. Noise abatement in the form of sound walls was considered throughout this area. Predicted traffic noise impacts are shown in **Table 2.2.7-8**.

As shown in **Tables 2.2.7-7** and **2.2.7-8,** there are existing noise impacts at 28 modeled receiver locations. The analysis considered future noise levels for the Build and No-Build alternatives by conducting modeling both with and without Barrier G, planned as part of the Isabel Avenue Interchange Project. Under the No-Build Alternative there would be noise impacts at 26 receiver locations without Barrier G and at 21 locations with Barrier G. Under the Build Alternative there would be noise impacts at 29 receiver locations without Barrier G and at 23 locations with Barrier G. Existing noise levels above 75 dBA would continue to be considered severe noise impacts and conditions would become slightly louder at receivers R24 and R25 under the Build and No-Build alternatives, with or without Barrier G. With Barrier G, severe noise impacts would be avoided at receiver R31 under both alternatives.

Table 2.2.7-7: Existing and Predicted Noise Levels: First Street to Airway Boulevard

Loudest Hour Noise Levels, Leq (h) dBA							
Receiver ID	**Existing, dBA**	**Future No-Build, dBA[1]**	**Future Build, dBA[1]**	**Future No-Build, dBA[2]**	**Future Build, dBA[2]**	**Type of Development[4]**	**Barrier Shielding**
ST-10	**75[3]**	**75[3]**	**75[3]**	**75[3]**	**75[3]**	SFR	No
ST-14	66	**67**	**67**	**67**	**67**	MFR	No
ST-15	**74**	**74**	**74**	**67**	**67**	MH	Yes[5]
ST-16	**72**	**72**	**72**	65	65	MH	Yes[5]
ST-17	**68**	66	66	64	64	SFR	Yes[5]
ST-18	64	64	65	63	63	Park	Yes
ST-19	**78[3]**	**78[3]**	**78[3]**	**78[3]**	**78[3]**	Park	No
ST-20	**69**	**70**	**70**	**70**	**70**	SFR	No
LT-2	**72**	**72**	**72**	**70**	**70**	SFR	Yes[5]
P-ST07	**73**	**73**	**73**	**73**	**73**	Hotel	No
P-ST08	**78[3]**	**78[3]**	**78[3]**	**78[3]**	**78[3]**	Park	No
P-ST09	66	**67**	**67**	**67**	**67**	MFR	No
P-LT02	63	63	63	60	61	MH	Yes[5]
P-LT03	64	64	65	64	65	SFR	No
R22	51	51	51	51	51	Hotel	No
R23	66	66	**67**	66	**67**	SFR	No
R24	**75[3]**	**76[3]**	**76[3]**	**76[3]**	**76[3]**	REC/Park	No

Table 2.2.7-7 Continued

Loudest Hour Noise Levels, Leq (h) dBA							
Receiver ID	**Existing, dBA**	**Future No-Build, dBA[1]**	**Future Build, dBA[1]**	**Future No-Build, dBA[2]**	**Future Build, dBA[2]**	**Type of Development[4]**	**Barrier Shielding**
R25	**74**	**75[3]**	**75[3]**	**75[3]**	**75[3]**	REC/Park	No
R26	**68**	65	66	65	66	SFR	Yes[5]
R26A	64	65	65	65	65	SFR	No
R26B	66	66	**67**	66	**67**	SFR	No
R27	**68**	64	65	64	64	Park	Yes[5]
R28	**67**	65	65	63	63	SFR	Yes[5]
R29	**69**	**69**	**69**	65	65	SFR	Yes[5]
R30	**74**	**74**	**74**	**67**	**67**	MH	Yes[5]
R31	**75[3]**	**76[3]**	**76[3]**	**67**	**67**	MH	Yes[5]
R32	**74**	**74**	**74**	**68**	**68**	MH	Yes[5]
R33	**70**	**70**	**70**	64	64	MH	Yes[5]
R34	65	65	**66**	61	61	MH	Yes[5]
R35	**71**	**71**	**71**	**67**	**67**	MH	Yes[5]
R36	**67**	**67**	**67**	**67**	**67**	MFR	No
R37	62	62	63	62	63	SFR	No
R38	64	64	65	64	65	SFR	No
R39	**71**	**68**	**69**	**68**	**69**	SFR	No
R40	**71**	**72**	**73**	**72**	**73**	SFR	No
R41	**71**	**72**	**73**	**72**	**73**	SFR	No
R72	**68**	**66**	**66**	**65**	**66**	SFR	Yes[5]
R73	**69**	**66**	**67**	64	64	SFR	Yes[5]
R74	**68**	**68**	**68**	63	63	SFR	Yes[5]
R75	**72**	**72**	**72**	**66**	**66**	SFR	Yes[5]
R76	62	62	62	60	60	MH	Yes[5]
R77	62	62	62	59	60	MH	Yes[5]

[1] Scenario does not include Proposed Barrier G
[2] Scenario includes Proposed Barrier G
[3] Possible Severe Noise Impact
[4] SFR-Single-Family Residence, MFR-Multi-Family Residence, MH-Mobile Home, REC-Recreation Area
Bold text indicates noise levels approaching or exceeding the NAC for the land uses at the receiver.
[5] Includes shielding from Proposed Barrier G

Construction of the Build Alternative would result in a slightly higher noise level at receiver R23 (approximately 1 dBA higher) above those anticipated under No-Build conditions, though this is not a perceptible difference to the human ear. As shown in **Table 2.2.7-8,** under the Build Alternative, there would be minor increases in noise levels at eight receiver locations without Barrier G and decreases at three locations. With Barrier G, there would be increases at six receiver locations and decreases of 1 to 6 dBA at 11 receiver locations. Therefore, the project under consideration would not cause any substantial new noise impacts and would reduce impacts at several locations, but could be required to abate noise levels in locations where noise levels are anticipated to or already approach or exceed the NAC.

Table 2.2.7-8: Predicted Traffic Noise Impacts: First Street to Airway Boulevard

Receiver ID	Existing Loudest-Hour, dBA	Future Build Loudest-Hour, dBA[1]	Future Build Loudest-Hour, dBA[2]	Change in Noise Levels [1,3]	Change in Noise Levels [2,3,4]	Impact Type[5]	Number of Units Represented
ST-14	66	67	67	1	1	A/E	6
ST-15	74	74	67	0	-4	A/E	Duplicate See R32
ST-16	72	72	65	0	-5	A/E	Duplicate See R31
P-ST07	73	73	73	0	0	A/E	1
P-ST09	66	67	67	1	1	A/E	Duplicate See ST-14
R23	66	67	67	1	1	A/E	1
R24	75[6]	76[6]	76[6]	1	1	A/E	2
R25	74	75[6]	76[6]	1	2	A/E	2
R26B	66	67	67	1	1	A/E	1
R29	71	69	65	-2	-1	A/E	4
R30	74	74	67	0	-4	A/E	3
R31	75[6]	76[6]	67	1	-6	A/E	5
R32	74	74	68	0	-5	A/E	5
R33	70	70	64	0	-5	A/E	5
R34	65	66	61	1	-3	A/E	10
R35	71	71	65	0	-4	A/E	4
R36	67	67	67	0	0	A/E	9
R39	68	69	69	1	1	A/E	1
R40	71	73	73	2	2	A/E	1
R41	71	73	73	2	2	A/E	1
R72	68	66	66	-2	-2	A/E	5
R73	69	67	65	-2	-4	A/E	10
R74	68	68	63	0	-4	A/E	4
R75	72	72	66	0	-4	A/E	Duplicate See R30

[1] Scenario does not include Proposed Barrier G
[2] Scenario includes Proposed Barrier G
[3] Discrepancies may occur due to rounding.
[4] Noise level decreases due to Isabel Barrier constructed for Future Scenarios
[5] Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC
[6] Possible Severe Noise Impact

Segment 4: Greenville Road to First Street

Category B land uses in this segment include residencies and mobile homes along Alamaden Street, Barryessa Street, Southfront Court, Sundance Drive, and Sunflower Court; hotels on the northeast corner of First Street and I-580, and a school on the northwest corner of First Street and I-580. There are three existing noise barriers within this section: Barrier A shields the residences along Almaden Street and Berryessa Street, Barrier B shields the residences along Sunflower Court, and Barrier C shields the residences along Sundance Drive. One proposed future barrier, Barrier H (EA 04-290834 and 04-290844), is proposed be constructed to shield the mobile home park along Southfront Road. Future noise levels were predicted for the No-Build Alternative and Build Alternative that include both the presence and absence of Barrier H. Barrier H is anticipated to be constructed as part of the Isabel Avenue Interchange Project prior to construction of this project. As shown in **Table 2.2.7-9**, the loudest-hour $L_{eq\,(h)}$ for the existing condition ranges from 51 to 78 dBA. Under the No-Build Alternative conditions, noise levels at receiver locations are expected to range from 51 to 78 dBA. The Build Alternative condition is anticipated to increase the loudest-

hour $L_{eq\ (h)}$ noise levels in this segment by 0 to 2 decibels, resulting in noise levels of 51 to 78 dBA. This increase in noise levels is a result of the slight shifting of lanes, which will occur as a result of the project. This noise level increase is not considered substantial, as the change would not exceed the existing loudest hour noise level by 12 dBA or more. However, residences are predicted to experience noise levels that approach or exceed the NAC of 67 dBA. In some areas the future noise levels decrease due to construction of Barrier H; however, in some cases, receivers in these newly protected areas still experience noise levels that approach or exceed the NAC of 67 dBA. Noise abatement in the form of sound walls was considered throughout this area. Predicted traffic noise impacts are shown in **Table 2.2.7-10**.

As shown in **Tables 2.2.7-9** and **2.2.7-10,** there are existing noise impacts at 24 modeled receiver locations in Segment 4. The analysis considered future noise levels for the Build Alternative and No-Build Alternative by conducting modeling both with and without Barrier H, planned as part of another project. Under the No-Build Alternative there would be noise impacts at 26 receiver locations without Barrier H and 19 locations with the barrier. Under the Build Alternative there would be noise impacts at 29 receiver locations without Barrier H and at 22 locations with the barrier. Existing noise levels above 75 dBA (considered severe noise impacts) would continue at seven locations without Barrier H and but would be substantially reduced at receiver ST-5 with the barrier. Without the barrier, noise levels at this receiver would slightly increase (1 dBA) under both alternative scenarios.

Construction of the Build Alternative would result in a slightly higher noise level at eight receiver locations (approximately 1 to 2 dBA higher) above those anticipated under the No-Build Alternative. The Build Alternative would not cause any substantial new noise impacts, but could be required to abate noise levels in locations where noise levels are anticipated to or already approach or exceed the NAC.

Table 2.2.7-9: Existing and Predicted Noise Levels: Greenville Road to First Street

Loudest Hour Noise Levels, Leq (h) dBA							
Receiver ID	**Existing, dBA**	**Future No-Build, dBA[1]**	**Future Build, dBA[1]**	**Future No-Build, dBA[2]**	**Future Build, dBA[2]**	**Type of Development[4]**	**Barrier Shielding**
ST-1	60	60	61	60	61	SFR	Yes
ST-4	**67**	**67**	**67**	64	64	MH	Yes[5]
ST-5	**74**	**75[3]**	**75[3]**	66	66	MH	Yes[5]
ST-6	**67**	**67**	**68**	**67**	**68**	SFR	Yes
ST-7	63	63	63	63	63	SFR	Yes
ST-8	65	65	**66**	65	**66**	MH	Yes
ST-9	65	65	**66**	65	**66**	MH	Yes
ST-11	**67**	**67**	**67**	**67**	**67**	SFR	No
ST-13	**75[3]**	**75[3]**	**75[3]**	**75[3]**	**75[3]**	SFR	No
LT-1	76[3]	76[3]	77[3]	76[3]	77[3]	Park	No
P-ST11	63	63	63	63	63	School	No
P-ST12	**77[3]**	**78[3]**	**78[3]**	**78[3]**	**78[3]**	SFR	No
P-ST13	67	67	67	67	67	SFR	No
P-ST14	75[3]	77[3]	77[3]	67	67	MH	Yes[5]
P-LT05	65	65	66	65	66	MH	No

Table 2.2.7-9 Continued

Loudest Hour Noise Levels, Leq (h) dBA							
Receiver ID	**Existing, dBA**	**Future No-Build, dBA[1]**	**Future Build, dBA[1]**	**Future No-Build, dBA[2]**	**Future Build, dBA[2]**	**Type of Development[4]**	**Barrier Shielding**
P-LT06	65	**66**	**68**	**66**	**68**	SFR	Yes
P-LT07	60	60	61	60	61	SFR	Yes
R42	65	**66**	**66**	**66**	**66**	School	No
R43	51	51	51	51	51	Hotel	No
R44	**72**	**72**	**73**	**72**	**73**	Hotel	No
R44A	63	63	64	63	64	Hotel	No
R45	**78[3]**	**78[3]**	**78[3]**	**78[3]**	**78[3]**	MFR	No
R46	66	**66**	**67**	**66**	**67**	MH	Yes
R46A	**68**	**69**	**69**	**69**	**69**	MH	Yes
R47	**72**	**72**	**72**	**72**	**72**	SFR	No
R48	72	**72**	**72**	**72**	**72**	SFR	No
R49	64	64	65	64	65	MH	Yes
R49A	64	64	65	64	65	MH	Yes
R50	**66**	**66**	**66**	**66**	**66**	MH	Yes
R50A	64	64	65	64	65	MH	Yes
R51	65	65	65	65	65	SFR	Yes
R52	**67**	**67**	**67**	**67**	**67**	SFR	Yes
R53	**68**	**68**	**69**	**68**	**69**	SFR	Yes
R54	**69**	**69**	**69**	**69**	**69**	SFR	Yes
R55[6]	65	65	65	65	65	SFR	Yes
R56	**66**	**66**	**66**	**66**	**66**	SFR	No
R57	64	64	65	64	65	SFR	No
R58	**74**	**74**	**74**	**74**	**74**	SFR	No
R59	62	62	63	62	63	SFR	Yes
R60	**75[3]**	**75[3]**	**76[3]**	**75[3]**	**76[3]**	Park	No
R61	62	62	63	62	63	SFR	Yes
R62	**77[3]**	**78**[3]	**79**[3]	**70**	**70**	MH	Yes[5]
R63	**71**	**72**	**72**	**66**	**66**	MH	Yes[5]
R64	64	64	64	64	64	MH	Yes
R65	**74**	**75[3]**	**75[3]**	**75[3]**	**75[3]**	SFR	No
R66	**66**	**66**	**66**	**66**	**66**	SFR	Yes
R67	**67**	**67**	**68**	**67**	**68**	SFR	Yes
R68	64	64	64	64	64	SFR	Yes
R69	62	61	62	61	62	SFR	Yes
R70	59	59	60	59	60	SFR	Yes

[1] Scenario does not include Proposed Barrier H
[2] Scenario includes Proposed Barrier H
[3] Possible Severe Noise Impact
[4] SFR-Single-Family Residence, MFR-Multi-Family Residence, MH-Mobile Home, REC-Recreation Area
[5] Includes shielding from Proposed Barrier H
[6] Receiver R55 was originally documented as existing above the NAC for residencies (65 dBA). However, after the publication of the NADR, it was discovered that an additional 8 foot high developer sound wall bordered the property at this location. Subsequent remodeling that incorporated the developer sound wall found that the existing and future noise levels at receiver R55 (SFR) would be 65 dBA.
Bold text indicates noise levels approaching or exceeding the NAC for the land uses at the receiver.
Source: Illingworth & Rodkin, 2008.

Table 2.2.7-10: Predicted Traffic Noise Impacts: Greenville Road to First Street

Receiver ID	Existing Loudest-Hour, dBA	Future Build Loudest-Hour, dBA[1]	Future Build Loudest-Hour, dBA[2]	Noise Increase [1,3]	Noise Increase [2,3,4]	Impact Type[5]	Number of Units Represented
ST-4	67	67	64	0	-3	A/E	6
ST-5	74	75[6]	66	1	-8	A/E[6]	2
ST-6	67	68	68	1	2	A/E	2
ST-8	65	66	66	1	1	A/E	6
ST-9	65	66	66	1	1	A/E	4
ST-11	67	67	67	67	67	A/E	Duplicate See R58
ST-13	75[6]	75[6]	75[6]	0	0	A/E[6]	Calibration Point
P-ST12	77[6]	78[6]	78[6]	1	1	A/E[6]	1
P-LT06	65	68	67	3	2	A/E	2
R42	65	66	66	1	1	A/E	1
R44	72	73	73	1	1	A/E	1
R45	78[6]	78[6]	78[6]	0	0	A/E[6]	12
R46	66	67	67	1	1	A/E	6
R46A	68	69	69	1	1	A/E	4
R47	72	72	72	0	0	A/E	1
R48	72	72	72	0	0	A/E	1
R50	66	66	66	1	1	A/E	3
R52	67	67	67	0	0	A/E	2
R53	68	69	69	1	1	A/E	2
R54	69	69	69	0	0	A/E	2
R55[7]	65	65	65	0	0	A/E	2
R56	66	66	66	0	0	A/E	1
R58	74	74	74	0	0	A/E	3
R60	75[6]	76[6]	76[6]	1	1	A/E[6]	3
R62	77[6]	79[6]	70	1	-7	A/E[6]	6
R63	71	72	66	1	-5	A/E	2
R65	74	75[6]	75[6]	1	1	A/E[6]	1
R66	66	66	66	0	0	A/E	3
R67	67	68	68	0	1	A/E	1

[1] Scenario does not include Proposed Barrier H
[2] Scenario includes Proposed Barrier H
[3] Discrepancies may occur due to rounding.
[4] Noise level decreases due to Proposed Barrier H construction for Future Scenarios
[5] Impact Type: S = Substantial Increase (12 dBA or more), A/E = Approach or Exceed NAC
[6] Possible Severe Noise Impact
[7] Receiver R55 was originally documented as existing above the NAC for residencies (65 dBA). However, after the publication of the NADR, it was discovered that an additional 8 foot high developer sound wall bordered the property at this location. Subsequent remodeling that incorporated the developer sound wall found that the existing and future noise levels at receiver R55 (SFR) would be 65 dBA.
Source: Illingworth & Rodkin, 2008.

Temporary Construction Impacts

Noise generated by project-related construction activities would be a function of the noise levels generated by individual pieces of construction equipment, the type and amount of construction equipment operating at any given time, the timing and duration of construction activities, the proximity of nearby sensitive land uses, and the presence or lack of shielding at these sensitive land uses. Construction noise levels would vary on a day-to-day basis during each phase of construction depending on the specific task being completed. In general, noise levels at receivers nearest the project alignment would not be substantially higher than ambient traffic noise levels during the day

or night. However, certain construction techniques such as pile driving would generate high, impulsive noise levels that would be substantially higher than existing traffic noise levels and would exceed the absolute noise level limits established by local jurisdictions.

Most construction phases would generate similar or slightly lower average noise levels as compared to ambient daytime or nighttime traffic noise. Pile driving activities would generate average noise levels approximately 12-13 dBA higher than ambient noise conditions. Maximum noise levels generated by construction would generally be at or below 75 dBA, which is the existing maximum noise levels generated by traffic. The exception would be from construction activities that include the use of a hoe ram or impact pile driver.

AVOIDANCE, MINIMIZATION, AND/OR ABATEMENT MEASURES

Noise from project construction activities would be regulated through the Departments Standard Specifications and by local jurisdictions including Alameda County and the cities of Dublin, Livermore, Pleasanton. The City of Pleasanton is the only local jurisdiction that establishes quantitative noise limits for construction. Alameda County and the cities of Dublin and Livermore do not identify quantitative limits for construction noise, but rather, establish acceptable hours of construction. Section 7-1.101I of the Departments Standard Specifications states that, "…contractors shall comply with all local sound control and noise levels rules, regulations, and ordinances which apply…" and that, "…each internal combustion engine, used for any purpose shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall operate without a muffler."

Receivers that exceed either state or federal thresholds must be evaluated for potential abatement/mitigation measures. Substantial noise increases, as defined by CEQA, would not occur at Category B uses in the study area, but many receivers along the project would experience future noise levels that would approach or exceed the NAC. As a result, noise abatement must be evaluated for these receivers. Standard noise abatement measures identified in the Protocol include:

- Avoiding the project impact by using design alternatives, such as altering the horizontal and vertical alignment of the project;
- Constructing noise barriers;
- Using traffic management measures to regulate types of vehicles and speeds;
- Acquiring property to serve as a buffer zone; and
- Acoustically insulating public use or nonprofit institutional structures.

A preliminary noise abatement analysis was conducted that identified the feasibility of constructing or replacing sound walls to reduce traffic noise levels. According to the Department and FHWA policies, a sound wall must provide a minimum 5-dBA reduction in traffic noise to be considered feasible. Furthermore, under the Department policies, sound walls should interrupt the line of sight between a truck stack (of average height) and a receiver.

Because all existing walls within the project area are structurally in fair or good condition, replacement walls of equal height to existing walls would not be anticipated to change the noise environment at receiver locations. Receivers located behind existing barriers and sound walls

exceeded the NAC in many locations. In these instances, increasing the height of the existing barriers was assessed in this analysis. For the sound walls that are less than the maximum height allowed, raising the sound wall height to the maximum height would provide at least 5 dBA of noise reduction only at the existing barrier along Pimlico/Kirkcaldy Drive in Pleasanton.

The final decision to include sound walls in the proposed project design may consider reasonableness factors, such as cost effectiveness, as well as other feasibility considerations including topography, access requirements, other noise sources, safety, and information developed during the design and public review process. Furthermore, the views of impacted residents will be a major consideration in reaching a decision on the reasonableness of abatement measures to be provided. At this time, there are no sound walls proposed as part of the project, as the final decision for the construction of any noise abatement structures will be made upon completion of the project design and public involvement process. As previously discussed, outdoor land use areas such as schools and parks were represented by 100-foot "frontage units" for use in consideration of cost effectiveness.

Potential sound walls are discussed below in detail by study area segment. For noise barriers that achieved the minimum of a 5-dBA reduction at a given receiver, the reasonableness allowance was determined.

Where predicted noise levels are equal to or exceed 75 dBA $L_{eq\ (h)}$, receptors would experience a severe noise impact. In these instances, noise abatement measures other than those listed in 23 CFR 771.13(c) may be considered.

Segment 1: Santa Rita Road to Foothill/San Ramon Road

Three barriers were evaluated to abate noise impacts: SWEB1, SWEB2, and SWWB1. Based on preliminary design data, the noise barriers would reduce noise levels by 3 to 12 dBA at affected receivers. Proposed and existing sound walls and associated receiver locations within Segment 1 are depicted in **Figures 2.2.7-3a** and **2.2.7-3b**.

Sound Wall SWEB1: Sound wall SWEB1 would be located at the I-580 right-of-way along the eastbound side of I-580 between Foothill Road and I-680 (Sta. 195+25 to 201+50), adjacent to the Sheraton Hotel. The wall would feasibly abate traffic noise for one hotel swimming pool (R21 represents one 100-foot frontage unit). Normally hotels desire to be viewed from the freeway to attract customers, and the owners of the hotel would need to be contacted to see if they would want a sound wall in front of their property.

Sound Wall SWEB2: Sound wall SWEB2 would be located at the edge of shoulder along the eastbound side of the on-ramp to Eastbound I-580 from Hopyard Road, adjacent to the Best Western Pleasanton Inn. The wall would feasibly abate traffic noise for one hotel swimming pool (P-ST02 represents one frontage unit). As mentioned previously, the hotel may desire to be viewed from the freeway to attract customers, and the owners of the hotel may decline to have a sound wall installed in front of their property.

Sound Wall SWWB1: Sound wall SWWB1 would be located at the edge of the shoulder along the westbound side of I-580 (Sta. 236+00 to 255+00), adjacent to the Dublin Sports Complex fields.

This wall would feasibly abate traffic noise at the outdoor recreational fields used for multiple sports such as baseball, softball, and soccer. The sports complex represents 14 frontage units (R17 represents seven frontage units and R16 represents seven frontage units). The severe noise impact at Receiver R17, which represents seven frontage units, would be abated by this sound wall.

Segment 2: Airway Boulevard to Santa Rita Road

There are currently two existing barriers in this segment, Barriers E and F. Three potential barriers were studied to abate noise impacts, SWEB3, SWEB4, and SWWB2. Based on preliminary design data, the noise barriers would reduce noise levels by 1 to 10 dBA at affected receivers. Proposed and existing sound walls and associated receiver locations within Segment 2 are depicted in **Figures 2.2.7-3b**, **2.2.7-3c,** and **2.2.7-3d**.

Sound Wall SWEB3: Sound wall SWEB3 (Barrier F) is an existing 10- to 12-foot-high sound wall at or near the right-of-way along the eastbound side of I-580 near Pimlico Drive and Kirkcaldy Street (about Sta. 374+00 to 401+00). Replacing or modifying the sound wall with a taller sound wall was found to reduce sound levels for eight single-family residences and two multi-family residences.

Sound Wall SWEB4A or SWEB4B: A gap between existing sound walls at about Sta. 401+00 allows substantial traffic noise intrusion to two residences. Sound wall SWEB4A would be located just outside the right-of-way along the eastbound side of I-580 near Annis Circle and Kirkcaldy Street (about Sta. 401+00). The wall would run parallel to the freeway; closing the gap between existing sound walls E and F (see Table 6-2). Alternatively, the existing sound wall (F or SWEB3) could be extended along the right-of-way from about Sta. 401+00 to Sta. 404+25 (SWEB4B). Either barrier would feasibly abate traffic noise for the two residences.

Sound Wall SWWB2: Sound wall SWWB2 would be located at the right-of-way along the westbound side of I-580, and Collier Canyon Drive (Sta. 481+50 to 490+00). This wall would feasibly abate traffic noise for one single-family residence which was also indentified as a potential severe noise impact.

Segment 3: First Street to Airway Boulevard

There is currently one existing barrier (Barrier D) and plans for one future barrier (Barrier G) within Segment 3. Six barriers were studied to mitigate noise impacts, SWEB5 to SWEB8 and SWWB3 to SWWB4. Based on preliminary design data, the proposed barriers would reduce noise levels by 1 to 12 dBA at affected receivers. Proposed and existing sound walls and associated receiver locations within Segment 3 are depicted in **Figures 2.2.7-3d** and **2.2.7-3e**.

Sound Wall SWEB5: Sound wall SWEB5 would be located at the right-of-way along the eastbound side of I-580, east of Airway Boulevard (Sta. 539+00 to 548+50). The wall would feasibly abate traffic noise for the Boomers mini golf and go karts park (four frontage units). Normally, private recreational facilities such as mini golf courses desire to be viewed from the freeway to attract customers, and the owners would need to be contacted to see if they would want a sound wall in front of their property. The severe noise impact at this location would be abated by this sound wall.

It should be noted that this is a private facility that may not benefit from the placement of a sound wall because of the noise levels generated on site by the go kart facility. The I-580 Eastbound HOV Lane Project Noise Study identified this area for a sound wall so, for consistency, this study also addressed the feasibility of a sound wall in reducing noise levels.

Sound Wall SWEB6: Two alternatives for sound wall SWEB6 are SWEB6A and SWEB6B. SWEB6A would be considered if the proposed sound wall (Barrier G) associated with the Isabel Avenue Interchange Project (EA 11331) were constructed. SWEB6B would be considered if the proposed Barrier G is not to be constructed.

The western portion of both SWEB6A and SWEB6B would be located where plans for the Isabel Avenue Interchange Project show an on-ramp to Eastbound I-580. The analysis presented in this report did not have sufficient plan information to incorporate the sound wall analysis into the interchange project. Therefore, SWEB6A and SWEB6B were extended along the edge of the shoulder of I-580 into the planned interchange. If constructed, the final sound wall design should consider the interchange design where the wall would be along the on-ramp to Eastbound I-580.

> ***Sound Wall SWEB6A:*** Barrier G has an anticipated construction date of summer 2010, which is prior to the start of construction of this project, and would extend from just west of the Portola overcrossing to approximately Station 593+50. SWEB6A would join this wall to extend further west (Sta. 567+50 to 593+50). SWEB6A would feasibly abate traffic noise for up to eight single-family residences.
>
> ***Sound Wall SWEB6B:*** Sound wall SWEB6B would be located at the edge of the shoulder and right-of-way along the eastbound side of I-580 just west of the Portola Avenue overcrossing (Sta. 567+50 to 616+25). The wall would have to transition from the edge of the shoulder to the right-of-way and back to the edge of the shoulder to maintain a superior acoustical position. The placement of this sound wall does not account for planned modifications to the Isabel Avenue Interchange. This wall would feasibly abate traffic noise for up to 60 receivers (32 mobile homes, 27 single-family homes, and one frontage unit representing a swimming pool at the mobile home park).

Sound Wall SWEB7: Sound wall SWEB7 would be located at the edge of the shoulder along the eastbound side of I-580 just east of the Portola Avenue overcrossing (Sta. 618+25 to 632+00). The wall would feasibly abate traffic noise for 15 multi-family residences located along Paseo Laguna Seco (approximately 400 feet south of I-580, just east of Portola Avenue).

Sound Wall SWEB8: Sound wall SWEB8 would be located at the right-of-way along the eastbound side of I-580 just west of First Street (Sta. 718+50 to 730+50). The wall would feasibly abate traffic noise for two single-family residences located along the north side of Las Positas Road, approximately 0.5 mile west of First Street.

Sound Wall SWWB3: Sound wall SWWB3 would be located at the right-of-way along the westbound side of I-580, just east of Airway Boulevard (Sta. 532+50 to 539+50). The wall would feasibly abate traffic noise for one hotel swimming pool. The owners of the hotel would need to be contacted to see if they would want a sound wall in front of their property that might decrease visibility of the business from the freeway.

Sound Wall SWWB4: Sound wall SWWB4 would be located at the right-of-way along the westbound side of I-580, just east of the Las Colinas Road overpass (Sta. 707+25 to 713+75). The wall would feasibly abate traffic noise for one single-family residence located on the northeast side of the Las Colinas Road overpass.

Segment 4: Greenville Road to First Street

There are currently three existing barriers in this segment (Barriers A-C) and plans for one future barrier (Barrier H). There are 10 potential barriers studied to mitigate these potential impacts, SWEB9 to SWEB11 and SWWB5 to SWWB11. Based on preliminary design data, the barriers would reduce noise levels by 1 to 12 dBA at affected receivers. Proposed and existing sound walls and associated receiver locations within Segment 4 are depicted in **Figures 2.2.7-3e** and **2.2.7-3f**.

Sound Wall SWEB9: Sound wall SWEB9 would be located at the edge of the shoulder along the eastbound side of I-580 between First Street and South Vasco Road (Sta. 762+25 to 770+25). The wall would feasibly abate highway traffic noise for two single-family homes located along Southfront Road.

Sound Wall SWEB10: Sound wall SWEB10 would be located at the edge of the shoulder along the eastbound side of I-580 between First Street and South Vasco Road (Sta. 786+00 to 797+00). The wall would feasibly abate highway traffic noise for two single-family homes located along Southfront Road.

Sound Wall SWEB11: Two alternatives for sound wall SWEB11 are SWEB11A and SWEB11B. SWEB11A would be considered if the proposed sound wall (Barrier H) associated with the I-580 Eastbound HOV Lane Project (EA 04-290844) were constructed. SWEB11B would be considered if the proposed Barrier H is not to be constructed.

> ***Sound Wall SWEB11A:*** Barrier H has an anticipated construction date of winter 2010, which is prior to the start of construction of this project, and would be located at the edge of the shoulder along the eastbound side of I-580 between South Vasco Road and Greenville Road. Even with construction of Barrier H, some receivers behind the wall would still experience noise levels, which approach or exceed the NAC of 67 dBA. SWEB11A analyzes increasing the height of this sound wall. However, increasing the wall in height would only reduce noise levels by up to 1 dBA, therefore this barrier was not considered to be feasible.
>
> ***Sound Wall SWEB11B:*** Sound wall SWEB11B would be located at the edge of the shoulder along the eastbound side of I-580 between South Vasco Road and Greenville Road (Sta. 819+50 to 828+50). The wall would feasibly abate traffic noise for 16 mobile homes located along Southfront Road. The severe noise impact at eight of these mobile home residences would also be abated by this sound wall.

Sound Wall SWWB5: Sound wall SWWB5 would be located at the edge of the shoulder of the on-ramp to westbound I-580 from First Street (about Sta. 745+50 to 748+50). The wall would feasibly abate traffic noise for one school outdoor activity area located on the northwest corner of First Street and I-580.

Sound Wall SWWB6: Sound wall SWWB6 would be located at the edge of shoulder along the I-580 westbound off-ramp to First Street (about Sta. 753+50 to 760+50). The wall would be an extension of the existing 16-foot sound wall along Sundance Drive (Barrier C), and would feasibly abate traffic noise for 12 multi-family residences and a hotel swimming pool located along Sunburst Lane as well as provide additional attenuation to residences located along Sundance Drive. Normally hotels desire to be viewed from the freeway to attract customers, and the owners of the hotel would need to be contacted to see if they would want a sound wall in front of their property. However, this sound wall would also abate the severe noise impact at the 12 multi-family residences.

Sound Wall SWWB7: Sound wall SWWB7 would be located along the westbound side of I-580 along Sundance Drive. There is an existing 16-foot wall (Barrier C); however, increasing the height of this wall would only reduce noise levels by up to 1 dBA, and therefore this barrier was not considered to be feasible.

Sound Wall SWWB8: Sound wall SWWB8 would be located along the westbound side of I-580 along Sunflower Court. Currently there is an existing 12-foot wall (Barrier B). Increasing the height of this sound wall was analyzed; however, a 14- to 16-foot barrier would only reduce noise levels by up to 1 dBA. Therefore this barrier was not considered to be feasible.

Sound Wall SWWB9: Sound wall SWWB9 would be located at the edge of the shoulder along the westbound side of I-580 just west of South Vasco Road. The barrier would extend along the on-ramp to westbound I-580 (about Sta. 798+50 to 801+50). The wall would feasibly abate traffic noise for one single-family home located on the southeast side of Northfront Road.

Sound Wall SWWB10: Sound wall SWWB10 would be located at the edge of the shoulder along the westbound side of I-580 just east of South Vasco Road. The barrier would extend along the on-ramp to westbound I-580 (Sta. 805+75 to 813+75.) The wall would feasibly abate highway traffic noise for three single-family homes located along the northwest side of the onramp to westbound I-580.

Sound Wall SWWB11: Sound wall SWWB11 would be located at the edge of the shoulder along the westbound side of I-580 east of Vasco Road (Sta. 818+00 to 827+00). The wall would feasibly abate highway traffic noise for a park located along Northfront Road. The severe noise impact at this park would be abated by this sound wall.

Reasonable Allowance

To determine whether a proposed barrier is reasonable, the total reasonable allowance for that barrier must be greater or equal to the cost of the barrier. To calculate the reasonable allowance, two worksheets (Worksheets "A" and "B" in the Protocol) are completed. These worksheets calculate a reasonable allowance for each benefited receptor. A benefited receptor is any receptor receiving a minimum of a 5-dBA reduction in noise levels from the proposed barrier. **Table 2.2.7-11** depicts the reasonable allowance for each feasible sound wall.

Noise Abatement Decision Report

A Noise Abatement Decision Report (NADR) was prepared for the project using NEPA-23 CFR 772 and the Department's Protocol, which require that noise abatement be considered for projects that are predicted to result in traffic noise impacts.

The Protocol establishes a process for assessing the reasonableness and feasibility of noise abatement. Before publication of the draft environmental document, a *preliminary noise abatement decision* is made. The preliminary noise abatement decision is based on the *feasibility* of evaluated abatement and the *preliminary reasonableness determination.* Noise abatement is considered to be acoustically feasible if it provides noise reduction of at least 5 dBA at receivers subject to noise impacts. Other non-acoustical factors relating to geometric standards (e.g., sight distances), safety, maintenance, and security also can affect feasibility. NEPA-23 CFR 772 requires that noise abatement measures that are reasonable and feasible and are likely to be incorporated into the project be identified before adoption of the final environmental document.

At the end of the public review process for the environmental document, the final noise abatement decision is made and is indicated in the final environmental document. The preliminary noise abatement decision will become the final noise abatement decision unless compelling information received during the environmental review process indicates that it should be changed.

A summary of key information to be used in making the preliminary noise abatement decision is given in **Table 2.2.7-12**. The cost for each sound wall based on height was compared to the *total reasonable allowance* as provided by the NSR. Costs associated with the mitigation of secondary effects are not included in the abatement construction cost estimate. The analysis does not include sound walls SWEB11A, SWWB7, and SWWB8. As previously noted, these sound walls were determined to be infeasible for the I-580 HOV Lane Project prior to development of the construction cost estimate. In the initial review of these suggested locations, SWEB6B and SWEB11B were determined to be infeasible due to the near-future projects along the I-580 corridor that will be existing elements when the westbound HOV lane project begins construction. SWEB6B was determined not feasible since it is currently assume that the Isabel Avenue Interchange Project would construct a portion of the aforementioned sound wall. Similar to SWEB6B, SWEB11B was deemed infeasible since it is currently assumed that a sound wall would be constructed as part of the I-580 Eastbound HOV Lane Project.

Table 2.2.7-11: Reasonableness Allowance for Studied Barriers

Sound Wall ID	Approximate Stationing	Type of Analysis	Barrier Height	Predicted Noise Reduction, dBA	Number of Benefited Receivers	Total Reasonableness Allowance
SWEB1	EB, 195+25 to 201+50	New Wall	12	5	1	$38,000
			14	5	1	$38,000
			16	6	1	$38,000
SWEB2	EB, 268+25 to 269+5	New Wall	10	5	1	$38,000
			12	6	1	$38,000
			14	7	1	$40,000
			16	8	1	$40,000
SWEB3	EB 374+00 to 401+00	Increase Assessment	16	5	10	$500,000

Table 2.2.7-11 Continued

Sound Wall ID	Approximate Stationing	Type of Analysis	Barrier Height	Predicted Noise Reduction, dBA	Number of Benefited Receivers	Total Reasonableness Allowance
SWEB4A or SWEB4B	EB 401+00	New Wall	10	5	2	$100,000
			12	5	2	$100,000
			14	5	2	$100,000
			16	5	2	$100,000
SWEB5	EB 539+00 to 548+50	New Wall	10	5	2	$84,000
			12	6 to 7	4	$176,000
			14	7 to 8	4	$176,000
			16	7 to 9	4	$180,000
SWEB6A	EB 567+50 to 593+50	New Wall	12	5	3	$144,000
			14	6 to 7	3	$150,000
			16	5 to 7	8	$340,000
SWEB6B	EB 567+50 to 616+25	New Wall	8	5 to 8	5	$250,000
			10	5 to 9	23	$1,120,000
			12	5 to 10	40	$1,972,000
			14	5 to 11	60	$2,800,000
			16	5 to 12	60	$2,800,000
SWEB7	EB 618+25 to 632+00	New Wall	12	5	15	$570,000
			14	5	15	$570,000
			16	6	15	$570,000
SWEB8	EB 718+50 to 730+50	New Wall	10	5	2	$100,000
			12	6	2	$104,000
			14	7	2	$104,000
			16	7	2	$104,000
SWEB9	EB 762+25 to 770+25	New Wall	12	6	2	$108,000
			14	6	2	$108,000
			16	7	2	$108,000
SWEB10	EB 786+00 to 797+00	New Wall	10	5 to 5	1	$50,000
			12	5	2	$100,000
			14	5 to 6	2	$102,000
			16	6	2	$104,000
SWEB11A	EB 819+50 to 828+50	New Wall	8	6	6	$336,000
			10	6 to 8	8	$444,000
			12	6 to 9	10	$564,000
			14	5 to 10	16	$852,000
			16	5 to 11	16	$852,000
SWWB1	WB 236+00 to 255+00	New Wall	8	5 to 6	14	$588,000
			10	5 to 9	14	$616,000
			12	7 to 11	14	$616,000
			14	8 to 11	14	$630,000
			16	8 to 12	14	$644,000
SWWB2	WB 481+50 to 490+00	New Wall	8	5	1	$52,000
			10	6	1	$54,000
			12	9	1	$56,000
			14	10	1	$56,000
			16	10	1	$56,000

Table 2.2.7-11 Continued

Sound Wall ID	Approximate Stationing	Type of Analysis	Barrier Height	Predicted Noise Reduction, dBA	Number of Benefited Receivers	Total Reasonableness Allowance
SWWB3	WB 532+50 to 539+50	New Wall	14	5	1	$40,000
			16	6	1	$40,000
SWWB4	WB 707+25 to 713+75	New Wall	14	5	1	$48,000
			16	6	1	$48,000
SWWB5	WB 745+50 to 748+50	New Wall	12	5	1	$38,000
			14	5	1	$38,000
			16	5	1	$38,000
SWWB6	WB 753+50 to 760+50	New Wall	8	5 to 8	13	$690,000
			10	5 to 10	13	$714,000
			12	5 to 11	13	$714,000
			14	5 to 12	13	$738,000
			16	5 to 12	17	$980,000
SWWB9	WB 798+50 to 801+50	New Wall	12	5	1	$48,000
			14	5	1	$48,000
			16	5	1	$48,000
SWWB10	WB 805+75 to 813+75	New Wall	8	5	3	$150,000
			10	7	3	$156,000
			12	8	3	$156,000
			14	8	3	$156,000
			16	8	3	$156,000
SWWB11	WB 818+00 to 827+00	New Wall	8	5	3	$126,000
			10	6	3	$132,000
			12	7	3	$132,000
			14	10	3	$138,000
			16	11	3	$138,000

Source: Illingworth & Rodkin, 2008.

In further evaluating the suggested sound walls, construction cost estimates were calculated and compared to the *total reasonable allowance* values that were developed in the NSR (see **Table 2.2.7-12**). SWWB6 at 8, 10, and 16 feet high were the only scenarios determined to have a construction cost less the *total reasonable allowance*. When evaluating if the line-of-sight between the 5-foot receiver and 11.5-foot-high truck stack would be broken by the walls (per Chapter 1100 of the Department's Highway Design Manual), it was discovered that SWWB6 at 8 feet high would not be able to break the line-of-sight. Additionally, wall heights of 8 and 10 feet would display a noise reduction of 5 dBA or greater at two locations, while a wall height of 16 feet provided a 5 dBA reduction at three locations. Furthermore, adjacent to SWWB6 is an existing 16-foot sound wall (SWWB7). As stated in the previous section, SWWB6 would be an extension of SWWB7; therefore, selecting a wall height of 16 feet would visually compliment the existing wall height and maximize the number of benefited residences at this location (see **Figure 2.2.7-4**).

Based on the studies completed to date, the Build Alternative could incorporate noise abatement in the form of one sound wall at SWWB6 (located along the I-580 westbound off-ramp to First Street) at a height of 16 feet. Calculations based on preliminary design data indicate that the barrier will reduce noise levels by at least 5 dBA for 12 residences at a cost of $859,500. If, during final design,

conditions have substantially changed, noise abatement may not be necessary. The final decision of the noise abatement will be made upon completion of the project design and the public involvement processes.

CEQA Noise Analysis

The Department's Protocol states that a traffic noise impact may be considered significant under CEQA if the project is predicted to result in a substantial increase in traffic noise. A substantial noise increase is defined as an increase of 12 dBA from the existing conditions to design-year conditions. The results of the noise modeling assessment indicate that the project will typically result in increases of 0 to 1 dBA throughout the study area. The highest increases would be 2 dBA. The traffic noise impacts of the project are therefore considered less than significant under CEQA.

Table 2.2.7-12: Summary of Abatement Key Information

Sound Wall ID	Height (Ft.)	Acoustical Feasible	No. of Benefitted Residencies	Total Reasonable Allowance	Estimated Construction Cost	Cost Less Than Allowance
SWEB1	12	Yes	1	$38,000	$558,000	No
	14	Yes	1	$38,000	$605,800	No
	16	Yes	1	$38,000	$653,700	No
SWEB2	10	Yes	1	$38,000	$206,600	No
	12	Yes	1	$38,000	$224,100	No
	14	Yes	1	$40,000	$243,200	No
	16	Yes	1	$40,000	$262,500	No
SWEB3	16	Yes	10	$500,000	$2,605,200	No
SWEB4A	10	Yes	2	$100,000	$126,400	No
	12	Yes	2	$100,000	$129,800	No
	14	Yes	2	$100,000	$134,200	No
	16	Yes	2	$100,000	$138,100	No
SWEB4B	10	Yes	2	$100,000	$248,700	No
	12	Yes	2	$100,000	$269,800	No
	14	Yes	2	$100,000	$292,900	No
	16	Yes	2	$100,000	$315,800	No
SWEB5	10	Yes	2	$84,000	$781,100	No
	12	Yes	4	$176,000	$847,800	No
	14	Yes	4	$176,000	$920,500	No
	16	Yes	4	$180,000	$993,100	No

Table 2.2.7-12 Continued

Sound Wall ID	Height (Ft.)	Acoustical Feasible	No. of Benefitted Residencies	Total Reasonable Allowance	Estimated Construction Cost	Cost Less Than Allowance
SWEB6A	12	Yes	3	$144,000	$2,111,600	No
	14	Yes	3	$150,000	$2,310,600	No
	16	Yes	8	$340,000	$2,509,600	No
SWEB7	12	Yes	15	$570,000	$1,136,800	No
	14	Yes	15	$570,000	$1,244,000	No
	16	Yes	15	$570,000	$1,351,300	No
SWEB8	10	Yes	2	$100,000	$1,018,800	No
	12	Yes	2	$104,000	$1,103,000	No
	14	Yes	2	$104,000	$1,194,800	No
	16	Yes	2	$104,000	$1,286,800	No
SWEB9	12	Yes	2	$108,000	$649,600	No
	14	Yes	2	$108,000	$711,000	No
	16	Yes	2	$108,000	$772,100	No
SWEB10	10	Yes	1	$ 50,000	$ 965,400	No
	12	Yes	2	$ 100,000	$ 1,042,500	No
	14	Yes	2	$ 102,000	$ 1,126,700	No
	16	Yes	2	$ 104,000	$ 1,211,100	No
SWWB1	8	Yes	14	$ 588,000	$ 679,100	No
	10	Yes	14	$ 616,000	$ 824,500	No
	12	Yes	14	$ 616,000	$ 957,900	No
	14	Yes	14	$ 630,000	$ 1,103,200	No
	16	Yes	14	$ 644,000	$ 1,248,800	No
SWWB2	8	Yes	1	$ 52,000	$ 303,900	No
	10	Yes	1	$ 54,000	$ 369,000	No
	12	Yes	1	$ 56,000	$ 428,600	No
	14	Yes	1	$ 56,000	$ 493,700	No
	16	Yes	1	$ 56,000	$ 558,900	No
SWWB3	14	Yes	1	$ 40,000	$ 511,600	No
	16	Yes	1	$ 40,000	$ 565,300	No
SWWB4	14	Yes	1	$48,000	$377,600	No
	16	Yes	1	$48,000	$427,300	No

Table 2.2.7-12 Continued

Sound Wall ID	Height (Ft.)	Acoustical Feasible	No. of Benefitted Residencies	Total Reasonable Allowance	Estimated Construction Cost	Cost Less Than Allowance
SWWB5	12	Yes	1	$38,000	$290,400	No
	14	Yes	1	$38,000	$314,300	No
	16	Yes	1	$38,000	$338,600	No
SWWB6	8	Yes	13	$690,000	$619,800	Yes
	10	Yes	13	$714,000	$680,900	Yes
	12	Yes	13	$714,000	$737,100	No
	14	Yes	13	$738,000	$798,400	No
	16	**Yes**	**17**	**$980,000**	**$859,500**	**Yes**
SWWB9	12	Yes	1	$48,000	$201,900	No
	14	Yes	1	$48,000	$232,500	No
	16	Yes	1	$48,000	$263,100	No
SWWB10	8	Yes	3	$150,000	$696,500	No
	10	Yes	3	$156,000	$763,200	No
	12	Yes	3	$156,000	$824,200	No
	14	Yes	3	$156,000	$890,800	No
	16	Yes	3	$156,000	$957,500	No
SWWB11	8	Yes	3	$126,000	$321,700	No
	10	Yes	3	$132,000	$390,700	No
	12	Yes	3	$132,000	$453,800	No
	14	Yes	3	$138,000	$522,700	No
	16	Yes	3	$138,000	$591,500	No

Bold text indicates sound walls proposed for construction.

Source: BKF, 2008; Illingworth & Rodkin, 2008.

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I-580 Westbound HOV Lane Project EA/IS

Proposed and Existing Soundwalls and Reciever Locations(1)

FIGURE **2.2.7-3a**

Source: Geografika Consulting, 06.23.08

END OF SEGMENT ONE

BEGINNING OF SEGMENT TWO

Dublin Blvd

Hacienda Dr

Tassajara Creek

Tassajara Rd

580

Owens Dr

Pleasanton

Arroyo Mocho

SWEB3 (Barrier F)

SWEB4a

SWEB4b

LT-3 R1 P-ST03 R2 R3 R4 R5 R6 R7 R8 R9 R11

Pleasanton GP LT37

Legend

- Receiver Locations
- Existing Soundwall
- Proposed Soundwall

Interstate 580 Westbound HOV

- Project Limits
- Temporary Impact Areas

Existing CalTrans ROW

- Existing Caltrans ROW
- Existing Operating ROW

N

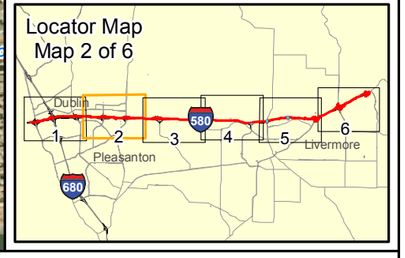
1 inch equals 1,000 feet

Meters
0 230 460

Feet
0 600 1,200

Source: BKF 2007, ESRI 2005, NAIP 2006
Illingworth Rodkin 2008

Locator Map
Map 2 of 6



I-580 Westbound HOV Lane Project EA/IS

Proposed and Existing Soundwalls and Reciever Locations(2)

FIGURE **2.2.7-3b**

Source: Geografika Consulting, 06.23.08

SWEB4a
SWEB4b
(Barrier F)
SWWB2
R8
R9
R10
R11
R12
R13
R22
580
84
Cottonwood Creek
Arroyo Las Positas
Arroyo Mocho
El Charro Rd
LIVERMORE

Legend

- Receiver Locations
- Existing Soundwall
- Proposed Soundwall

Interstate 580 Westbound HOV

- Project Limits

Existing CalTrans ROW

- Existing Caltrans ROW
- Existing Operating ROW

N

1 inch equals 1,000 feet

Meters
0 230 460

Feet
0 600 1,200

Source: BKF 2007, ESRI 2005, NAIP 2006
Illingworth Rodkin 2008

Locator Map
Map 3 of 6
Dublin
Pleasanton
Livermore
1 2 3 4 5 6
580
680

CirclePoint | **I-580 Westbound HOV Lane Project EA/IS**

Proposed and Existing Soundwalls and Reciever Locations(3)

FIG 2.2.7-3c

Source: Geografika Consulting, 06.23.08

END OF SEGMENT TWO

BEGINNING OF SEGMENT THREE

SWWB3

SWEB5

SWEB6a

SWEB6b

(Barrier G)

(Barrier D)

SWEB7

R22

P-ST07

R24

R25

R23

R26A

R26B

ST-19

ST-20

R27

R26

R28

R72

R73

ST-17,18

R29

R30

R31

R7

R35

R74

ST-15

R32

ST-16

R33

R34

P-LT02

R77

R76

ST-14

R36

580

84

Arroyo Loas Positas

Airway Blvd

Livermore

Cayetano Creek

Portola Ave

Murrieta Blvd

Legend

- Receiver Locations
- Existing Soundwall
- Proposed Soundwall

Interstate 580 Westbound HOV

- Project Limits
- Temporary Impact Areas

Existing CalTrans ROW

- Existing Caltrans ROW
- Existing Operating ROW

N

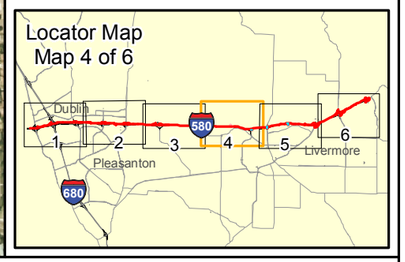
1 inch equals 1,000 feet

Meters: 0 230 460

Feet: 0 600 1,200

Source: BKF 2007, ESRI 2005, NAIP 2006
Illingworth Rodkin 2008

Locator Map
Map 4 of 6



I-580 Westbound HOV Lane Project EA/IS

Proposed and Existing Soundwalls and Reciever Locations(4)

FIGURE **2.2.7-3d**

Source: Geografika Consulting, 06.23.08

END OF SEGMENT THREE

BEGINNING OF SEGMENT FOUR

Livermore Ave

Arroyo Seco

Arroyo Las Positas

Las Positas Rd

Livermore

Portola Ave

1st Ave

580

P-LT03

R39

ST-10

R38

R37

R43

R44A

P-ST11

R42

R44

R45

R46A

R40

R41

SWWB4

SWEB8

SWEB5

SWWB6

Legend

- Receiver Locations
- Existing Soundwall
- Proposed Soundwall

Interstate 580 Westbound HOV

- Project Limits
- Temporary Impact Areas

Existing CalTrans ROW

- Existing Caltrans ROW
- Existing Operating ROW

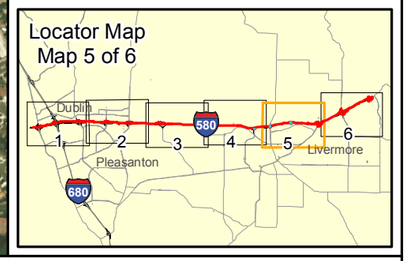
N

1 inch equals 1,000 feet

Meters
0 230 460

Feet
0 600 1,200

Source: BKF 2007, ESRI 2005, NAIP 2006
Illingworth Rodkin 2008



I-580 Westbound HOV Lane Project EA/IS

Proposed and Existing Soundwalls and Reciever Locations(5)

FIGURE **2.2.7-3e**

Source: Geografika Consulting, 06.23.08

Legend

- Receiver Locations
- Existing Soundwall
- Proposed Soundwall

Interstate 580 Westbound HOV

- Project Limits

Existing CalTrans ROW

- Existing Caltrans ROW
- Existing Operating ROW

N

1 inch equals 1,000 feet

Meters
0 230 460

Feet
0 600 1,200

Source: BKF 2007, ESRI 2005, NAIP 2006
Illingworth Rodkin 2008

I-580 Westbound HOV Lane Project EA/IS

Proposed and Existing Soundwalls and Reciever Locations(6)

FIGURE **2.2.7-3f**

Source: Geografika Consulting, 06.23.08

NOT TO SCALE

I-580 Westbound HOV Lane Project EA/IS

Proposed Soudwall

FIGURE **2.2.7-4**

Source: Google Earth 2008; Illingworth & Rodkin; Circlepoint, 2008

2.3 Biological Environment

This section presents the findings of a Natural Environment Study (NES) prepared for the project in January 2008 and other studies concerning natural communities, wetland and waters of the U.S., vegetation and wildlife communities, threatened and endangered species, and invasive vegetative species with the study area.

The study area for biological resources, referred to as the Biological Study Area (BSA), is defined as those areas where any permanent feature would be constructed, or where temporary construction effects, including staging and access, would occur during construction of the Build Alternative. The BSA encompasses the I-580 right-of-way, additional areas necessary for equipment staging and other construction activities (temporary construction easements), and additional right-of-way proposed to be acquired to accommodate the project along the I-580 corridor between Greenville Road and San Ramon Road/Foothill Road within the project limits. The BSA captures the limits of the area in which project activities would occur, see **Figure 2.3-1**. While project impacts are described in detail within the appropriate sections below, **Table 2.3-1** summarizes the project's impacts to biological resources.

2.3.1 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 areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed below in the Threatened and Endangered Species **Section 2.3.5**. Wetlands and other Waters are also discussed below in **Section 2.3.2**.

AFFECTED ENVIRONMENT

The identification of natural communities in the BSA was based on a search of the U.S. Fish and Wildlife Service (USFWS) Species List Database, the California Natural Diversity Database (CNDDB), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants for the three 7.5-minute U.S. Geological Survey (USGS) quadrangles within the BSA (Dublin, Livermore, and Altamont), as well as field reconnaissance surveys, habitat assessments, botanical surveys, and a wetland delineation survey completed for the Build Alternative. The results of these efforts are documented in the NES for the project, as well as in the following technical reports:

- Habitat assessments for vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Route I-580 Westbound HOV Lane Widening Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571). Prepared by NRM, 2007.

Biological Study Area
Major Streams in Vicinity

Data Sources:
Background: NAIP 2005;
Highways & Major Sreams-ESRI;
Biological Study Area: Digitized by NRM

Biological Study Area

FIGURE 2.3-1

Source: Geografika Consulting 12.06.07

Table 2.3-1: Summary of Project Impacts

Biological Resource	Temporary Impacts	Permanent Impacts	
		Breeding Habitat	Upland Habitat
Natural Communities of Special Concern			
Riparian Woodland	PM	PM	
Annual Grassland	PM	22.21 acres*	
Fish Passage and Aquatic Resources	PM	NI	
Trees	5 trees trimmed	16 trees removed	
Noxious Weeds	PM	PM	
Designated Critical Habitat	PM	PM	
Special-Status Plant Species and Occurrences			
Condgon's tarplant	NI	2 individuals removed	
Round-leaved filaree	NI	NI	
Special-Status Animal Species and Occurrences			
Vernal pool fairy shrimp	PM	0.013 acres*	
California tiger salamander	PM	0.013 acres*	8.55 acres*
California red-legged frog	PM	0.730 acres*	19.36 acres*
Western pond turtle	PM	PM	
Special status migratory birds	PM	PM	
Bat species of concern	PM	PM	
American badger	PM	PM	
San Joaquin kit fox	PM	21.21 acres*	

Source: NES (Caltrans, 2008)
Notes:
NI = No impact; PM = Potential for impacts reduced with implementation of Avoidance and Mitigation Measures.
*All impact calculations are preliminary and subject to approval by USFWS.

- Preliminary Determination of Waters of the U.S. Route I-580 Westbound HOV Lane Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571). Prepared by NRM, October 2008.

Land cover types mapped in the BSA include ruderal vegetation (vegetation associated with ungrazed disturbed or neglected land), annual grasslands, riparian habitat, and ornamental/landscaped areas. The only natural communities within the BSA include annual grassland and riparian habitat, as described below. These communities are described in a manner consistent with the Holland classification system[8], with modifications to more accurately describe the natural vegetation types within the BSA.

Annual Grassland

Annual grassland corresponds to Holland's Non-native Grassland, an upland type that consists of a dense to sparse cover of introduced annual grasses, mainly less than 3 feet in height. This vegetation type sometimes includes remnants of native perennial grasses, and a diverse assemblage of native annual forbs (wildflowers). The dominant grasses in this habitat include slender wild oat (*Avena barbata*), brome grasses (*Bromus hordeaceus, B. diandrus*, and others), quaking grass (*Briza maxima*), Mediterranean barley (*Hordeum marinum ssp. gussoneanum*), other barleys (*Hordeum spp.*), and Italian ryegrass (*Lolium multiflorum*). Within the BSA, annual grassland habitat is characterized by the presence of slender wild oat and brome grasses mixed with non-native forbs. Approximately 22 acres of annual grassland occur in the BSA.

Riparian Habitat

As described in the Wetlands and Other Waters Section (see **Section 2.3.2**), several perennial and intermittent creeks and channels occur within the BSA. Many of these water courses are concrete-lined channels and most are extremely degraded; however, some of the more substantial creeks, such as Arroyo Las Positas, exhibit limited riparian vegetation (*Juncus* sp. and *Typha* sp.) at certain locations. Most of the creeks within the BSA are subject to cattle grazing, and riparian vegetation is sparse or non-existent. Portions of Arroyo Las Positas in the vicinity of North Livermore Avenue appear to have been planted with native species, which are protected from encroachment and are flourishing. Other creeks that cross beneath I-580 include Alamo Canal, Tassajara Creek, Cottonwood Creek, Cayetano Creek, Collier Canyon Creek, and Arroyo Seco. These creeks support very little, if any, riparian vegetation. Approximately 1 acre of riparian habitat occur in the BSA.

Sensitive Natural Communities

Two sensitive natural communities, Sycamore Alluvial Woodland and Valley Sink Scrub, were identified in the California Natural Diversity Database (CNDDB) search of the Livermore, Altamont, and Dublin 7.5-minute quadrangles. Sycamore Alluvial Woodland occurs 2.5 miles from the BSA and will not be impacted by the project. Valley Sink Scrub occurs 0.3 miles from the BSA in the Springtown Alkali Sink/Frick Lake area. This natural community does not occur in the BSA and will not be impacted by the project. Therefore, these sensitive natural communities are not discussed further in this document.

[8] Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

ENVIRONMENTAL CONSEQUENCES

Annual Grassland

Temporary disturbance during construction and permanent loss of annual grassland habitat in the BSA would occur with the project. Construction of paved areas and permanent project facilities would result in the direct and permanent loss of this habitat type, and other construction-related activities (staging, vehicle access) would result in temporary disturbance within the BSA.

Riparian Habitats

Construction activities in riparian habitats could result in temporarily increasing erosion along creek banks and/or degradation of water quality. In addition, construction activities could permanently impact riparian habitat in the BSA if trees or shrubs are removed or trimmed (temporary impact) during project construction. The extent of tree removal and/or trimming would be dependent on construction needs.

This assessment concluded that the project would not create barriers to fish passage within the creeks that pass through the BSA. An assessment of the creeks within the BSA was conducted to determine if the project would create barriers to fish passage. The Assessment of Barriers to Fish Passage is included as an attachment to the NES Report.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Storm Water Pollution Prevention Plans (SWPPP) and erosion control best management practices (BMPs) shall be developed to minimize any wind or water-related erosion. The SWPPP shall provide guidance for design staff to include provisions in construction contracts to include measures to protect sensitive areas and to prevent and minimize storm water and non-storm water discharges. Protective measures shall include, at a minimum:

- No discharge of pollutants from vehicle and equipment cleaning will be allowed into any storm drains or water courses;
- Vehicle and equipment fueling and maintenance operations will be at least 50 feet away from water courses, except at established commercial gas stations or established vehicle maintenance facility;
- Concrete wastes will be collected in washouts and water from curing operations will be collected and disposed of and not allowed into water courses;
- Dust control will be implemented, including use of water trucks and tackifiers to control dust in excavation and fill areas, rocking temporary access road entrances and exits, and covering temporary stockpiles when weather conditions require;
- Coir rolls or straw wattles will be installed along or at the base of slopes during construction to capture sediment;
- Protection of graded areas from erosion using a combination of silt fences, fiber rolls along toes of slopes or along edges of designated staging areas, and erosion control netting (such as jute or coir) as appropriate on sloped areas; and

- Bio-filtration strips and swales will be used to receive storm water discharges from the freeway, or other impervious surfaces.

All slopes or unpaved areas temporarily affected by the project shall be reseeded with native grasses and shrubs to stabilize the slopes and bare ground against erosion. Following construction, native (and non-native if appropriate) plant species shall be installed at the disturbed area.

CUMULATIVE IMPACTS

Annual Grassland

Construction of the project may result in temporary and permanent impacts to annual grassland and riparian habitats in the BSA. However, because the quality of annual grassland habitat within the BSA is degraded, and because annual grassland is abundant throughout the region, it is unlikely that the impacts associated with the project would contribute to an overall cumulative impact on this habitat type. In addition, the riparian woodland habitat within the BSA represents a relatively small amount of habitat compared to that available in the Livermore Valley region. Therefore, it is unlikely that the impacts associated with the project would contribute to an overall cumulative impact to this habitat type. Restoration of temporarily disturbed areas to pre-project conditions also would reduce cumulative temporary impacts.

2.3.2 Wetlands and other Waters

REGULATORY SETTING

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (CWA) (33 U.S. Code [USC] 1344) is the primary law regulating wetlands and waters. The CWA regulates the discharge of dredged or fill material into waters of the U.S. including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment, or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the Environmental Protection Agency (EPA).

The Executive Order for the Protection of Wetlands (E.O. 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as the FHWA, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds that (1) there is no practicable alternative to the construction, and (2) the project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the CDFG and the Regional Water Quality Control Boards (RWQCB). Sections 1600-1607 of the California Fish and Game Code (FGC) require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFG.

The RWQCB were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issue water quality certifications in compliance with Section 401 of the CWA. Additional details are discussed in **Section 2.2.2**, Water Quality.

AFFECTED ENVIRONMENT

The identification of wetlands and other waters was based on the results of the wetland delineation survey completed for the BSA, as documented in the technical report, *Preliminary Determination of Waters of the U.S. Route I-580 Westbound HOV Lane Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571)* (October 2008).

The Wetland Delineation Report (WDR) was originally submitted to the USACE, San Francisco District, for verification on February 29, 2008. Following the completion of the revisions to the WDR, NRM resubmitted the report to the USACE for verification in October, 2008. A copy of the most recent WDR is included as Appendix D to the Natural Environmental Study for the project. A copy of the resource maps depicting the location of wetlands and other waters within the BSA are included as Appendix A to the Natural Environmental Study. For the purposes of this assessment, all wetland and water resources identified in this section should be considered both waters of the U.S. (regulated by USACE) and waters of the state (regulated by CDFG).

Wetlands

There is approximately 0.242 acre of wetlands within the BSA. These features range in size from less than 0.002 acre to 0.087 acre. Approximately 0.18 acre of wetlands within the BSA is classified as seasonal wetlands. Seasonal wetlands within the BSA are located in topographic depressions or ditches that are inundated seasonally and support the growth of hydrophytic vegetation. The remaining 0.062 acre of wetlands within the BSA is classified as emergent wetlands. Emergent wetlands are associated with creeks and drainages throughout the BSA and support perennial, hydrophytic vegetation, including cattails and rushes.

Other Waters

Other jurisdictional waters of the U.S. and state within the BSA include perennial creeks and roadside ditches hydrologically connected to navigable waters. Perennial creeks are creeks that have flowing water year round during a typical year. The following five perennial creeks occur in the BSA: Arroyo Seco, Arroyo Las Positas, Cottonwood Creek, Tassajara Creek, and South San Ramon Creek (Alamo Canal). Dublin Creek runs adjacent to the BSA from South San Ramon Creek west; however, it does not cross I-580 within the BSA. The locations of these creeks within the BSA are

illustrated on maps in Appendix A of the NES report for the project, as well as in **Figure 2.3-1**.

Roadside ditches are predominantly human-made features, or features created as a result of runoff alongside the highway to convey storm water runoff. These features range in width from 1 foot to 10 feet within the BSA, and typically extend along the length of the roadway. Roadside ditches described in this section were determined to be hydrologically connected to tributaries of navigable waters, where they convey surface water to navigable waters via a culvert, pipe, or upland ditch. It is likely that roadside ditches will be determined non-jurisdictional by the USACE once the Preliminary Wetland Delineation Report has been verified. However, prior to verification, roadside ditches are treated as a possible sensitive feature in this assessment.

In total, there are about 1.069 acres of other waters of the U.S, of which 0.846 acre is classified as perennial creeks and 0.223 acre is classified as roadside ditches.

ENVIRONMENTAL CONSEQUENCES

The project would result in the permanent removal of wetlands, including seasonal wetlands and emergent wetlands. The project would also result in some temporary impacts to to wetlands and other waters as a result of temporary hydrological interruption, alteration of creek bed or bank, and/or other construction-related activities. The projects temporary and permanent impacts to wetlands and other waters are summarized in **Table 2.3-2**. These calculations should be considered preliminary until the WDR for the project is verified by USACE.

Table 2.3-2 Potential Effects on Jurisdictional Wetlands and Other Waters within the BSA

Water Feature	Located Within the BSA (Acres)	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Wetlands	0.242	0.017	0.229
Other Waters			
Perennial Creeks	0.846	0.057	0.787
Roadside Ditches	0.223	n/a	0.218
Total Other Waters	1.069	0.057	1.005

Source: NES, 2008
Note: All impact calculations are preliminary and subject to verification by USACE.

The permanent removal of wetlands or other waters could result in long-term degradation of sensitive plant communities and fragmentation or isolation of important wildlife habitat. Degradation to drainages within an ecosystem also may redirect flow, eliminate flow, or increase pollution in the water, reducing habitat quality or eliminating suitable habitat for plant and wildlife species. As a result, temporary and permanent impacts to wetlands and other waters are considered significant and adverse.

Table 2.3-3 summarizes the federal and state permits that will need to be obtained in order to work in and around waters of the U.S and state, including wetlands, as well as the current consultation status with the governing regulatory agency.

Table 2.3-3 Permits Required to Implement the Project in Waters of the U.S. and State and Consultation Status

Regulation / Statute	Regulatory Agency	Consultation Status
CWA, Section 404, Individual Permit	USACE	Wetland delineation submitted October 2008. Permit application pending.
California Fish and Game Code, Section 1602, Lake or Streambed Alteration Agreement	CDFG	Permit application pending.
CWA, Section 401, Water Quality Certification	RWQCB	Permit application pending

Source: NRM, 2008

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

To the extent possible, the width and alignment of the project components were designed to avoid and minimize impacts to sensitive natural resources, including wetland habitat and other water features. In addition, proposed construction methods were reviewed and modified where possible to reduce potential impacts to wetlands habitats.

SWPPP and BMP measures to reduce erosion as well as reseeding areas affected by project construction will reduce impacts to wetland and other waters.

Environmentally Sensitive Areas (ESAs) shall be established along the outside perimeter of sensitive habitats that occur in, and immediately adjacent to, the BSA. Orange barrier fencing shall be installed along the work area perimeter adjacent to sensitive habitats to clearly delineate the extent of the area where construction may occur. The ESAs shall prevent construction encroachment into sensitive habitats supporting special-status species including creek habitats located directly adjacent to but not within the BSA. The specific locations of wetlands and waters directly adjacent to the BSA shall be verified by the USACE and the boundaries of the adjacent wetlands where they intersect the project area shall be transcribed from the jurisdictional determination map onto construction drawings for the project. The construction specifications shall contain clear language that prohibits construction-related activities, vehicle operation, material and equipment storage, and other surface-disturbing activities within the ESA. In addition, hydrological features (e.g., topographic depressions, roadside ditches, culverts, etc.) outside the BSA will not be manipulated (e.g., re-routed, dredged, filled, graded, etc.).

Restrictions on construction activities shall also be enacted to further reduce impacts to wetlands and other waters including:

- A speed limit of 15 m.p.h. in the BSA in unpaved areas shall be enforced to reduce dust and excessive soil disturbance;
- Temporary construction easements shall be located outside of any designated ESAs. Access routes and the number and size of staging and work areas shall be limited to the minimum necessary to construct the project; routes and boundaries of roadwork shall be clearly marked prior to initiating construction or grading;
- All food and food-related trash items shall be enclosed in sealed trash containers and removed completely from the site at the end of each day;

- No pets belonging to project personnel shall be allowed anywhere in the BSA during construction;
- All equipment shall be maintained such that there will be no leaks of automotive fluids such as gasoline, oils or solvents, and a Spill Response Plan will be prepared; hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers in a designated location that is at least 100 feet from wetlands and aquatic habitats;
- Work within an inundated drainage or channel and/or in-water work, shall be conducted outside the Central and Northern California rainy season of October 15 through April 15; any work on bridges and/or culverts in the several creeks within the BSA that require work within the main channel of a creek will occur between April 15 and October 15; and
- Construction in an inundated drainage shall be conducted with coffer dams to isolate dewatered areas from active channel habitats.

Mitigation Measure 2.3-1: Compensatory Mitigation for Impacted Waters of the U.S. and State

Compensatory mitigation shall be implemented to offset both temporary and permanent impacts on waters of the U.S. and state, including wetlands, and to ensure no net loss of habitat functions or values. Mitigation ratios will be determined through coordination with the state and federal agencies. At a minimum, compensation shall be at a 1:1 ratio (1 acre of mitigation for each acre impacted), and may be accomplished through a combination of onsite restoration/creation, offsite restoration, or purchase of mitigation credits.

CUMULATIVE IMPACTS

Construction of the Build Alternative may result in temporary and permanent impacts to wetlands and other waters in the BSA and may represent an overall cumulative impact to these resources. However, implementation of best management practices (BMPs), and mitigation pursuant to state and federal permit requirements, will reduce the potential for cumulative impacts. In some cases, when mitigation is implemented at a ratio of 1:1 (for the project and projects planned for the foreseeable future), compensatory mitigation may result in a net increase in the total amount of wetlands or other waters in the region. Therefore, cumulative impacts to wetlands or other waters are not expected as a result of the project.

2.3.3 Plant Species

REGULATORY SETTING

The USFWS and CDFG share regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. "Special status" is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or

threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see **Section 2.3.5**, Threatened and Endangered Species, in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFG fully protected species and species of special concern, USFWS candidate species, and non-listed California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at United States Code 16 (USC), Section 1531, et seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et seq. Department projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act, Public Resources Code, Sections 2100-21177.

In addition to state and federal laws regulating impacts to wildlife, there are often local regulations (i.e. county or city) that need to be considered when developing projects.

California Native Plant Protection Act

The California Native Plant Protection Act (NPPA) of 1977 (FGC 1900-1913) was created with the intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA is administered by CDFG. The Fish and Game Commission (FGC) (a separate entity from the CDFG) has the authority to designate native plants as "endangered" or "rare" and to protect endangered and rare plants from "take" (defined in Section 86 of the FGC as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). CESA provided further protection for rare and endangered plant species, but the NPPA remains part of the FGC.

AFFECTED ENVIRONMENT

The identification of special-status plant species with potential to occur in the region was based on a search of the USFWS Species List Database, the CNDDB, and the CNPS Inventory of Rare and Endangered Plants for the three USGS quadrangles within the BSA: Dublin, Livermore, and Altamont. Reconnaissance level surveys of the BSA also were conducted in 2007 to determine the potential for special-status plant species to occur in the BSA. The results of these database searches and the reconnaissance level surveys are documented in the NES for the project.

The database searches identified 22 special-status plant species that could potentially occur in the region. Appendix D lists each of these species and describes whether or not the species could occur in the BSA. Of these 22 species, six have habitat requirements (i.e., serpentine soil, elevation range, habitat type) that are absent from or unlikely to occur in the BSA. With the exception of Congdon's tarplant (*Centromadia parryi ssp. congdonii*) and round-leaved filaree (*California macrophylla*), the remaining special-status species are unlikely to occur in the highly degraded habitat within the BSA. Only one special-status plant species, Congdon's tarplant, was documented in the BSA during reconnaissance-level surveys. There are no NPPA-protected plants found in the BSA.

Congdon's Tarplant

Congdon's tarplant is protected under CEQA (CEQA Guidelines Sections 15380 and 15065). Congdon's tarplant is a CNPS list 1B.2 species, indicating that it is rare throughout its range and has declined significantly over the last century, but is not considered threatened or endangered by CDFG or USFWS. The Threat Rank designation of 0.2 indicates that Congdon's tarplant is fairly threatened in California (moderate degree/immediacy of threat). It is found in valley and foothill grasslands with alkaline soils[9]. Within the BSA, annual grasslands and ruderal habitat were identified as containing suitable habitat for Congdon's tarplant.

A reconnaissance-level survey of areas with the highest potential to support the species was conducted in October 2007, during the end of the species' blooming period. These areas were identified by their proximity to known occurrences outside the BSA. Within the BSA, Congdon's tarplant was found in bloom at two locations. One population of four plants was found in annual grassland in the northeast cloverleaf of the Fallon Road/El Charro Road interchange. One additional plant was found in ruderal habitat adjacent to the edge of the pavement, directly south of Las Colinas Road. Maps of the locations where Congdon's tarplant was found within the BSA are provided as Appendix A of the NES. As a result of the findings from the reconnaissance-level survey, all annual grassland habitat within the BSA is considered suitable habitat for Congdon's tarplant.

Round-Leaved Filaree

Round-leaved filaree has the potential to occur in the BSA due to the proximity of known CNDDB occurrences of the species and its habitat requirements. Round-leaved filaree is a CNPS list 1.B.1 species, indicating that it is rare throughout its range and has declined significantly over the last century, but is not considered threatened or endangered by CDFG or by USFWS. The Threat Rank designation of 0.1 indicates that round-leaved filaree is seriously threatened in California (high degree/immediacy of threat). It is found in cismontane woodland and valley and foothill grasslands with clay soils[10]. Within the BSA, although extremely disturbed, annual grasslands were identified as containing suitable habitat for round-leaved filaree. Round-leaved filaree blooms March through May. Due to the timeline of the project, protocol-level surveys were completed. Therefore, all annual grasslands within the BSA are considered suitable habitat for this species.

Native Trees

A survey of all trees that could be potentially impacted by the project was conducted in January 2008. A total of 21 trees were mapped within the BSA, including 16 native trees and five non-native trees. Appendix A of the NES presents the location of these trees within the BSA.

ENVIRONMENTAL CONSEQUENCES

The project would result in permanent removal of two Congdon's tarplant individuals. In addition, the project could potentially require the removal of 16 native trees of which14 are coast live oaks

[9] USFWS 2007. Inventory of rare and endangered plants of California (online edition, version 7.07d). Available at: http://www.cnps.org/inventory.

[10] 2007. Inventory of rare and endangered plants of California (online edition, version 7.07d). Available at: http://www.cnps.org/inventory.

and two are western sycamore trees. Tree trimming could impact an additional five non-native trees but would be considered a temporary impact.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Special-Status Plants Species

Measures specific above to establish environmentally sensitive areas around wetlands, and implement erosion control measures and storm water pollution prevention plans would also reduce impacts on special-status plant species.

Native trees removed during project construction should be re-established within the BSA at the replacement rate ranging from 1:1 to 3:1 depending on the quality of the habitat impacts or otherwise specified by California Department of Fish and Game (CDFG) in any Streambed Alteration Agreement obtained for the project. To the extent practicable, all replacement trees will be derived from local seed stock to maintain genetic integrity. Trees will be planted in close proximity to removal sites, if appropriate.

No compensatory mitigation is necessary for temporary disturbance to trees resulting from trimming unless the trimming results in tree mortality. In such cases, the tree will be replaced.

CUMULATIVE IMPACTS

Special-Status Plant Species

Continued and persistent development pressures within the Livermore Valley region have resulted in cumulative impacts to the special-status plant species described in this section, and implementation of the project would likely contribute to that cumulative effect. Primary threats to biological resources are from urban and agricultural development; however, these types of local projects are not consistently subject to the same types of laws and permit requirements as federal actions. These projects might contribute to cumulative loss of resources in the general project corridor.

Large-scale transportation projects and other actions requiring federal approval are generally subject to laws and permit processes requiring consideration of and mitigation for impacts to special-status species. These laws and requirements assure that the impacts of such undertakings would be fully mitigated. Minimization and mitigation measures required for these projects ensure that they have no contribution to cumulative impacts.

Implementation of the Avoidance and Minimization Measures (AMMs) and construction BMPs will reduce the project's cumulative impacts. Implementation of AMMs, BMPs, and the Mitigation and Monitoring Plan for the project also would reduce the potential for cumulative effects on native trees. In addition, the proposed operational improvements to I-580 would not facilitate increased development in the region, and subsequently result in additional growth-related cumulative impacts to special-status plant species or native trees.

2.3.4 Animal Species

REGULATORY SETTING

Many state and federal laws regulate impacts to wildlife. The USFWS, National Marine Fisheries Service (NMFS), and CDFG are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under CESA or FESA. Species listed or proposed for listing as threatened or endangered are discussed in the Threatened and Endangered Species section below. All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, USFWS or NMFS candidate species, migratory birds, and nesting raptors.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act;
- Migratory Bird Treaty Act; and
- Fish and Wildlife Coordination Act.
- State laws and regulations pertaining to wildlife include the following:
- California Environmental Quality Act;
- Sections 1600 – 1603 of the Fish and Game Code; and
- Section 4150 and 4152 of the Fish and Game Code.

AFFECTED ENVIRONMENT

The identification of special-status animal and fish species with potential to occur in the region was based on a search of the USFWS Species List Database, the CNDDB, and the CNPS Inventory of Rare and Endangered Plants for the three USGS quadrangles within the BSA, as well as field reconnaissance surveys, habitat assessments, botantical surveys, and the wetland delineation survey completed for the project. The results of these efforts are further discussed in the appropriate sections below, and are documented in **Appendix D**[11].

The database searches identified 38 special-status wildlife and fish species that could potentially occur in the region. Of these 38 species, 17 special-status wildlife and fish species have the potential to occur in the BSA. Five of those species are listed as endangered or threatened under CESA or FESA and are described in the Threatened and Endangered Species **Section 2.3.5**. Four of those species have the potential to occur in the BSA. In addition, California Central Coast steelhead (*Oncorhynchus mykiss irideus, CCCS*) have the potential to occur within creeks located downstream of the BSA. Although, steelhead do not occur within the BSA, they are discussed herein due to their occurrence within watercourses that are hydrologically connected to the creeks that pass through the BSA. The following 12 special-status species are described in this section:

- Western pond turtle (*Emys* (*Clemmys*) *marmorata*);

[11] **Appendix D** lists each of the identified special-status wildlife and fish species that could potentially occur in the region, and identifies whether or not the species could occur in the BSA.

- Cooper's hawk (Accipiter cooperii);
- Tricolored blackbird (*Agelaius tricolor*);
- Western burrowing owl (Athene cunicularia hypugaea);
- Ferruginous hawk (*Buteo regalis*);
- White-tailed kite (*Elanus leucurus*);
- California horned lark (*Eremophila alpestris actia*);
- Loggerhead shrike (*Lanius ludovicianus*);
- Pallid bat (Antrozous pallidus);
- Townsend's big-eared bat (*Corynorhinus townsendii*);
- Hoary bat (*Lasiurus cinereus*); and
- Yuma myotis (*Myotis yumanensis*).

All of these species, with the exception of the white-tailed kite, are protected under CESA as a State species of concern. The white-tailed kite is identified as a fully protected species under the FGC. Several species, including the tricolored blackbird, ferruginous hawk, Loggerhead shrike, and California horned lark are considered migratory birds and are protected under the Migratory Bird Treaty Act (MBTA). In addition, nesting raptors, including white-tailed kite, Cooper's hawk, and western burrowing owl, that nest in the BSA would be protected under the FGC, Section 3503.5.

Western Pond Turtle

Western pond turtle, which includes the subspecies northwestern pond turtle (*Clemmys marmorata marmorata*) is a State species of concern. This species occurs throughout California and inhabits rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters. Western pond turtles use aquatic habitat primarily for foraging, thermoregulation, and predator avoidance. Although it is primarily an aquatic species, pond turtles can survive on land or in water, and may remain active during the winter season, depending on environmental conditions. Females travel from aquatic sites into open, grassy areas to lay eggs in shallow nests approximately 600 to 1,300 feet or more from water.

The perennial creeks and riparian habitats in and adjacent to the BSA provide suitable aquatic habitat for the western pond turtle. Furthermore, this species was observed in many of the creeks in the BSA during California red-legged frog and California tiger salamander habitat assessment surveys and is known to occur in the BSA.

Nesting Raptors and Migratory Birds

Trees, riparian areas, manmade bridges, and box culverts may provide potential nesting habitat for birds protected under the MBTA and other special-status birds, including raptors. Loggerhead shrike and California horned lark may nest in appropriate communities within or adjacent to the BSA. Several special-status birds also may forage in annual grassland, riparian areas, or other communities within or adjacent to the BSA, but are unlikely to nest in the BSA. These species include tricolored blackbird and ferruginous hawk.

Several common species of raptors may nest in suitable habitat within and adjacent to the BSA, including white-tailed kite, Cooper's hawk, and western burrowing owl. Tree nesting raptors may nest in the large eucalyptus trees and in riparian habitats within and adjacent to the BSA. Ground nesting raptors, such as the western burrowing owl, may forage in the BSA, though it is unlikely this species would nest within the BSA because of the proximity to I-580. Although no focused surveys for these species have been conducted, trees and shrubs associated with riparian woodland communities may support these special-status species.

Bat Species

The pallid bat, Townsend's big-eared bat, hoary bat, and *Yuma myotis* are State species of concern with the potential to occur in the BSA. Although some suitable habitat (buildings and trees for roosting and some foraging habitat) is present in the BSA, it is unlikely that bats are present due to the disturbed nature of the habitat, proximity to a roadway, and the distance to the closest-known occurrences of these species. Nonetheless, the BSA and adjacent riparian habitats may provide marginally suitable foraging habitat for these species.

ENVIRONMENTAL CONSEQUENCES

Western Pond Turtle

Western pond turtle located within creeks in the BSA could be harmed, injured, or killed during construction of the Build Alternative. In addition, the permanent removal of riparian vegetation and reductions in water quality from construction-related sediment and runoff could temporarily impact this species.

Nesting Raptors and Migratory Birds

The permanent removal of trees, shrubs, and other vegetation to construct the project may impact nesting raptors and migratory bird species due to the loss of possible nests and associated eggs and/or nestlings. Temporary noise and construction activities within the BSA also may preclude or disrupt nesting in these areas.

Bat Species

Construction activities in perennial creeks in the BSA may temporarily impact suitable foraging habitat for bat species. Disturbance to open grassland habitat may impact foraging habitat for the pallid bat and removal of trees from the BSA could impact roosting habitat for this species. However, it is unlikely that any bat species roost in the BSA because they are sensitive to human disturbance and the BSA is highly disturbed. There would be no permanent impacts to individual bats or breeding bat habitat as a result of the project.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Western Pond Turtle

Avoidance and minimization measures discussed in **Section 2.3.2** regarding erosion control actions, storm water pollution prevention plans, replanting and reseeding disturbed areas, and restrictions of construction activities will help to reduce adverse effects to western pond turtles.

In addition, to further reduce potential construction-related impacts on western pond turtle, preconstruction surveys for the western pond turtle shall be conducted by a qualified biologist in the areas that contain suitable habitat (i.e., creek crossings, drainages, riparian areas) 24 hours prior to construction and will be repeated following any lapse in construction activities of two weeks or more. If western pond turtles are detected in the BSA, CDFG will be contacted to facilitate the translocation of individuals outside of the boundaries of the work area, or to facilitate the establishment of a work-exclusion area, as approved by CDFG.

Nesting Raptors and Migratory Birds

To the extent practicable, shrub and tree trimming and/or removal activities associated with the project will be conducted outside the nesting season (generally between February 1 and August 31).

If shrub and tree removal is scheduled to occur during the nesting season, a qualified wildlife biologist, familiar with the species and habitats in the BSA, shall conduct preconstruction surveys for nesting birds with suitable nesting habitat in the BSA. The nesting bird surveys should be conducted within one week of initiation of construction activities within those habitats. If no active nests are detected during surveys, construction may proceed. If active nests are detected, a no-disturbance buffer shall be established around nest(s). The extent of the no-disturbance buffers will be determined by a wildlife biologist in consultation with CDFG and will depend on the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. The purpose of the buffer will be to avoid disturbance or destruction of the nest until after the breeding season, or until a wildlife biologist determines that the young have fledged (usually late-June to mid-July). Within this buffer, all non-essential construction activities (e.g., equipment storage, meetings) should be avoided; however, construction activities can proceed if the biological monitor determines that the individual is not likely to abandon the nest during construction.

Bat Species

Mitigation measures requiring the replanting/reseeding disturbed areas discussed above, will minimize impacts on potential roosting habitat (trees) for bat species within the BSA.

CUMULATIVE EFFECTS

Continued and persistent development pressures within the Livermore Valley region have resulted in cumulative impacts to the special-status species described in this section, and implementation of the Build Alternative would likely contribute to that cumulative effect. Primary threats to biological resources are from urban and agricultural development; however, these types of local projects are

not consistently subject to the same types of laws and permit requirements as federal actions. These projects might contribute to cumulative loss of resources in the general project corridor.

Large-scale transportation projects and other actions requiring federal approval are generally subject to laws and permit processes requiring consideration of and mitigation for impacts to special-status species. These laws and requirements assure that the impacts of such undertakings would be fully mitigated. Minimization and mitigation measures required for these projects ensure that they have no contribution to cumulative impacts.

Implementation of the AMMs, construction BMPs, and compensatory mitigation measures will reduce the project's cumulative impacts. In addition, the proposed operational improvements to I-580 would not facilitate increased development in the region, and subsequently result in additional growth-related cumulative impacts to special-status animal species.

2.3.5 Threatened and Endangered Species

REGULATORY SETTING

The primary federal law protecting threatened and endangered species is FESA. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of FESA, federal agencies, such as the FHWA, are required to consult with USFWS and NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of a consultation under Section 7 is a Biological Opinion or "incidental take permit," where take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

CESA provides similar protections at the state level, with an emphasis on early consultation to avoid potential impacts to rare, endangered, and threatened species and development of appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The CDFG is the agency responsible for implementing CESA. Section 2081 of the FGC prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the FGC as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFG. For projects requiring a Biological Opinion under Section 7 of the FESA, CDFG may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the FGC.

AFFECTED ENVIRONMENT

The identification of plant and animal species listed as threatened or endangered under CESA or FESA with potential to occur in the region was based on a search of the USFWS Species List Database, the CNDDB, and the CNPS Inventory of Rare and Endangered Plants for the three USGS quadrangles within the BSA, as well as field reconnaissance surveys, habitat assessments,

botanical surveys, and the wetland delineation survey completed for the project. The results of these efforts are documented in the NES for the project, as well as the following technical reports:

- Habitat Assessments for vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Route I-580 Westbound HOV Lane Widening Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571) (February 2008);
- Biological Assessment. Route I-580 Westbound HOV Lane Widening Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571) (February 2008); and
- Preliminary Determination of Waters of the U.S. Route I-580 Westbound HOV Lane Between San Ramon Road/Foothill Road and Greenville Road, Alameda County, California (EA 131571) (February 2008).

The database searches identified 38 special-status wildlife and fish species that could potentially occur in the region. In addition, critical habitat has been proposed or designated for three federally listed invertebrate species, three federally listed fish species, two federally listed amphibian species, and one federally listed reptile species in the project region. There were no federal- or State-listed plant species identified in the region.

Of the 38 special-status fish and wildlife species identified in the region, 23 are listed as threatened or endangered under FESA and/or CESA. Four of those species, vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), and San Joaquin kit fox (*Vulpes macrotis mutica*) have the potential to occur in the BSA, as described below. In addition, California Central Coast steelhead (*Oncorhynchus mykiss irideus, CCCS*) have the potential to occur within creeks located downstream of the BSA. Although, steelhead do not occur within the BSA, they are discussed herein due to their occurrence within watercourses that are hydrologically connected to the creeks that pass through the BSA. The remaining listed species are unlikely to occur in the project area because their habitat requirements are absent from or unlikely to occur in the BSA.

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp was federally listed as threatened on September 19, 1994 (USFWS 1994)[12]. Critical habitat was designated on August 6, 2003[13]and revised August 11, 2005. The remaining populations of this species are restricted to southern Oregon and northern, central, and portions of southern California. Vernal pool fairy shrimp are known from a total of 32 populations located in an area extending from Shasta County through most of the Central Valley to Tulare County, and along the Central Coast Range from Solano County to San Benito County[14]. Vernal

[12] USFWS 1994. "Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, and the Vernal Pool Tadpole Shrimp; and Threatened Status for the Vernal Pool Fairy Shrimp." Federal Register 59-48136. September 19, 1994.
[13] USFWS 2003a. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon Vernal pool crustacean and plants in California and Oregon. Portland, Oregon.
[14] USFWS 2002. Vernal Pool Fairy Shrimp (Branchinecta lynchi) Life History, February 1, 2002, http://ecos.fws.gov/docs/life_histories/K03G.html.

pool fairy shrimp are found in ephemeral freshwater habitats, such as vernal pools and swales. None are known to occur in running or marine waters or other permanent bodies of water.

A vernal pool fairy shrimp habitat assessment of the BSA was completed in October 2007 by NRM. One seasonal wetland within the BSA, Seasonal Wetland 1, was identified as potential vernal pool fairy shrimp habitat due in large part to its proximity and hydrologic connection to an adjacent complex outside of the BSA that provides suitable habitat for the species. About 0.013 acres (0.005 hectare) of vernal pool fairy shrimp habitat associated with Seasonal Wetland 1 are located within the BSA.

A large USFWS-designated critical habitat area for vernal pool species also is located north of the BSA, at the intersection of Laughlin and Northfront roads (see Figures 2-1 through 2-3 in the NES). A very small portion of that habitat is located within the BSA, although it is predominantly made up of paved road and compacted shoulder. Biologists determined that the hydrologic and topographic conditions of the natural portions of that habitat in the BSA are unlikely to support vernal pool fairy shrimp lifecycles (Jennings personal communication 2007).

Assessment of Barriers to Fish Passage and Aquatic Resources

Aquatic resources downstream of the BSA may provide habitat for CCCS. The federally listed threatened CCCS includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin (62 FR 43937).

Steelhead are known to occur in the proposed project region within Alameda Creek and its tributary, Arroyo Mocho. This species is not known to occur in creeks within the BSA. There is no suitable spawning or rearing habitat present in any of the creeks within the BSA, such as Arroyo Las Positas or Cayetano Creek (Leidy et. al. 2005). There is no designated critical habitat for CCCS within the BSA (USFWS 2006a). An assessment of barriers to fish passage was conducted for this project. The results of that assessment are attached to the NES Report prepared for the proposed project.

California Tiger Salamander

The California tiger salamander was listed as threatened throughout its range in 2004[15], with the exceptions of the Sonoma and Santa Barbara County populations, which were listed as endangered in 2005. At the state level, California tiger salamanders are considered a State species of concern.

California tiger salamanders inhabit grasslands and open oak woodlands in central and northern California. They require two major habitat components: aquatic breeding sites with large contiguous areas of vernal pools or comparable aquatic breeding habitats with multiple breeding ponds, and nearby terrestrial aestivation or refuge sites. Breeding ponds are considered population centers that become the source populations for the formation of new breeding colonies. The primary causes of the decline of California tiger salamander throughout its range, including Alameda County, are the loss and fragmentation of habitat from human activities and the spread of non-native predators.

[15] USFWS 2004a. Endangered and threatened wildlife and plants; determination of threatened status for the California Tiger Salamander. Federal Register 69(149):47211-47248.

A California tiger salamander habitat assessment of the BSA was completed in October 2007 by NRM. California breeding habitat for the California tiger salamander does not occur within the BSA, although there is a single known breeding wetland located adjacent to the BSA, in the vicinity of Seasonal Wetland 1. All other historic breeding records in the region represent ponds and breeding habitat that have been extirpated[16]. Suitable upland habitat for California tiger salamander within the BSA is defined as unpaved soils within 1.24 miles of documented breeding habitat for the species[17]. A total of 8.55 acres of California tiger salamander upland and breeding habitat are located within the BSA.

USFWS-designated critical habitat for California tiger salamander is located approximately 0.6 miles north of the Airway Boulevard interchange. Given that this habitat is located well outside the BSA, it is not discussed further in this assessment.

California Red-Legged Frog

The California red-legged frog is federally listed as threatened[18]. The species has been extirpated or nearly extirpated from 70 percent of its former range. Historically, this species was found throughout the Central Valley and Sierra Nevada foothills. At present, California red-legged frogs are known to occur in 243 streams or drainages within 22 counties, primarily in central coastal California. California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the species throughout its range.

A California red-legged frog habitat assessment of the BSA was completed in October 2007 by NRM. There are several locations of California red-legged frog breeding, migratory, and potential upland habitat within the BSA. Suitable upland and dispersal habitat contiguous with the BSA occurs in grassland habitat within 1 mile of breeding habitat. Upland habitat within the BSA is considerably disturbed because it is located within the right-of-way of I-580. In total, about 20.09 acres of suitable upland and aquatic habitat for California red-legged frogs are present in the BSA.

USFWS-designated critical habitat for California red-legged frogs is located approximately 0.6 mile north of the Airway Boulevard interchange. Given that this habitat is located well outside the BSA, it is not discussed further in this assessment.

San Joaquin Kit Fox

The San Joaquin kit fox was federally listed as endangered in 1967[19] and State listed as threatened in 1971. Currently, kit foxes occur in the remaining native valley and foothill grasslands and chenopod scrub communities of the valley floor and surrounding foothills from southern Kern County north

[16] Jennings, Mark. Personal communication with NRM. October 9 and December 4, 2007.
[17] USFWS 2003b. Interim Guidance on site assessment and field surveys for determining presence or a negative finding of the California tiger salamander.
[18] USFWS 1996. Endangered and threatened wildlife and plants: determination of threatened status for the California red-legged frog. Federal Register 61(101):25813– 25833.
[19] USFWS 1967. "Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the San Joaquin Kit Fox." March 11, 1967.

to Merced County. San Joaquin kit fox breed in burrows and forage in annual grasslands or grassy open stages with scattered shrubby vegetation. The species requires loose-textured sandy soils and a suitable prey base to sustain itself.

A San Joaquin kit fox habitat assessment of the BSA was completed in October 2007 by NRM. Non-native annual grassland located along the freeway shoulder throughout the BSA may provide marginally suitable foraging habitat for San Joaquin kit fox. In total, approximately 21.21 acres of suitable habitat for the San Joaquin kit fox is present in the BSA.

Federal Endangered Species Act Consultation Summary

Initial agency consultation included informal conversations, a project meeting and field review with USFWS staff in October 2007 to discuss potential effects on the four species considered in the biological assessment for the project: San Joaquin kit fox, vernal pool fairy shrimp, California tiger salamander, and California red-legged frog. Two additional meetings were held in March 2008 to discuss revisions to the project description, construction activities in creeks within the BSA, permitting and construction schedules, and potential mitigation options for loss of habitat as a result of unavoidable project impacts.

In July 2008, an e-mail was sent to NMFS requesting concurrence on the determination that the project would have no effect on California central coast steelhead. This determination is based on research conducted for the project, including several consultations with fish biologists familiar with the Alameda Creek watershed, which concluded that the species is not known to occur in creeks within the BSA, and there is no suitable spawning or rearing habitat present in any of the creeks in the BSA, including Arroyo Las Positas or Cayetano Creek[20].

California Endangered Species Act Consultation Summary

As described above the State-listed San Joaquin kit fox could be affected by the project. No consultation with CDFG on the project had been conducted to date.

ENVIRONMENTAL CONSEQUENCES

Vernal Pool Fairy Shrimp

Construction of the project would result in a permanent impact to approximately 0.013 acre of suitable habitat for vernal pool fairy shrimp at a single location identified as Seasonal Wetland 1. Permanent impacts to a federally listed threatened or endangered species are considered a significant adverse impact.

[20] Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.

Fish Passage and Aquatic Resources

Within the BSA identified for the project, only Arroyo Las Positas has been identified as a stream, which historically supported anadromous runs of CCCS.[21] The portions of all other creeks within the BSA do not currently, nor have they historically supported anadromous fish. As such, pursuant to California State Senate Bill 857, biologists conducted an assessment of barriers to fish passage on Arroyo Las Positas. The assessment is included as an attachment to the NES prepared for the project.

At each of the three stream crossings of Arroyo Los Positas in the BSA, the roadway is supported by continuous concrete bridge structures with no potential barriers to fish passage. There are barriers to passage in the system below Las Positas, well downstream of the BSA . The project would widen the existing creek crossing structures along both the north and south edges of the roadway consistent with the existing roadway supports at each of these creek crossings.

California Tiger Salamander

The project would result in the permanent loss of 8.56 acres of California tiger salamander upland and breeding habitat. Effects to habitat would be associated with paving and placement of constructed project components along the freeway facility and construction of a retaining wall in the vicinity of Seasonal Wetland 1. Permanent impacts to a federally listed threatened or endangered species are considered a significant adverse impact. Construction vehicle traffic, vehicle parking, and construction staging also could generate construction-related sediment or storm water runoff, which could indirectly affect adjacent suitable salamander habitat by degrading water quality.

The project would not, however, include new or additional lighting that could increase off-ground illumination and affect the species. The project would not result in fragmentation of existing habitat for the species.

California Red-legged Frog

The project would result in the permanent loss of 20.09 acres of California red-legged frog upland and aquatic habitat. Effects to habitat would be associated with paving and placement of constructed project components along the freeway right-of-way and construction of bridge supports, culvert extensions, and other in-water activities associated with construction of creek crossings within the BSA. Permanent impacts to a federally listed threatened or endangered species are considered a significant adverse impact. Construction vehicle traffic, vehicle parking, and staging also could generate construction-related sediment or storm water runoff, which could indirectly affect adjacent suitable California red-legged frog habitat by degrading water quality.

The project would not, however, include new or additional lighting that could increase off-ground illumination and affect the species. The project would not result in fragmentation of existing habitat for the species.

[21] Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.

San Joaquin Kit Fox

Construction activities for the project could effect 21.21 acres of suitable habitat for San Joaquin kit fox. Effects to habitat would be associated with construction-related soil disturbance and the presence of construction crews and equipment within the BSA. Although a majority of the habitat will be returned to pre-project conditions, for the purposes of this assessment, all potential project effects on suitable kit box habitat have been categorized as permanent. Permanent impacts to a federally listed threatened or endangered species are considered a significant adverse impact.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Avoidance and minimization measures discussed in **Section 2.3.2** regarding erosion control actions, storm water pollution prevention plans, replanting and reseeding disturbed areas, and restrictions of construction activities will help to reduce adverse effects to threatened and endangered species. Species specific minimization and mitigation measures are discussed below.

Vernal Pool Fairy Shrimp

Several components of the project were included in the project design to avoid or minimize potential effects on vernal pool fairy shrimp and their habitat. Specifically, project construction within the vicinity of Seasonal Wetland 1 will not extend laterally beyond the BSA. A retaining wall will be constructed at the edge of the BSA to contain the work area and permanent project features, and no additional encroachment or right-of-way acquisition will be proposed at this location. An existing culvert that drains Seasonal Wetland 1 during high water events will be extended through the retaining wall in order to not alter the hydrology of the area. Down spouts that currently drain highway runoff into Seasonal Wetland 1 also will be rerouted to drain directly into the culvert, improving water quality. In addition, the design of the project was revised in 2007 to avoid all designated critical habitat for vernal pool fairy shrimp.

Before the onset of construction activities, a qualified biologist shall conduct an education program for all construction personnel. At a minimum, the training shall include a description of vernal pool fairy shrimp, California Tiger Salamander, California red-legged frog, San Joaquin kit fox, and their habitats; the occurrence of these species within the BSA; an explanation of the status of these species and protection under the FESA; the measures that are being implemented to conserve the species and their habitats as they relate to the work site; and the work site boundaries within which construction may occur. A fact sheet conveying this information shall be prepared for distribution to the above-mentioned people and other project personnel who may enter the BSA. Upon completion of the program, personnel shall sign a form stating that they attended the program and understand all the avoidance and minimization measures and implications of FESA.

Silt fences will be installed on the slopes adjacent to construction activities to prevent silt and runoff from entering Seasonal Wetland 1. The silt fences will be monitored and maintained in place during construction.

Construction activities located at Seasonal Wetland 1 will be restricted to the dry season between April 15 and October 15.

Mitigation Measure 2.3-2: Compensatory Vernal Pool Habitat

To offset the permanent loss of 0.013 acre of suitable vernal pool fairy shrimp habitat that occurs in Seasonal Wetland 1, the applicant shall coordinate with USFWS to identify suitable vernal pool fairy shrimp habitat, or suitable multi-species habitat, that will be either created, restored, or set aside in perpetuity. Alternatively, credits will be purchased at an agency-approved mitigation bank.

Fish Passage and Aquatic Resources

To reduce impacts to fish passage and aquatic resources the applicant will implement avoidance and minimization measures to reduce potential impacts to watercourses within the BSA. Work within an inundated drainage or channel, or in-water work, will be conducted outside the Central and Northern California rainy season of October 15 through April 15. Any work on bridges and/or culverts in the several creeks within the BSA that require work within the main channel of a creek will occur between April 15 and October 15. If the channels are not inundated, work may occur without restriction.

If dewatering is required, the applicant will submit the dewatering plans to the appropriate resource agencies once the plans are finalized.

- An approved fish removal and relocation plan should be developed and approved by the California Department of Fish and Game and National Marine Fisheries Service;
- A USFWS approved biologist will be present during the dewatering period to ensure that sensitive aquatic species will not be trapped in the downstream areas receiving less water; and
- Prior to dewatering within any coffer dam or sheet piling installation, fish and other aquatic vertebrates within the construction area to be dewatered should be removed and relocated out of the area.

Following the removal of riparian vegetation and canopy, all bank slopes and adjacent riparian areas should be replanted with native grasses and shrubs to stabilize the slopes against erosion, and to provide shade and cover. Disturbed woody native vegetation should be re-established within the areas affected by construction at the replacement rates specified by California Department and Fish and Game and National Marine Fisheries Service (typically at a ratio of 3:1).

Following completion of the project, all materials used to maintain flow and divert water from the BSA during the construction period, including any cofferdams, pipe, filter fabric, and gravel should be removed. All excess soil should be disposed at an approved upland site.

California Tiger Salamander

Several components of the project were included in the project design to avoid or minimize potential effects on California tiger salamanders and their habitat. Project construction within the vicinity of Seasonal Wetland 1 will not extend laterally beyond the BSA. A retaining wall will be constructed at the edge of the BSA to contain the work area and permanent project features, and no additional encroachment or right-of-way acquisition will be proposed at this location. An existing culvert that drains Seasonal Wetland 1 during high water events will be extended through the

retaining wall in order to not alter the hydrology of the area. Down spouts that currently drain highway runoff into Seasonal Wetland 1 also will be rerouted to drain directly into the culvert, thus improving water quality. In addition, construction staging areas will be located outside California tiger salamander upland habitat.

A qualified biological monitor will be on site during initial grading of areas where California tiger salamander habitat is mapped within the BSA. The biological monitor will conduct a training session for all construction workers before work is started on the project which will address special-status species and AMMs.

To prevent inadvertent entrapment of California tiger salamander during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped, special-status species animal is discovered, the onsite biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape, or the USFWS and/or CDFG will be contacted by telephone for guidance. The USFWS will be notified of the incident by telephone and e-mail within one working day.

If possible, within the portion of the BSA mapped as suitable upland California tiger salamander habitat, grading and clearing will be conducted during the dry season (April 15 to October 15) of any given year. If grading cannot be confined to the dry season, the following additional measures shall be imposed:

a) Prior to ground disturbance, the boundaries of the work area will be delineated with orange-colored plastic construction fencing or solid barriers to prevent workers or equipment from inadvertently straying from the project area; a temporary barrier consisting of silt fencing, plywood, or suitable material at least 35 inches high, after being buried 15 centimeters in the ground or sealed in a like manner to prevent incursion under the fence, will be placed immediately outside the construction fencing barriers to prevent California tiger salamander potentially occurring offsite from entering the project site, and a qualified biologist will inspect this barrier when it is constructed to verify that this requirement is met.

b) The exclusion fence/barrier placed within the California tiger salamander upland habitat areas will be inspected during rain events; during this inspection the biologist also will inspect any subterranean refugia within the BSA to detect California tiger salamanders that may be onsite.

Construction activities in the vicinity of Seasonal Wetland 1 will be restricted to the dry season (April 15 to October 15) to minimize potential effects on California tiger salamander breeding habitat.

Mitigation Measure 2.3-3: Compensatory California Tiger Salamander Habitat

To offset the permanent loss of 8.52 acres of California tiger salamander breeding and upland habitat in the BSA attributed to the project,[22] the applicant will coordinate with USFWS to identify suitable California tiger salamander habitat, or suitable multi-species habitat, that will be either created, restored, or set aside in perpetuity. Alternatively, credits will be purchased at a USFWS approved mitigation bank.

California Red-Legged Frog

A USFWS-approved biologist will be designated for the project and will be onsite during initial grading when it occurs within California red-legged frog upland habitat within the BSA. An onsite biologist also shall be present during work conducted in suitable aquatic habitat mapped within the BSA. The resident engineer will halt work and immediately contact the approved biologist and the USFWS in the event that a California red-legged frog enters the construction zone. The resident engineer shall suspend all construction activities in the immediate construction zone until the animal leaves the site voluntarily or is removed by the biologist to a release site using USFWS-approved transportation techniques. No project activities shall occur outside the delineated project construction area.

Temporary erosion control consisting of applying erosion control materials, such as straw, stabilizing emulsion, silt fencing, and jute wattles, shall be applied to embankment slopes and excavation slopes. Plastic mono-filament netting (erosion control matting) or similar material will not be used within the BSA because California red-legged frog may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

Temporary drainage inlet protection, including placement of erosion control around the drainage inlets (e.g., erosion control blankets, rocks, fiber rolls, gravel-filled bags, silt fencing, form barriers, and sediment filter bags) shall be implemented, depending on the conditions at the time of construction, as determined by the contractor and as approved by the engineer.

Temporary concrete washout facilities for waste management and material pollution for concrete operations shall be installed to eliminate discharge into storm drain systems or water courses. Temporary concrete washout facilities may consist of a plastic liner, gravel-filled bags, and/or straw bales as determined by the contractor with approval from the engineer.

A temporary linear barrier for sediment control to intercept and detain sediment in storm water runoff from unprotected areas at construction sites shall be installed adjacent to California red-legged frog aquatic habitat.

[22] Effects associated with the proposed project would occur and overlap with some portions of the area of effect for three other interchanges being constructed in the BSA (Isabel, Portola, and Fallon roads). Based on direction from USFWS staff, the project applicant will only be responsible for mitigating for the effects of the proposed project outside the other interchange footprints (i.e., 8.52 acres of upland and breeding tiger salamander habitat). The remaining 0.04 acres of suitable California tiger salamander habitat with the BSA would be mitigated by the proponents sponsoring the other interchange projects.

If requested, before, during, or upon completion of ground breaking and construction activities, the Department shall allow USFWS and/or CDFG personnel access to the BSA to inspect project effects on California red-legged frogs and their habitats.

Prior to any ground disturbance within mapped California red-legged frog suitable aquatic habitat within the BSA, pre-construction surveys shall be conducted by a USFWS-approved biologist for California red-legged frog. These surveys shall consist of walking the project limits and adjacent areas accessible to the public to determine presence of the species.

Only USFWS-approved biologist(s) who are familiar with the biology and ecology of California red-legged frog shall capture or handle the species. The USFWS-approved biologist(s) will use nets or their bare hands to capture individuals within the BSA.

USFWS-approved biologists shall take precautions to prevent introduction of amphibian diseases to the BSA by disinfecting equipment and clothing as directed by USFWS.

To prevent inadvertent entrapment of California red-legged frog during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped, special-status animal is discovered, the onsite biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape, or the USFWS and/or CDFG will be contacted by telephone for guidance. The USFWS shall be notified of the incident by telephone and e-mail within one working day.

If possible, grading and clearing in California red-legged frog suitable aquatic habitat in the BSA shall be limited to April 15 through October 15. If grading is scheduled to occur before April 15 or after October 15, barrier fencing shall be constructed along the edges of the construction area. The barrier fencing shall be placed in a matter consistent with that described under California Tiger Salamander mitigation measures above.

A temporary barrier, consisting of silt fencing or plywood, at least 36 inches in height (when buried 6 inches in the ground) shall be placed immediately outside the construction fencing in the creek work areas supporting suitable California red-legged frog habitat in the BSA. This measure is intended to prevent frogs that may potentially be present in offsite seasonal wetlands from entering the project site. Wire mesh screens shall be placed over culverts to prevent frogs from entering the BSA. While construction is underway in suitable aquatic habitat, this barrier will be inspected daily and maintained to ensure that it is functional.

Upon completion of the project, all California red-legged frog habitat subject to temporary ground disturbances, including storage and staging areas and temporary roads, shall be recontoured, if appropriate, soil cover restored and revegetated with seeds and/or cuttings of appropriate plant species to promote restoration of the area to pre-project conditions.

The Department will submit a post-construction compliance report prepared by the on-site biologist to the USFWS within 40 working days following project completion or within 60 calendar days of any break in construction activity lasting more than 40 working days.

Mitigation Measure 2.3-4: Compensatory California Red-legged Frog Habitat

To offset the permanent loss of 18.96 acres of California red-legged frog aquatic and upland habitat in the BSA attributed to the project,[23] coordination with the USFWS shall occur to identify suitable California red-legged frog habitat, or suitable multi-species habitat, that will be either created, restored, or set aside in perpetuity. Alternatively, credits shall be purchased at a USFWS-approved mitigation bank.

San Joaquin Kit Fox

A USFWS-approved biologist shall be designated for the project and will be on-call during all construction activities that occur within the BSA. Qualifications of the biologist(s) must be presented to USFWS for review and written approval prior to groundbreaking at the project site. The biologist will perform pre-construction surveys, surveys for dens, and pipe and culvert searches.

The resident engineer shall halt work and immediately contact the approved on-call biologist and USFWS in the event that a kit fox enters the construction zone. The resident engineer shall suspend all construction activities in the immediate construction zone until the animal leaves the site voluntarily or is removed by the biologist to a release site using USFWS-approved transportation techniques.

To prevent inadvertent entrapment during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. If at any time a trapped special-status species is discovered, the on-call biologist will immediately be contacted and requested to place escape ramps or other appropriate structures to allow the animal to escape or to relocate the animal to a USFWS-approved location. The USFWS shall be notified of the incident by telephone and e-mail within one working day.

To eliminate attraction of kit fox predators to the project site, all food-related trash items, such as wrappers, cans, bottles, and food scraps, shall be disposed of in closed containers and removed at least once a day from the entire project site.

To avoid injury or death of kit foxes, no firearms shall be allowed on the project site except for those carried by authorized security personnel, or local, state or federal law enforcement officials.

To prevent harassment, injury or mortality of kit foxes, or destruction of their dens or burrows by dogs or cats, no canine or feline pets shall be permitted on the project site.

[23] Effects associated with the proposed project would occur and overlap with some portions of the area of effect for three other interchanges being constructed in the BSA (Isabel, Portola, and Fallon roads). Based on direction from USFWS staff, the project applicant will only be responsible for mitigating for the effects of the proposed project outside the other interchange footprints (i.e., 18.53 acres of upland and aquatic California red-legged frog habitat). The remaining 1.13 acres of suitable California red-legged frog habitat within the BSA would be mitigated by the proponents sponsoring the other interchange projects.

Use of herbicides shall be restricted in the areas where ground squirrel burrows have been mapped, as depicted in the San Joaquin Kit Fox Habitat Assessment (NRM 2007).

To the maximum extent possible, nighttime construction shall be minimized.

If requested, before, during, or upon completion of construction activities, the Department shall allow USFWS and/or CDFG personnel access to the project site to inspect project effects on kit foxes and their habitats.

The Department shall identify and execute the appropriate action(s) regarding notification, buffers, excavation and fill, or seal-off if an occupied natal den is visible or encountered within the BSA.

Individuals of the species may enter stored pipe in the BSA and become trapped or injured. All replacement pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored in the BSA for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise moved or used in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS has been consulted by telephone.

Upon completion of the project, all San Joaquin kit fox habitat subject to temporary ground disturbances, including storage and staging areas and temporary roads, shall be recontoured, if appropriate, and revegetated with seeds and/or cuttings of appropriate plant species to promote restoration of the area to pre-project conditions.

Injured kit foxes shall be cared for by a licensed veterinarian or other qualified person such as the onsite biologist. Dead individuals shall be preserved according to standard museum techniques and held in a secure location. The USFWS and CDFG shall be notified within one working day of the discovery of a dead or injured kit fox.

A post-construction compliance report prepared by the on-call biologist shall be provided to USFWS within 40 working days following project completion or within 60 calendar days of any break in construction activity lasting more than 40 working days.

> **Mitigation Measure 2.3-5:** Compensatory Kit Fox Habitat
>
> To offset the permanent loss of 18.87 acres of San Joaquin kit fox habitat in the BSA attributed to the project,[24] coordination with the USFWS shall be conducted to identify suitable kit fox, or suitable multi-species habitat, that will be either created, restored, or set aside in perpetuity. Alternatively, credits shall be purchased at a USFWS-approved mitigation bank.

[24] Effects associated with the proposed project would occur and overlap with some portions of the area of effect for three other interchanges being constructed in the BSA (Isabel, Portola, and Fallon roads). Based on direction from USFWS staff, the project applicant will only be responsible for mitigating for the effects of the proposed project outside the other interchange footprints (i.e., 18.87 acres of suitable kit fox habitat). The remaining 2.34 acres of suitable kit fox habitat within the BSA would be mitigated by the proponents sponsoring the other interchange projects.

CUMULATIVE IMPACTS

Continued and persistent development pressures within the Livermore Valley region have resulted in cumulative impacts to the special-status species described in this section, and implementation of the Build Alternative would likely contribute to that cumulative effect. Primary threats to biological resources are from urban and agricultural development; however, these types of local projects are not consistently subject to the same types of laws and permit requirements as federal actions. These projects might contribute to cumulative loss of resources in the general project corridor.

Large-scale transportation projects and other actions requiring federal approval are generally subject to laws and permit processes requiring consideration of and mitigation for impacts to special-status species. These laws and requirements assure that the impacts of such undertakings would be fully mitigated. Minimization and mitigation measures required for these projects ensure that they have no contribution to cumulative impacts.

Implementation of the avoidance, minimization and/or mitigation measures discussed above, construction BMPs, and compensatory mitigation measures will reduce these cumulative impacts. In addition, the proposed operational improvements to I-580 would not facilitate increased development in the region, and subsequently result in additional growth-related cumulative impacts to these species.

2.3.6 Invasive Species

REGULATORY SETTING

On February 3, 1999, President Clinton signed Executive Order 13112, Invasive Species, which requires federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999 directs the use of the state's noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

Invasive species are defined by the California Invasive Plant Council (Cal-IPC) as species which are not native to California, yet spread into wildland ecosystems and displace native species, hybridize with native species, alter biotic communities, or alter ecosystem processes (e.g., hydrology, fire regimes, soil chemistry). Cal-IPC maintains an inventory and ranking system for noxious weeds that meet the above criteria. Similarly, the California Department of Food and Agriculture (CDFA), maintains a list of target invasive species that pose high threats of invasion. The CDFA lists weeds and assigns ratings to each of the species on its list. These ratings are guidelines that indicate the most appropriate action to take against an invasive plant species under general circumstances. In general, presence of high-priority noxious weeds trigger the need for mitigation; the presence of noxious weed ranked as moderate or limited does not. Both the Cal-IPC and CDFA rating systems are summarized in **Table 2.3-4**.

Table 2.3-4 California Invasive Plant Council and California Department of Food and Agriculture's Noxious Weed Rankings and Definitions

Rank	Definition
California Invasive Plant Council's Noxious Weed Rankings and Definitions	
High	These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically, both among and within ecosystems.
Moderate	These species have substantial and apparent but generally not severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
Limited	These species are invasive but their ecological impacts are minor on a statewide level or there is not enough information to justify a higher score. Their reproductive biology and other invasiveness attributes result in low to moderate rates of invasion. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.
Alert	This is an additional designation for some species in either the high or medium category, but whose current ecological amplitude and distribution are limited. The designation alerts managers to species that are capable of rapidly invading unexploited ecosystems, based on initial, localized observations and on observed ecological behavior in similar ecosystems elsewhere.
Evaluated but not listed	In general, this designation is for species for which information is currently inadequate to respond with certainty to the minimum number of criteria questions or for which the sum effects of ecological impacts, invasiveness, and ecological amplitude and distribution fall below the threshold for listing (i.e., the overall rank falls below Low). Many such species are widespread but are not known to have substantial ecological impacts (though such evidence may appear in the future) (CAL-EPPC 2003).
California Department of Food and Agriculture's Noxious Weed Rankings and Definitions	
A	An organism of known economic importance subject to state- or commissioner- (when acting as a state agent) enforced action involving eradication, quarantine, containment, rejection, or other holding action.
B	An organism of known economic importance subject to eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner, or an organism of known economic importance subject to state-endorsed holding action and eradication only when found in a nursery.
C	An organism subject to no state-enforced action outside of nurseries except to retard spread at the discretion of the commissioner or an organism subject to no state-enforced action except to provide for pest cleanliness in nurseries.

Source: NRM, 2008

AFFECTED ENVIRONMENT

Four high-priority invasive weeds and forty-five common noxious weeds were found during botanical surveys conducted within the BSA, and are identified as noxious invasive species by CDFA and/or Cal-IPC. Table 3-2 of the NES identifies these weeds, which are sorted by the Cal-IPC ranking from high priority to limited priority. Stinkwort (*Dittrichia graveolens*) is additionally ranked with an Alert by Cal-IPC.

ENVIRONMENTAL CONSEQUENCES

Construction activities may introduce or spread noxious weeds (non-native, invasive plants) into currently uninfested areas within or adjacent to the BSA. Once established, these weeds may invade wildlands, potentially degrading existing habitat for special-status plants and animals. The spread of noxious weeds could also result in a reduction or elimination of species diversity or abundance within the BSA and adjacent areas.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Avoidance measures discussed in **Section 2.3.2** regarding erosion control actions, storm water pollution prevention plans, replanting and re-seeding disturbed areas, and restrictions of construction activities will help to reduce adverse effects from invasive species.

To minimize the dispersal of invasive species, construction supervisors and managers shall be educated on weed identification and the importance of controlling and preventing the spread of noxious weeds. Areas with populations of high-priority noxious weed infestations shall be identified and flagged for easy identification by construction crews. Construction equipment shall be cleaned after leaving areas with high-priority noxious weed infestation areas. The Alameda County agricultural commissioner and land management agencies shall be consulted to ensure that the appropriate BMPs are implemented.

In addition, in compliance with the Executive Order 13112, and subsequent guidance from the FHWA, the landscaping and erosion control included in the project will not use species listed as noxious weeds. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or adjacent to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur.

2.4 Cumulative Impacts

REGULATORY SETTING

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

Regional Context

Because this document is based on accepted, regional land use forecasts for 2035, and assumes transportation improvements programmed within the same time frame (see **Table 2.1.5-6**), effects evaluated with the project include the cumulative effects of development within the region. Thus, additional analysis of cumulative effects related to specific development and transportation improvement projects within the region is not necessary for impacts such as land use, transportation (including traffic and transit), air quality, and noise.

Local Context

Cumulative effects are not always regional in scope, and the current project was analyzed to determine whether less than significant environmental effects that would be experienced locally could become significant when considered in combination with other reasonably foreseeable future projects in the project area. Reasonably foreseeable future projects are defined as the projects assumed in the No-Build Alternative described in **Chapter 1**, including other concurrent, recently completed projects in the vicinity of I-580.

Large-scale transportation projects and other actions requiring federal approval are generally subject to laws and permit processes requiring consideration of and mitigation for impacts to special-status species and their habitats; to wetland/waters of the U.S.; to water quality; and to cultural and parkland resources. These laws and requirements assure that the impacts of such undertakings would be fully mitigated. Minimization and mitigation measures required for these projects ensure that they have no contribution to cumulative impacts.

Primary threats to biological and wetlands resources are from urban and agricultural development, however, these types of local projects are not consistently subject to the same types of laws and permit requirements as federal actions. Therefore, the search for cumulative impacts for this environmental document was extended to the types of local development projects for which no or only limited regulatory protections exist, or for which such regulation might be applied inconsistently. These projects might contribute to cumulative loss of resources in the general project corridor. The additional local development projects identified and included in the cumulative impact analysis are identified in **Table 2.3-5**.

Table 2.3-5 Other Development Adjacent to I-580 Corridor

Project Name	Jurisdiction	Proposed Uses	Status
East Dublin BART Station	Dublin	BART parking structure, retail	Parking structure under construction – nearing completion; retail portion under planning review
The Green at Park Place Retail Center	Dublin	305,000-square-foot retail commercial shopping center	Under planning review
Dublin Ranch	Dublin	Residential commercial and office mixed-use neighborhood	Some residential elements approved; commercial and office uses on hold
Staples Ranch Project	Pleasanton	Master development plan for mixed-use area with residential, commercial, industrial and community park uses	Phased project; EIR released for some elements; not yet approved
Kolb Ranch	Pleasanton	14-unit residential project	Approved – first building permits issued.
Barbara Young	Pleasanton	3-unit residential expansion	Pending approval
Windstar Communities	Pleasanton	350-unit residential mixed-use transit-oriented development	Pending approval
El Charo Specific Plan	Livermore	Residential mixed-use with outlets shops	Final EIR prepared; final project approvals pending

Source: CirclePoint, 2008. Based on personal communications with planning staff at City of Pleasanton and City of Livermore; http://www.ci.dublin.ca.us/pdf/planning/DevelopmentProjectList2008-06.pdf.

BIOLOGICAL RESOURCES

Cumulative impacts to biological resources are discussed above under **Section 2.3**. Because the impacts to biological resources are relatively minor and would be mitigated by measures specified in **Section 2.3**, the project does not contribute substantially to a cumulative impact with these other projects, nor do the projects taken together result in significant cumulative impact on biological resources.

VISUAL QUALITY

The Build Alternative, in conjunction with other planned improvements along the I-580, would result in cumulative visual changes in the project corridor. In particular, the I-580 Eastbound HOV Lane Project would have the most dramatic visual impact within the I-580 corridor because it would involve the removal of vegetation within the median of I-580. This vegetation removal would be conducted as part of the eastbound project and was addressed in the environmental document for the project (EA 04-290834 and 04-290844). The I-580 Eastbound HOV Lane Project includes measures to reduce the visual effects associated with the removal of vegetation in the median and the eastbound outside shoulder area.

These planned interchange, auxiliary lane, and HOV lane projects will increase the predominance of paved roadway surfaces along the corridor. These projects would each be required to individually assess any adverse effects to landscaped areas or other visual elements that would be caused by the development of each project. In many cases, avoidance measures would be similar to the measures proposed as part of this project, which require the funding of landscape replacement focused around an interchange.

In general, although surrounding commercial, residential, and agricultural land uses would experience a perceptible change due to cumulative project impacts, the change is expected to be minor. For motorists, taken as a whole, the cumulative visual impact would include an increased perception of roadway pavement within motorists' foreground views, while mid-ground and distant views would not experience cumulative project impacts. As a result, the overall cumulative impact would be minor and is not anticipated to be adverse.

HYDROLOGY AND WATER QUALITY

The project would increase the total impervious surface (e.g., widening potions of the outside lanes) within the project limits, but would result in only a slight increase in runoff volume.

Other projects that would increase impervious surfaces in the project area include the I-580 Eastbound HOV Lane Project, Isabel Avenue Interchange Project, Fallon/El Charro interchange, and local development projects (see **Tables 2.1.1-1** and **2.1.1-2**). These projects would increase the amount of impervious surface but would constitute only a small percentage of the total amount of impervious surface in the Tri-Valley area. In addition, each project would be subject to environmental review and agency permitting which would in most cases require avoidance, minimization, and/or mitigation measures to address increases in storm water runoff or impacts to water quality such as storm water treatment plans and detention basins or facility.

CONSTRUCTION PHASE TRAFFIC IMPACTS

Long-term cumulative effects of the I-580 projects would be beneficial, relieving present congestion. If, however, two or more projects in the same transportation corridor are under construction at the same time, excessive traffic delays and detours could occur during construction.

The project is expected to begin construction in 2010, and is part of a larger program of I-580 improvements. Of the related projects in the I-580 corridor, the West Dublin/Pleasanton BART Station and the Fallon Road/El Charro interchange are currently under construction. The I-580 Eastbound HOV Lane Project (EA 04-290834 and 04-290844) is currently underway. The Isabel Avenue Interchange Project is anticipated to begin construction in the summer of 2009. Planned construction traffic management provisions in the TMP for each of the projects would minimize the mainline delays and avoid a substantial cumulative effect.

As described in **Section 2.1.5**, Avoidance, Minimization, and Mitigation Measures, construction of the project would be managed to minimize traffic impacts. Detours and delays would be coordinated with local authorities. The project would therefore not contribute to adverse cumulative effects. Permanent cumulative effects of the project would be beneficial, as future travel demand and projected peak-hour traffic volumes would be better accommodated by the westbound HOV lane.

2.5 Climate Change

REGULATORY SETTING

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas[25] (GHG) emissions reduction and climate change research and policy have increased dramatically in recent years. In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires the Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions; these regulations will apply to automobiles and light trucks beginning with the 2009 model year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

With Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Climate change and GHG reduction is also a concern at the federal level; at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. However, California, in conjunction with several environmental organizations and several other states, sued to force the U.S. Environmental Protection Agency (EPA) to regulate GHGs as a pollutant under the Clean Air Act (Massachusetts vs. Environmental Protection Agency et al., U.S. Supreme Court No. 05–1120. 549 Argued November 29, 2006—Decided April 2, 2007). The court ruled that GHGs do fit within the Clean Air Act's definition of a pollutant, and that EPA does have the authority to regulate GHGs. Despite the Supreme Court ruling, there are no promulgated federal regulations to date limiting greenhouse gas emissions.

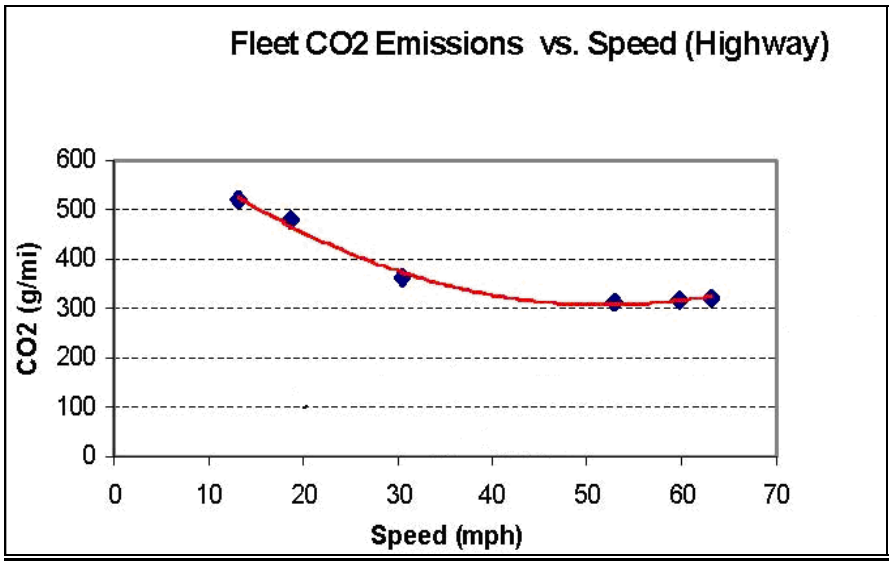
CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

[25] Greenhouse gases related to human activity, as identified in AB 32, include: Carbon dioxide, Methane, Nitrous oxide, Tetrafluoromethane, Hexafluoroethane, Sulfur hexafluoride, HFC-23, HFC-134a*, and HFC-152a*.

According to a recent white paper by the Association of Environmental Professionals[26] "an individual project does not generate enough greenhouse gas emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases.

The Department and its parent agency, the Business, Transportation, and Housing 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, the Department has created and is implementing the Climate Action Program at Caltrans (December 2006). Transportation's contribution to GHG emissions is dependent on three factors: the types of vehicles on the road, the type of fuel the vehicles use, and the time/distance the vehicles travel.

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 m.p.h.) and speeds over 55 m.p.h.; the most severe emissions occur from 0-25 m.p.h. (see the **Figure 2.5-1**). Relieving congestion by enhancing operations and improving travel times in high congestion travel corridors will lead to an overall reduction in GHG emissions.



Source: Center for Clean Air Policy— http://www.ccap.org/Presentations/Winkelman%20TRB%202004%20(1-13-04).pdf.

Figure 2.5-1

EXISTING CONDITIONS

The Tri-Valley Area, a major residential and employment center, is located downwind of several major freeways and industrial areas. The mountains surrounding the area tend to trap pollutants such that vehicle emissions and other activities create unhealthful air that often exceeds U.S.

[26] Hendrix, Micheal and Wilson, Cori. Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents (March 5, 2007), p. 2.

Environmental Protection Agency (EPA) standards. Idle or slow-moving vehicles on I-580 during peak hours contribute to this problem. The project would support regional air quality attainment goals by reducing congestion and delay, particularly during the early morning hours when high volumes of westbound commuters idle in slow-moving traffic. Vehicle Hours of Travel would decrease almost 20 percent under the Build Alternative compared to the No-Build Alternative for the 2035 forecast year.

AFFECTED ENVIRONMENT

Project air quality impacts from local traffic were evaluated as part of the air quality analysis (see **Section 2.2.5**, which modeled emissions of criteria pollutants). In addition modeling of CO_2 was conducted for the entire I-580 project mainline. This modeling analyzed a combination of "Peak" and "Off-Peak" vehicle miles traveled (VMT), speeds, and EMFAC 2007 emission rates. Modeling results are found in **Table 2.5-1**.

The carbon dioxide assessment was conducted for existing conditions in 2007 and future No-Build and Build conditions for 2015 and 2035. The results indicate that current CO_2 emissions with or without the project would increase due to an increase in traffic within the project limits. The project is predicted to have slightly lower CO_2 emissions than the No-Build condition, due to the slight increase in speed.

Table 2.5-1 Project Carbon Dioxide Emissions

Carbon Dioxide Emissions Along Roadway Segments Within the Project Limits (Along I-580) Emissions are in Tons per Day					
Roadway Segment	**2007 Existing**	**2015 No-Build**	**2015 Build**	**2035 No-Build**	**2035 Build**
I-580 Mainline	1248	1578	1522	1766	1702

Source: Illingworth & Rodkin, Inc., 2008.

Accurate modeling of GHG emissions at the project level is not currently possible. The numbers provided above are only emissions for a single gas and are not an accurate reflection of what the true GHG emissions would be because these emissions are dependent on other factors that are not part of the model, such as the fuel mix, the amount of stop–and-go driving occurring, the rate of vehicles acceleration, and the aerodynamics and efficiency of the vehicles. These numbers are only shown to give the reader a relative sense of the emissions that would occur under each alternative.

No federal, state, or regional regulatory agency has provided methodology or criteria for GHG emission and climate change impact analysis. Therefore, the Department is unable to provide a scientific or regulatory-based conclusion regarding whether the project's contribution to climate change is cumulatively considerable. The Department continues to be actively involved on the Governor's Climate Action Team as ARB works to implement AB 1493 and AB 32. As part of their Climate Action Program, the Department is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: promoting job/housing proximity, developing transit-oriented communities, and promoting high-density housing along transit corridors. The Department is working closely with local jurisdictions on planning activities; however, the department does not have local land use planning authority. The Department is also supporting

efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars and light- and heavy-duty trucks.[27]

TRANSIT ALTERNATIVES IN THE I-580 CORRIDOR

Expansion of bus and rail transit services along the I-580 corridor would likely also reduce the number of vehicles on the road and serve a similar purpose as increasing fuel economy while also reducing GHG emissions. Increased use of public transportation reduces the number of personal vehicles on the roads, thereby reducing the amount of GHG emissions. The U.S. EPA estimates that an individual who leaves their car at home for just two days a week will reduce GHG emissions by an average 1,600 pounds per year.[28] There are a number of expansions of transit services in the I-580 area that are being studied or have been approved that would reduce congestion along I-580 and reduce GHG emissions. These projects are being pursued by other agencies and organizations, with input from the Department, but are not part of the Build Alternative.

Many local transit agencies currently provide commute services within the Tri-Valley Area, specifically along the I-580 Corridor. Bus services that currently run within the project area include Amtrak California, WHEELS, Tri-Delta Transit, Altamont Commuter Express (ACE), MAX Commuter Express, and SJRTD/SMART Bus. Increased services and route assignment projects related to these bus lines would be implemented under the jurisdiction of their respective transit agencies. However, it is likely that express bus routes and commuter shuttles would benefit from the implementation of the project, as the buses would be able to utilize the HOV lane for faster, more frequent trips during peak periods.

The Metropolitan Transportation Commission, the Peninsula Corridor Joint Powers Board (Caltrain), BART, and California High Speed Rail Authority (CHSRA) have joined efforts over the past two years to develop a long-range vision for improving the passenger rail system in the Bay Area by expanding its reaches to serve future Bay Area travel demand. In September 2007, these agencies released the Regional Rail Plan (RRP), which comprehensively identifies potential passenger rail improvements and expansions. Rail projects included as part of the base for the RRP include increasing ACE service and the preservation of right of way for extending BART in the I-580 corridor.

Alternative alignments are being considered to extending BART service eastward from the current terminus at the Dublin/Pleasanton BART Station. Three alignments are proposed to be studied at a programmatic level, although others, or variations, may arise as a result of further analysis. All alternatives follow an alignment within the I-580 corridor, and vary depending on the proposed terminus station. Furthermore, each alignment emphasizes interregional rail connectivity in that the planned BART terminus stations would provide convenient transfers to the ACE commuter rail service between Stockton and the San Francisco Bay Area. In the future, these BART extensions may also provide for connections to the CHSRA Statewide High-Speed Train (HST) System.

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[27] It is important to note that the control of the fuel economy standards is held by the United States Environmental Protection Agency.

[28] EPA's Climate Change: What You Can Do on the Road Web site. Available at: <www.epa.gov/climatechange/wycd/road.html>. Last Accessed September 19, 2008.

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