Chapter 3 Affected Environment, Environmental Consequences, and Mitigation Measures

The following sections describe the affected environment, environmental consequences, and mitigation measures for each of the build alternatives. These sections are based on the technical studies and assessments that were completed and updated between 1992 and 2001, and are listed in Appendix B. The technical areas of study and assessment included:

- air quality
- cultural resources
- energy
- geotechnical
- hazardous waste
- hydrology and water quality
- natural environment
- noise
- parking and circulation
- pedestrian and bicycle
- right-of-way (relocation)
- safety
- socioeconomic
- traffic
- visual resource and aesthetics

These studies and assessments are available for review at the Caltrans District 4 Office of Environmental Analysis, 111 Grand Avenue, Oakland, California.

There were no studies or assessments of coastal resources or floodplains for the reason that the project area is outside of the coastal zone and 100 year floodplain.

There was also no Section 4(f) evaluation prepared for this project. Section 4(f) of the Department of Transportation Act (49 U.S.C. 303 and 23 U.S.C. 138) specifies that use of a publicly owned park, recreation area, wildlife or waterfowl refuge, or land from a historic site, requires steps to be taken to ensure that there is no feasible and prudent alternative to the use of such land and that the proposal include all possible planning to minimize harm to Section 4(f) land resulting from such use. There are several publicly owned parks, but no recreational areas, wildlife or waterfowl refuges, or historic sites within a few blocks of the project area. The project has been developed so that none of these nearby parks would be needed in whole or part by the proposed project and none would experience new noise, air quality, visual, or other environmental impacts by their proximity to the project area. Consequently, there are no Section 4(f) resources associated with the proposed project.

3.1 Geology

3.1.1 Affected Environment

The project is located on the San Francisco Bay plain (Bay plain). The Bay plain is bounded by tidal flats located approximately 4.8 to 9.6 km (3 to 6 miles) west of the study area and by the foothills of the Diablo range located between 16 and 24 km (10 to 15 miles) east of the interchange. The natural ground in the study area is flat but slopes gently downward to the south at a gradient generally less than two percent. Natural ground elevations range from 7.6 m (25 feet) above mean sea level (MSL) at the south end of the project limits of about elevation 19.8 m (65 feet) above MSL at the north end. Prior to the original excavations for the existing interchange, the original ground surface was approximately elevation 14.3 m (47 feet) above MSL.

Caltrans logs of test borings and other documents were reviewed to obtain subsurface data for the site. Based on this review, study area soils consist of an original 0.61 to 0.91 m (2 to 3 foot) thick surface layer of dark colored plastic clay of moderate expansion potential. Underlying the natural surface clays are intermingled silts, clays, and sands extending as deep as 42.6 m (140 feet), the maximum depth of exploration in the area. Some sands have liquefaction potential. Groundwater is about 3 to 4.6 m (10 to 15 feet) below the original ground surface.

The study area is located within the San Andreas fault system. This system is composed of a branched network of generally northwest-trending strike-slip faults.

Offset or displacement has often accompanied damaging historic Bay Area earthquakes. For purposes of this report, definitions for active and potentially active faults are those currently used by the California Division of Mines and Geology (Hart 1988) (the California Division of Mines and Geology is now the California Geological Survey) for defining fault-rupture hazard zones. That is, an "active fault" is one that has "had surface displacement within Holocene time (about the last 11,000 years)." A "potentially active fault" is one showing "evidence of surface displacement during Quaternary time (last 2 million years)." A Quaternary fault can be assumed to be inactive based on direct geologic evidence of inactivity during all of Holocene time or longer. A regional plot of Quaternary or younger faults within about 80.5 km (50 miles) of the site is shown in Figure 3.1-1.* The study area is on a deep alluvial unit where no folding has taken place.

Active or potentially active faults of most significance to the study area include the Hayward fault, located about 1.6 to 2.4 km (1 to 1.5 miles) northeast; the San Andreas fault, located about 27.4 km (17 miles) southwest; and the Calaveras fault, located about 16 km (10 miles) northeast of the study area. These faults have caused severe ground shaking in the study area in the past and have the potential to do so in the future. The Hayward fault is actively creeping and has ruptured in the historic past causing surface displacement in the study area. This fault is considered capable of future rupture.

Earthquake intensities are measured using a variety of methods. For this report, two methods, the Modified Mercalli (MM) scale and the Richter scale, are used to describe earthquakes for the study area. The MM scale evaluates earthquake intensities based on damage incurred by buildings/structures and the ability of people to feel the motion (Table 3.1-1) of the quake. The Richter scale provides a point system of evaluating seismic disturbance in terms of the energy dissipated with 1.5 indicating the smallest earthquake that may be felt, 4.5 an earthquake causing slight damage, and 8.5 a devastating earthquake.

The Bay Area has experienced three large historic earthquakes associated with the Hayward fault in 1836, 1858, and 1868, with maximum MM intensities of IX-X, VIII, and about VIII-IX+ and Richter scale magnitudes of 6.8, 6.1, and 6.8, respectively.

* Figures are located in Chapter 12

Table 3.1-1 Modified Mercalli Earthquake Intensity Scale (Abridged)*

Intensity	Effects	Intensity	Effects
I	Not felt except by a very few under especially favorable circumstances (I Rossi-Forel scale).	VIII	Damage slight in specially designed structures; considerable in ordinary buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Change in well water levels. Persons driving automobiles disturbed (VIII to IX Rossi-Forel scale).
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing (I to II Rossi-Forel scale).	IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings with partial collapse. Buildings shifted off foundations; ground cracked conspicuously. Underground pipes broken (IX+Rossi-Forel scale).
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibration like passing of truck (III Rossi-Forel scale).	X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks (X Rossi-Forel scale).
IV	During the day felt indoors by many; outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing automobiles rocked noticeably. (IV to V Rossi-Forel scale).	XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and landslips in soft ground. Rails bent greatly.
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop (V to VI Rossi-Forel scale).	XII	Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into air.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight (VI to VII Rossi-Forel scale).		
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; some chimneys broken. Noticed by persons driving automobiles (VIII Rossi-Forel scale).		

Correlations with the Rossi-Forel Intensity scale are underlined.

Four major historic earthquakes have occurred along the San Andreas fault in the Bay Area vicinity in 1838, 1865, 1906, and 1989. These events had an estimated Richter scale magnitude of 7.0, 6.5, 8.2, and 7.1 respectively. The October 17, 1989 Loma Prieta earthquake involved about 15 seconds of strong ground shaking.

Several historic earthquakes with magnitudes exceeding 6.0 have been associated with the southern portion of the Calaveras fault. These include the Coyote Lake event, a 6.3 magnitude in 1897 (Reasenberg and Ellsworth 1982), the Coyote Mainshock, a magnitude of 6.6 in 1911 (Bolt and Miller 1975), and the Morgan Hill earthquake, magnitude 6.2 in 1979 (Bolt et al. 1985).

The maximum credible earthquake (MCE), as defined by the Division of Mines and Geology (California Geological Survey), is the maximum earthquake that appears capable of occurring under the presently known tectonic framework. It is a rational and believable event that is in accord with all known geologic and seismologic facts. In determining the MCE, little regard is given to its probability of occurrence, except that its likelihood of occurring is great enough to be of concern.

A number of estimates for the MCE magnitude have been made for the Hayward fault and are based on the Richter scale. The maximum historic earthquake on the Hayward fault has been estimated at 6.8. Slemmon and Chung (1982) reviewed several previous MCE estimates for both the Hayward and Calaveras faults and concluded that most data suggests a MCE magnitude of about 6.8 to 7.3 for both fault zones. For emergency-response planning, the California Division of Mines and Geology (Steinbrugges et al. 1987) uses a magnitude 7.5 earthquake on the Hayward fault based, in part, on the assumption that the entire fault from San Pablo Bay south to Mt. Misery in East San Jose will rupture during this event. The likelihood of earthquakes and, perhaps, an associated co-seismic surface fault offset on the Hayward fault is quite high. Agnew et al. (1988) estimated that there is about a 20 percent chance that an earthquake of about 7.0 will occur on the Hayward fault nearest the study area during the next 30 years. They viewed this event as more than twice as likely as a repeat of the 1906 San Andreas fault earthquake during the same interval.

The San Andreas fault was the source of the 1906 San Francisco earthquake, which caused extensive damage throughout the Bay Area, and of the October 1989 Loma Prieta earthquake. The U.S. Geological Survey (U.S.G.S.) (Working Group 1990) has estimated that there is a 23 percent chance that a Richter magnitude 7 or larger earthquake will occur on the San Francisco Peninsula segment of the San Andreas

fault within the next 30 years. The estimated maximum credible Richter magnitude for the San Andreas fault is 8.5 (Wesson et al. 1975).

In 1999, the U.S.G.S. reported increased probabilities of 6.7 Richter scale magnitude earthquakes occurring on regional faults before the year 2030. There is a 32 percent chance of such an earthquake will occur on the Hayward Fault, 18 percent on the Calaveras Fault, and 21 percent on the San Andreas Fault.

Table 3.1-2 summarizes the MCE associated with the pertinent faults, along with an estimate of the maximum credible bedrock acceleration at the study area.

Table 3.1-2 Summary of MCE for Relevant Faults

Fault System	Maximum Credible Earthquake, Richter Magnitude	Maximum Credible Bedrock Acceleration, g
Hayward	7.5	0.70
Calaveras	6.3	0.35
San Andreas	8.5	0.37

Source: Parsons Brinckerhoff 1991.

3.1.2 Permanent Impacts

The majority of natural surficial materials in the study area consist of moderately plastic dark-colored clay, which has moderate potential for expansion. While large settlements are not anticipated in the alluvium at the site, potential settlement may occur due to compression and consolidation of occasional weak or compressible upper soils due to the weight of new ramp and roadway fills.

Existing slopes within the study area appear to be in good condition and exhibit no signs of instability. It is anticipated that most of the new slopes are fill slopes less than 6.1 m (20 feet) in vertical height. Alluvial materials upon which fills are supported have medium strength and relatively low compressibility. Slope failure is unlikely provided that slope inclinations do not exceed 2 to 1. No erosion or sedimentation is expected within the project limits due to the generally cohesive nature of the surface soils at the site, and the landscape vegetation cover.

Potential impacts to the project from naturally occurring geologic formations and soil conditions are prevented through the following procedures, which have been incorporated in the design of the project.

- Pavements would be designed thick enough to resist expansion pressure. Where feasible, exposed expansive soils would be excavated and replaced with non-expansive fill where they are within 0.9 m (3 feet) of finished pavement grade. Settlement of structures is avoided by supporting them on deep pile foundations.
- Settlement of approach fills to these structures would be avoided by placing fills as early as possible or surcharging and delaying final pavement course construction as long as possible. In several months of delay, a good portion of approach fill settlement takes place. Standard measures are used to maximize slope stability include limiting slope inclination, quality control of embankment materials, proper preparation of ground surfaces to receive fills, and controlled surface drainage. Cut and fill slopes are generally less steep than 2 to 1.
- For slopes with vertical heights greater than 6.1 m (20 feet), there would be a 3.05 m (10-foot)-wide bench at mid-height of the slope. The bench would be sloped back into the hill and longitudinally to direct water to a protected drainage system.
- Tops of slopes and benches would be provided with lined ditches to prevent water from flowing onto slopes.
- Embankment materials are predominantly granular, inorganic, and have low plasticity and low expansion potential. Areas to receive fill would be stripped of surface organics, then scarified and recompacted. Fill to be placed on existing slopes would be benched and keyed.
- Erosion and sedimentation would be controlled by channelization of surface runoff into ditches and drains, and vegetative slope protection would be used on both cut and fill slopes. Ditches with longitudinal slopes greater than 5 percent would be lined.

Based on existing geologic information, there are no known active faults crossing the study area. The site is not located within a Special Studies Fault Rupture Hazard (Alquist-Priolo) Zone, and potential for surface fault rupture is considered remote. Impacts from earthquakes are described in the Richter scale units for the following discussion.

In the event of a strong earthquake occurring along any of the major faults in the Bay Area, ground shaking in the study area is expected to be severe. Since the study area is within 2.4 km (1.5 miles) of the Hayward fault, ground shaking would be severe during a large earthquake on the Hayward fault. The Maximum Credible Earthquake (MCE) affecting the study area would likely be a magnitude 7.5 event occurring on the Hayward fault.

Soil liquefaction is a phenomenon in which submerged, cohesionless soil layers lose strength during cyclic loading, such as that imposed by earthquakes, and acquire "mobility" sufficient to permit both horizontal and vertical movements. Soils that are most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained sands. Based on Caltrans log information, sands with liquefaction potential were encountered in four deep borings. Two of these were in the area of the existing I-880/92 Separation Structure (elevated portion of Route 92 over I-880), one at the Calaroga Avenue Separation Structure, and one at the Tennyson Road Separation Structure. Features of these potentially liquefiable layers are summarized in Table 3.1-3. These layers would potentially liquefy during the strong shaking associated with the maximum credible earthquake, and the primary consequence of this would be settlement of roadways adjacent to pile-supported structures. It is possible that liquefaction zones are localized and discontinuous. Potential for liquefaction at each pile group will be evaluated as part of the final geotechnical investigation for the project.

Table 3.1-3 Potentially Liquefiable Layers in the Study Area

Location	Boring	Layer Description	Elevation
I-880/Route 92	B-2	Slightly compact, poorly sorted sand	+5 to +16
I-880/Route 92	B-4	Compact, poorly sorted sand	-5 to –16
Calaroga Avenue	B-3	Compact medium-fine sand	+3 to 0
Tennyson Road	B-5	Compact and slightly compact gravel, sand and silt	+3 to -7

Source: Parsons Brinckerhoff 1991.

Given that secondary ground cracking, landslides, and mudflows due to strong earthquake shaking can occur only in loose cohesionless dry or moist soils, and most of the upper soils of the study area are clayey, the likelihood of this impact is low. The flatness of the terrain and strength of soils preclude the occurrence potential for critical secondary ground cracking or landslides and mudflows.

If structural sections of the I-880/Route 92 interchange were unable to withstand a maximum credible earthquake, people traveling over structural sections and people below structural sections would be at risk to injuries or death. Although the existing I-880/Route 92 interchange structures have already been seismically retrofitted, the risk of injuries or death from collapsing structures would be slightly less under the

build alternatives than under the No Build Alternative, assuming the new interchange is designed to state-of-the-art seismic standards.

3.1.3 Mitigation Measures

For all the build alternatives, facilities would be designed and constructed to withstand ground shaking, pavement distortions, and soil liquefaction associated with maximum credible earthquakes on the Hayward and other nearby faults.

To mitigate potential structural damage during earthquakes due to liquefaction of soils, geotechnical investigation during final design would identify the liquefaction potential of soils at each pile group, and where needed, new structures will be supported on pile foundations that extend well below areas susceptible to liquefaction. Piles would be designed to support downdrag loads exerted by soils above liquefiable layers.

Alternately, potentially liquefiable layers would be treated or densified by cement or chemical grouting, vibratory replacement, or vibratory stone column methods. Because these standard design and construction procedures would be followed, no additional mitigation is proposed. Knowledge gained from structure failure during the Loma Prieta earthquake would also be applied to the structural design of the project to reduce impacts from seismic events.

3.2 Hydrology, Water Quality, Storm Water Runoff

The impacts of hydrology, water quality, and storm water runoff are similar for each alternative.

3.2.1 Affected Environment

Drainage throughout the project area is by man-made storm drains and channelized creeks (Alameda, Sulfur, Ward). Previous analyses of surface water and storm runoff into these storm drains and creeks showed traces of copper and zinc.

Beneath the project area is the East Bay Plain aquifer (San Lorenzo cone subarea). This aquifer flows west/southwest with a depth ranging from 3.0 to 9.1 m (10 to 29.9 feet) below the ground surface. The aquifer waters are suitable for irrigation but nonpotable. At shallow depths, the aquifer waters may have toxic chemicals, nitrates, and bacteria.

Under the 1972 Federal Water Pollution Control Act (also referred to as the Clean Water Act) and its subsequent amendments, Caltrans is obligated to protect the water quality of Alameda, Sulfur, and Ward Creeks, other surface waters, and aquifers. Discharges of pollutants to waters of the United States are illegal without a National Pollution Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) issued Caltrans a Statewide NPDES permit, Order No. 99-06-DWQ/NPDES Permit No. CAS000003, on July 15, 1999. This NPDES permit covers storm water and construction activities from all Caltrans properties, facilities, and projects. Additionally, the SWRCB issued Order 99-08-DWQ/NPDES General Permit No. CAS000002, on August 19, 1999, for general construction projects that involve five or more acres of soil area, and which Caltrans must also follow.

The Caltrans Statewide NPDES Permit includes discharge prohibitions, effluent limitations, and receiving water limitations. As required by the Caltrans Permit, a final Storm Water Management Plan (SWMP) was adopted by the SWRCB on May 17, 2001. The SWMP includes Best Management Practices (BMPs) that Caltrans may implement to manage storm water discharges from storm water drainage systems, and requires a monitoring and evaluation program and annual reports. The Statewide SWMP describes procedures and practices that Caltrans will use to manage discharges from storm water drainage systems associated with Caltrans highway right-of-way, construction activities within the highway right-of-way, and highway-related facilities and

properties. The SWMP commits Caltrans to implement appropriate procedures and temporary and permanent best management practices (BMPs) to control pollutant discharges from storm water. Examples of BMPs that are being considered include biofilter strips/swales, infiltration basins, detention devices, dry weather flow diversions, and litter removal devices.

3.2.2 Permanent Impacts

After completion of construction, the resulting facility would have slightly more impervious surface area than the existing I-880/Route 92 interchange. Consequently, there would be slightly less ground adsorption of precipitation and slightly more runoff into drainage systems. The increased amount of paving also means that there may be slightly more auto fluids (oil, grease, and total petroleum hydrocarbons), and auto detritus (from tires, brake linings, plastic parts, etc.), as well as litter and debris tossed from vehicles, on the roadway that may end up transported by storm runoff to surface waters. There is a potential for impacts upon water quality as a result of fuel, chemical, and other material spills onto roadways of the resulting facility.

By complying with the storm water pollution prevention plan (SWPPP) requirements in the State General NPDES Permit for Storm Water Discharges Associated with Construction Activity, the Caltrans Statewide NPDES Permit, possible Waste Discharge Requirements from the Regional Water Quality Control Board, and Storm Water Monitoring Plans, Caltrans can minimize the water quality impacts of all alternatives. The most important feature of the project for controlling storm water discharges is the new expanded pump plant, which would hold excess storm waters, allow for the settlement of sediments and other substances, and then discharge the waters into the City of Hayward's storm water system. The pump plant would be maintained regularly to remove sediments and other substances to keep the pump plant operating optimally.

3.2.3 Temporary Impacts

3.2.3.1 Construction Phase Impacts

During construction of the project, clearing, grading, stockpiling and excavation activities may result in excess soils and sediments being deposited into drainage systems, and then transported to surface waters by storm runoff. Excavation and pile driving activities may cause migration of soil, sediments, and surface contaminants to ground waters. Fuel, fluids, slurries, solvents and other chemicals

and materials may be washed or accidentally released into storm sewer systems or onto soils and paved surfaces, and then transported to surface waters by runoff. Ground water that has filtrated into excavations would require collection and disposal to prevent transport into sewer systems.

3.2.4 Mitigation Measures

Permit and plan requirements will be followed in accordance with the erosion control and sediment control management mandates of the State's Storm Water Management Plan (SWMP). The construction contractor will be required to submit a Storm Water Pollution Prevention Plan (SWPPP) prior to the start of construction activities. The SWPPP will address water pollution controls during construction. The SWPPP specifies measures to prevent soil, sediments, construction materials, and fluids from being carried off the site by storm water. Such measures typically include: covering stockpiles with polyethylene materials; placement of sediment trapping devices surrounding drainage inlets and storm drain openings as well as the toe of slopes; and use of temporary, on-site storage systems for contaminated waters and excavated materials. Additionally, the SWPPP would identify locations where lubricants, fuels, reinstates, and other fluids are to be handled, and discuss measures to be implemented for controlling spills.

To prevent the contamination of ground water aquifers resulting from pile driving and other construction activities, sealed excavations, tight casings, and other measures that stop the migration and mixing of surficial soils and runoff with clean soils and waters at lower depths would be specified in the Special Provisions of the construction contract.

All project facilities would be designed to drain properly through gravitational and mechanically assisted means and maintained so that temporary flooding may be avoided. Temporary and permanent control measures (PCMs) per the SWMP are also to be considered in the design of project facilities to prevent erosion and water contamination. Again, the new expanded pump plant would be the permanent control measure used. Biofiltration strips/swales and litter removal devices may also be used where feasible.

3.3 Hazardous Waste/Materials

3.3.1 Affected Environment

The study area for identification of known/potential hazardous waste sites extends along I-880 from Tennyson Road to Winton Avenue and along Route 92, from Industrial Boulevard to Santa Clara Street.

Review of records and identified sites in the project area were discussed in the DEIS/R and the Supplement to the DEIS/R. The most recent review of potential hazardous waste sites is presented in the Initial Site Assessment (ISA) of the Route 92/I-880 Interchange Project performed by the Caltrans (August 2001). The ISA included a record review, a site reconnaissance, identification of known or potential hazardous waste sites in the area and conclusions based on the study findings. Sources of information included in the ISA are listed below:

- Site reconnaissance
- Historical aerial photographs from the Earth Science Map Library in Berkeley, California
- Sanborn maps from the Earth Science Map Library in Berkeley, California
- Aerial photographs from Caltrans, District 4 files
- California Regional Water Quality Control Board, San Francisco Bay Region (Oakland) files
- City of Hayward Fire Department files
- Interview with City of Hayward Fire Department staff

Historically, the entire study area was either vacant or used for agricultural purposes until the late 1940s. Rapid development in the Hayward area occurred from the early 1950s to the present. Residential land use in the study area consists of single family homes between West Winton Avenue and West Jackson Street along the east side of I-880 and single and multiple family housing between the south end of Southland Mall and Calaroga Avenue on the west side of I-880. Commercial uses include a shopping center on the corner of Santa Clara and West Jackson Streets, several service stations, and the Southland Mall west of I-880 and south of West Winton Avenue. Governmental land use consists of three municipal administrative offices and maintenance facilities.

The various studies conducted to identify areas with either potential or known contamination identified 21 properties within 0.403 km (0.25 mile) of the project. Previous studies identified potentially contaminated sites within 0.806 km (0.5 mile) of the project, but for the purposes of the Final EIS/R, only those sites within 0.403 km (0.25 mile) have been considered. These properties are listed in Table 3.3-1 and are shown on Figure 3.3-1. Contamination problems have been documented at 14 sites due to leakage of from underground fuel tanks (e.g., diesel, gasoline), and three sites from other types of chemical spills. Four other sites, identified on regulatory databases as hazardous waste generators, are identified in Table 3.3-1.

A soil and ground water study of the project areas was conducted to evaluate whether there are elevated levels of contaminants in the soil or ground water within the existing right-of-way. Data will be used in the assessment of potential for worker exposure to dangerous levels of hazardous materials and/or petroleum products, and to evaluate whether special soil and/or ground water handling procedures are needed during construction.

The results of this study are presented in *Soil and Groundwater Investigation for the Interstate 880/Route 92 Interchange Project, prepared for the California Department Of Transportation District 4* (October 2002). The soil and ground water investigation included 114 roadway borings and 62 borings at retaining/sound wall locations. Soil samples were analyzed for petroleum hydrocarbons, heavy metals, organo-chlorine pesticides, PCBs, PAH compounds, and soil pH. Ground water samples were analyzed for petroleum hydrocarbons, fuel oxygenate compounds and VOCs, SVOCs/PAHs, heavy metals, organo-chlorine pesticides, PCBs, and cyanide.

Aerially deposited lead from vehicular emission is a potential hazardous materials concern in the project area. The top 0.152m (6 inches) of soil in unpaved areas near highway facilities typically has lead concentrations that are above thresholds deemed hazardous under California regulations. If this soil is to be excavated or disturbed by other construction activities, regulations require the soil to be disposed in an appropriate facility, or covered over with clean material. The soil and ground water study concluded that elevated concentrations of lead occur in soil samples collected from borings across the study area.

The as-built drawings for this interchange indicate the presence of asbestos sheet packing between expansion plates at the hinge between concrete girders, and as asbestos-cement components in the abutments. Asbestos in these forms is non-

friable and, thus, non-hazardous, but could become hazardous when structural sections are demolished and reduced to rubble.

There is a remote possibility that Polychlorinated biphenyls (PCBs) may be found in some of the transformers mounted on electric distribution lines in the study area. In addition, older residential structures in the project area may contain asbestos and lead-based paints.

Table 3.3-1 Properties with Recognized Environmental Conditions or Hazardous Waste Generation (Sites Within ¼-mile of Project Area)

No.	Facility/Location	Database	Comments
	Fuel Spills/Leaks		
1[1]	Cassaro Property 593 W. Harder Road	(a)	Fuel leaks
2[3]	Former Mobil Station 404 West Harder Road	LUST, CORTESE, UST/AST	Gasoline leaks Remediated Low concentration of hydrocarbon contamination may be present Confirmation ground water sampling recommended
3[3]	Exxon/Tosco/BP/Circle K) 210 West Jackson Street	UST/AST, GNRTR	Unleaded gasoline leaks Confirmation ground water sampling recommended
4[3]	Jackson-Amador Shopping Center (Former Exxon) 215 West Jackson Street	LUST, UST/AST	UST removal Remediation completed Monitoring continues. Tetrachloroethene use Confirmation ground water sampling recommended
5[1,3]	Exxon Service Station 390 West Jackson Street	LUST, CORTESE UST/AST, GNRTR	Gasoline leaks Not remediated Confirmation soil and ground water sampling recommended
6[3]	Hayward Main Post Office 24438 Santa Clara Street	LUST, CORTESE, UST/AST	Unleaded gasoline leaks Confirmation ground water sampling recommended
7[1,3]	Alameda County Maintenance Yard 951 Turner Court	LUST, NORTH BAY, CORTESE, UST/AST, SPILLS	Diesel leaks Site has been remediated High potential source for hazardous waste contamination Confirmation soil and ground water sampling recommended. '97 DEIS/R – fuel leaks and dumping of hazardous waste
8[1]	Citgo 660 W. Winton Avenue	(a)	Fuel leaks
9[2]	Exxon 26115 Hesperian Boulevard	LUST	Underground diesel/fuel oil tank leak. Soil excavated and disposed. Ground water affected - downgradient, monitoring indicated no contamination Remediation status: case closed
10[2]	Chabot College 25555 Hesperian Boulevard	LUST	Underground gasoline tank leak Soil excavated and treated Ground water affected - downgradient, monitoring indicated no contamination Remediation status: case closed
11[2]	Franklin Optical 26200 Industrial Boulevard	LUST	Underground gasoline tank leak Soil affected only Cause under review
12[2]	UC Moving Services 26999 Industrial Boulevard	LUST CORTESE	Underground gasoline/diesel tank leak Soil excavated and disposed

No.	Facility/Location	Database	Comments
			Remediation status: closed
13[2]	John Shelby Property 27057 Industrial Boulevard	LUST	Underground tank leak Remediation status: closed Case closed
14[2]	Drewry Photocolor Corp. 27105 Industrial Boulevard	LUST CORTESE	Underground gasoline tank leak Soil affected only Cause under review
	Spills		
15[3]	Town and Country Cleaners 400-456 West Harder Road	--	Tetrachloroethene use Not remediated Extent of PCE contamination in ground water not established Confirmation ground water and soil sampling recommended
16[3]	South Hayward Dialysis 254 West Jackson Street	LUST	Paint thinner UST removed Remediation has been implemented to control extent of contamination Confirmation ground water sampling recommended
17[1,3]	Sears Automotive Center 660 W Winton	LUST, CORTESE	? – '97 EIS indicates spills
	Generators		
18[1]	Regional Occupational Center 26316 Hesperian Boulevard	(b)	Generator
19[1]	Southland Mall Maintenance Facility La Playa Drive	--	Generator
20[1,3]	Pacific Bell 1880 Depot Court	GNRTR	Generator
21[3]	Rite Aid No. 5919 24989 Santa Clara	GNRTR	Generator

Sources:

[1] Woodward-Clyde Consultants. "Hazardous Waste Initial Site Assessment Route 92/Interstate 880 Interchange", Final Technical Report, July 1992.

[2] VISTA Information Solutions, Inc. "Site Assessment Plus Report (ID 041998275)", December 22, 1998.

[3] California Department of Transportation, District 4 (VISTA Information Solutions, Inc.). "Initial Site Assessment Route 92/I-880 Interchange Project", August 2001.

(a) RWQCB Fuel Leak list for Alameda County

(b) City of Hayward Fire Department List of Contaminated Sites

3.3.2 Permanent Impacts

3.3.2.1 Property Acquisition

Sites identified on Figure 3.3-1 and Table 3.3-1 represent properties that either have or have potential for contamination of soil or ground water. The sites identified that would be directly affected by project activities (e.g., clearing, grading, excavation) are discussed below. Other sites, further from project construction activities, are a potential source for off-site migration of contamination that might affect the project right-of-way.

Peripheral portions of two right-of-way parcels, 593 West Harder Road and 390 West Jackson Street (see Table 3.3-1 and Figure 3.3-1), that would be partially acquired for all three build alternatives (Alternatives 2C Variation, 2D Variation, and H), are included in hazardous waste databases. In addition, under Alternative 2D Variation, two additional parcels, 951 Turner Court and the Southland Mall maintenance facility on LaPlaya Drive, also require partial acquisition. A preliminary site investigation would reveal the level of contamination of these parcels and whether any hazardous waste cleanup is necessary.

Sites requiring acquisition under the various alternatives include sites 1, 5, 7, and 19. These sites are briefly discussed below.

- Site 1, the Cassaro property (593 West Harder Road) – The Cassaro property at the intersection of Santa Clara and Jackson streets, was formerly the site of two service stations and is noted to be a historic fuel leak site. The gas stations were dismantled and the site is now occupied by the Gateway Plaza shopping center. A detailed soil and ground water contamination investigation was not conducted. A narrow strip of land on this parcel along West Jackson Street would be acquired. Project-related grading associated with improvements to West Jackson Street could affect residual soil contamination. These concerns would apply to all three build alternatives (i.e., Alternatives H, 2C Variation, and 2D Variation).

- Site 5, Exxon Service Station (390 West Jackson Street) – The Exxon station property has been identified as having soil contamination with maximum concentrations of petroleum hydrocarbons of 344 ppm. The site is considered by the Hayward Fire Department to have a relatively minor contamination problem.

Right-of-way acquisition at this site includes narrow strips of land on both Santa Clara and Jackson Streets. This acquisition requires relocation of an underground fuel tank for this site. These concerns apply to all three build alternatives (i.e., Alternatives H, 2C Variation, and 2D Variation).

- Site 7, Alameda County Maintenance Yard (951 Turner Court) – The Alameda County property has potential for hazardous waste contamination despite remediation efforts completed to-date. Partial acquisition would occur at this site. Given the wide variety of hazardous materials used at the site, it is possible that other sources of soil and/or ground water contamination may be present, which could be disturbed or encountered during project construction. These concerns apply only to Alternative 2D Variation.

- Site 19, Southland Mall Maintenance Facility (La Playa Drive) – The maintenance facility is not identified on any regulatory agency database as being a site of potential contamination; however, the facility is listed as a hazardous waste generator. Partial acquisition would also occur at this site, and grading and clearing of the right-of-way portion that extends into the site could potentially disturb contaminated soils. These concerns apply only to Alternative 2D Variation.

Acquisition and subsequent demolition of residential structures could generate wastes containing asbestos and lead-based paints. Under the various build scenarios, Alternative 2C would require the greatest number of residential structure demolitions (57 residential structures), followed by Alternative 2D (14 residential structures and one non-residential structure), and Alternative H (12 residential structures).

3.3.2.2 Contaminated Groundwater and Soil

Impacts from encountering contaminated ground water or soils would be primarily during the construction period, when earthmoving and ground water pumping activities occur. The greatest potential for human exposure to hazardous materials on site is during project construction, when residual contamination in the soil and ground water could be uncovered during earthmoving activities. Examples of construction-phase risks include inhalation of organic vapors or contaminated dust, and direct skin contact with contaminated soil or water.

Consideration must be given to some of the existing right-of-way, and right-of-way to be acquired, with regard to aerially deposited lead near the surface in unpaved areas. Soil testing within the existing right-of-way indicated that elevated concentrations of lead occur within the study area. Elevated concentrations occur near the surface and decrease with depth, consistent with aerially deposited lead.

The aerially deposited lead constitutes a minor risk to the health of workers and public and to the environment when handled and managed according to a project-specific health and safety plan by a certified industrial hygienist. There are costs associated with management of lead contaminated soil and with actions required to protect construction workers, the public, and ground water from exposure.

Ground water grab samples collected from the structural and roadway investigation areas were reported by the laboratory to contain volatile organic compounds and heavy metals.

There are other potential hazardous waste exposure impacts associated with the demolition of ramps and bridges (such as asbestos components in structural sections) and with chemicals and fuels used in construction. Following health and safety plan measures to minimize the exposure of workers, other people, and the environment to the hazardous materials can minimize these impacts.

3.3.2.3 Contaminated Materials Disposal

The impacts associated with contaminated materials disposal are expected to be temporary, although impacts from the final disposition of any contaminants (i.e., their ultimate disposition) could have long-term implications if handled improperly. Off-site disposal reduces the capacity of disposal facilities, however, no long-term permanent environmental impacts are anticipated from materials disposed of properly.

Soil stockpiles need to be tested for lead prior to reuse on-site or disposal off-site. The preliminary site investigation found that, except for a single sample, lead concentrations in the upper soil layer are below levels classified as hazardous waste under federal Resource Conservation and Recovery Act (RCRA) regulations. But, the soils still require special handling and disposal because they exceed California thresholds. The manners in which soils are removed and stockpiled, including the staging of construction, determine the appropriate measures to be taken in the management and disposal of lead-contaminated soils.

If the lead contaminated soils were to be removed, there are minor adverse impacts associated with transporting the soil to a disposal site and with reduction of landfill capacity. (An estimated 54,000 m^3 of roadway material is to be excavated under Alternative H; no estimates are available for Alternatives 2C Variation and 2D Variation.) The impacts of transporting the soil to a disposal site are minor or controllable: use of fuel by the transporting vehicles; increased truck traffic and noise; and potential soil spills on roadways. The impact each of the alternatives poses to disposal/landfill sites is also minor; the volumes of soil to be disposed would reduce some of the remaining capacity of the disposal facilities.

If lead-contaminated soils were reused on-site beneath impervious materials (such as paving) or clean soil, the impacts of the lead contaminated soils would minimize the impacts associated with off-site disposal. The reuse of lead-contaminated soil may be the most appropriate method of handling this material since the project requires 160,000 m^3 of fill for the approaches to the Route 92/I-880 separation structure.

3.3.3 Mitigation Measures

Prior to any property acquisition, additional site investigations would be conducted to determine the presence of any hazardous materials or hazardous waste contamination and identify the cleanup or special handling that may be necessary.

Prior to construction, additional sampling and analysis of soil and ground water in unpaved areas within the project limits would be conducted to further characterize concentrations of lead and other hazardous materials. These analyses enable the preparation of specifications for excavation, handling, transport, and disposal or reuse of soil and ground water in the construction contract Special Provisions.

In the event soils are found to have lead concentrations in excess of regulatory limits, the extent of contamination would be determined and all soils requiring removal would be subject to special handling and disposal provisions. Soils exceeding regulatory thresholds may be managed in one or both of the following ways.

1. The soil may be reused on-site in accordance with provisions of the variance issued to Caltrans by the California Department of Toxic Substances Control, as well as any additional requirements of the RWQCB. Reuse of lead-contaminated soils on-site requires covering the soils with a clean, non-hazardous layer of sufficient depth to minimize lead migration to subsurface waters.

2. The soil may be transported, according to applicable regulations, by properly licensed transporters, and disposed at an appropriate facility (i.e., a facility licensed by regulatory approvals to receive and handle the type of contaminated material). This method of managing contaminated soils requires measures to prevent the uncontrolled spread or release of contaminated materials—dust control, covering stockpiles on-site and in truck beds, and preventing the tracking of materials from the site on the shoes of workers and tires of vehicles.

Prior to construction, structures to be demolished are tested to ascertain the presence and condition of asbestos-containing material and to specify handling and disposal requirements. All asbestos containing materials are handled in accordance with regulatory requirements established to protect public and worker health and safety. If asbestos is present, construction contractors take additional precautions to prevent the material from becoming friable, airborne, and inhaled by workers and the public. There are also regulatory requirements for notifications, transport, disposal, and recordkeeping.

Another section of the construction contract Special Provisions requires the construction contractor's health and safety plan to have measures to prevent and contain any accidental releases of hazardous materials to the environment and to protect workers and the public. The health and safety plan has specific measures to minimize exposure of workers or the public to contaminated materials including dust control, removal of dirt from the exterior of trucks, and covering loads of trucks prior to leaving the construction site.

The construction contracts also have procedures and responsibilities for responding to an unanticipated discovery of hazardous materials. Provisions include responsibilities, reporting requirements, worker protection, and site control measures to prevent off-site impacts.

3.4 Air Quality

3.4.1 Affected Environment

3.4.1.1 Climatology

Relatively mild, wet winters and relatively warm, dry summers characterize the climate of the San Francisco Bay Area. The major climatic controls are: (1) the Pacific high-pressure system over the eastern Pacific Ocean, (2) the Pacific Ocean, and (3) the local topography. The formation of a high-pressure area over the Great Basin Region to the east also affects the area, though primarily in the winter months.

The Pacific high-pressure system is a semi-permanent subtropical high-pressure system located off the Pacific Coast. During the summer, the size and strength of the Pacific High pressure system is at a maximum and dominates the regional climate. As a result, mostly clear skies with intense solar heating occur over California's interior, forming a thermal trough of relatively low surface pressure intensifying prevailing northwesterly wind flow over the area. Little precipitation occurs during the summer since migrating Pacific weather systems are weak and well to the north. As the Pacific High pressure system weakens and shifts southward during the fall, its dominance over the area weakens. During the winter, three weather regimes generally prevail: (1) storm periods with winds; (2) clear weather associated with either a buildup of pressure over the California interior or the influence of a well-developed Great Basin High pressure system; and (3) persistent fog or stratus clouds and temperature inversions associated with a weak influence of the Great Basin High, trapping a layer of cool, moist air in the interior valleys. Sky cover, temperature and humidity conditions are more variable during the winter than during other seasons. Stagnant conditions occur more frequently during the winter than in the summer months. However, west to northwesterly winds remain dominant in winter afternoons.

The local climate is strongly influenced by the topography and the area's proximity to the San Francisco Bay and Pacific Ocean. Cool, on-shore winds blowing from the San Francisco Bay and Pacific Ocean have a moderating effect over the project area and tend to keep the area well ventilated, preventing the long-term build up of pollutants in the local atmosphere. However, short-term build-ups can still occur during high pressure-related stagnation periods. The resulting overall airflow patterns are complex and exhibit local variation.

Temperature, precipitation and winds are monitored at a number of locations in the Bay Area. One of the stations near the study area is at the Oakland Airport. Climatic conditions at the I-880/Route 92 interchange area are described below based on data recorded at the Oakland Airport station.

The climate in the Hayward area is relatively warm in summer and cool in winter. Temperatures in the vicinity of the proposed project area vary seasonally. The annual average monthly temperature is 14.5˚C (58˚F). The warmest month is September, with an average daily maximum temperature of 22.7˚C (73˚F) and an average daily minimum temperature of 13.9˚C (57˚F). The coldest month, January, has an average daily maximum temperature of 12.8˚C (55˚F) and an average minimum temperature of 6.1˚C (43˚F) (U.S. Department of Commerce 1991).

The average annual rainfall in the study area is about 458 mm (18.03 inches). Rainfall is seasonal, summers are typically dry, with about 90 percent of the rain occurring between November and April. January is the wettest month on average, receiving nearly 25 percent of the annual rainfall; however, rainfall can be variable during the winter months (U.S. Department of Commerce 1991). Most rainfall is associated with the passage of frontal weather systems from the Pacific Ocean. Any rainfall that occurs during the summer is generally light and associated with isolated showers or thundershowers.

The large-scale winds over the San Francisco Bay Area are predominantly from the west and northwest. Since there are no substantial mountains between the project area and the San Francisco Bay and Pacific Ocean to block the on-shore winds, the predominant wind direction in the project area is westerly. Based on wind data compiled by the California Air Resources Board (CARB 1984), the average wind speed measured at the Oakland Airport is 13.8 km/h (8.6 mph). Winds are strongest during the spring months, with an average speed of 15.6 km/h (9.7 mph), while the fall is the calmest period of the year when the average wind speed is 11.7 km/h (7.3 mph).

3.4.1.2 Air Quality Regulatory Background

State and national ambient air quality standards have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), fine particulate matter (PM_{10} and $PM_{2.5}$) and lead (Pb). These standards vary numerically and in form, but are similarly designed to protect the public from adverse health effects due to exposure to pollutant levels above those specified by

the standard. Relevant national and state ambient air quality standards are listed in Table 3.4-1.

Federal Regulatory Requirements

Federal law has imposed several sets of deadlines for attaining national standards. Air quality problems have persisted, and the greater project area continues to be subject to a variety of requirements imposed by the federal Clean Air Act. Geographic areas with measured pollutant levels that violate the national ambient air quality standards are called nonattainment areas. The 1990 Clean Air Act Amendments require that nonattainment areas be classified as serious, severe or extreme based on the severity of pollution problems. Federal law for attaining standards ranges from 1999 to 2010 depending on the severity of the nonattainment problem. Air pollution sources in nonattainment areas are subject to various specified control requirements. In addition, areas must develop control plans or strategies for each nonattainment pollutant. These plans are generally referred to as clean air plans and are compiled by each state into a *State Implementation Plan* (SIP).

One key element of these strategies is a requirement that the nonattainment area's transportation plan be consistent with the basis and timetable of the SIP. Policy guidance from the U.S. Environmental Protection Agency (U.S. EPA) indicates that transportation plans must produce a budget for emissions from transportation sources in the nonattainment area. The emissions budget is incorporated as part of the SIP, and transportation projects built thereafter must operate within that budget (Preamble to Title I, 1992). For this reason, the 1990 Clean Air Act Amendments give preference to transportation projects that help reduce motor vehicle emissions. U.S. EPA instituted new regulations on November 24, 1993 requiring transportation-related actions and federal actions to conform to the local SIP.

Under the conformity regulations for transportation-related projects, project conformity is determined in accordance with the following criteria:

- the project must come from a plan and program (i.e., RTP and TIP that have been found to conform with the SIP)
- the project has not changed in design concept and scope from the design concept and scope approved in the plan and program

- the project must eliminate or reduce the number and severity of violations of the CO standards in the area substantially affected by the project (this determination may be made as part of the TIP conformity assessment or for the individual project as described in the TIP taken as a whole, not for portions of a project which has been broken into stages or segments for funding purposes; this evaluation is to be done during the environmental review phase of project development)

Transportation plans and TIPs must conform to the SIP in order to be valid. In air basins without an approved SIP, a "transportation conformity freeze" occurs: no amendments can be made to listed projects in the existing transportation plan or TIP; no new projects can be added to the transportation plan or TIP; and the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) are not allowed to approve new transportation plans and TIPs (to replace expiring ones) as being in conformity with the SIP and the Clean Air Act until there is an approved SIP. If a transportation plan or TIP should expire before a SIP is approved, the air basin enters a "transportation conformity lapse." During a transportation conformity lapse, no federal approvals of environmental documents, or reimbursements of design and right-of-way phase activities are allowed for transportation projects except safety projects, transit rolling stock purchases, and projects that have already completed the conformity and National Environmental Policy Act processes. Affected transportation projects come to a halt.

Table 3.4-1 State and Federal Air Quality Standards and Bay Area Attainment Status (as of January 2003)

		California Standards		National Standards	
Pollutant	**Averaging Time**	**Concentration**	**Attainment Status**	**Concentration**	**Attainment Status**
Ozone (O_3)	8 hour	--	--	0.08 ppm	U
	1 hour	0.09 pm (180 µg/m^3)	N	0.12 ppm (235 µg/m^3)	N[1]
Carbon Monoxide (CO)	8 hour	9.0 ppm (10 µg/m^3)	A	9 ppm (10 µg/m^3)	A[2]
	1 hour	20 ppm (23 µg/m^3)	A	35 ppm (40 µg/m^3)	A
Nitrogen Dioxide (NO_2)	Annual Average	--	--	0.053 ppm (100 µg/m^3)	A
	1 hour	0.25 ppm (470 µg/m^3)	A	--	--
Sulfur Dioxide (SO_2)	Annual Average	--	--	80 µg/m^3 (0.03 ppm)	A
	24 hour	0.04 ppm (105 µg/m^3)	A	365 µg/m^3 (0.14 ppm)	A
	1 hour	0.25 ppm (655 µg/m^3)	A	--	--
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N[3]	50 µg/m^3	A
	24 hour	50 µg/m^3	N	150 µg/m^3	U
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N[3]	15 µg/m^3	U
	24 hour	--	--	65 µg/m^3	U
Lead	Calendar Quarter	--	--	1.5 µg/m^3	A
	30 Day Average	1.5 µg/m^3	A	--	--

A = Attainment
N = Nonattainment
U = Nonattainment with no classification
ppm = parts per million
µg/m^3 = micrograms per cubic meter
PM10 = particulate matter < 10 microns in diameter

1 In August 1998, the Bay Area was redesignated to nonattainment with no classification for the national 1-hour ozone standard.
2 In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
3 In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

State Regulatory Requirements

The project area is also subject to the requirements of the California Clean Air Act of 1988. The California Act was amended in 1992 to allow the state and federal planning processes to be combined to the extent possible; however, the goal of the California Act is attainment of state ambient air quality standards, which are generally more stringent than national ambient standards.

The California Air Resources Board (CARB) coordinates and oversees both state and federal air quality control programs in California. The CARB establishes state ambient standards, monitors existing air quality, issues state planning guidelines, classifies nonattainment areas, regulates vehicle fuels, and sets emission standards for passenger cars and other vehicles. Both the CARB and the Bay Area Air Quality Management District (BAAQMD) are responsible for developing state and national clean air plans for the project area. The BAAQMD controls stationary sources of emissions and coordinates with local and regional transportation agencies. The MTC, Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) also have responsibility to ensure that transportation plans and projects conform to plans for attaining air quality standards.

The MTC is responsible for preparing and updating the Bay Area TIP, which is the region's five-year transportation project construction plan.

Transportation Plan Regulatory Status

On December 20, 2000, the BAAQMD adopted the *2000 Bay Area Clean Air Plan* for attainment of the 1-hour California standard for O_3. To move towards attainment of the 1-hour federal standard for O_3, the BAAQMD, the MTC, and the Association of Bay Area Governments (ABAG) prepared a *1999 San Francisco Bay Area Ozone Attainment Plan*. The California Air Resources Board submitted this plan to the U.S. EPA in August 1999 as a revision to the SIP. Environmental groups challenged this plan in court. On September 20, 2001, in keeping with the terms of a court settlement, the U.S. EPA disapproved a portion of the *Bay Area Ozone Attainment Plan* pertaining to the emissions budget from transportation sources. The U.S. EPA's action caused the San Francisco Bay Area to enter a transportation conformity freeze on October 22, 2001 (the effective date following the publishing of the U.S. EPA's action in the Federal Register). A revised *Bay Area Ozone Attainment Plan* was approved by regional agencies and submitted by the California Air Resources Board to the U.S. EPA in December 2001. On January 21, 2002, the

1998 RTP expired and the Bay Area experienced a transportation conformity lapse. The U.S. EPA approved the revised Bay Area Ozone Attainment Plan/SIP on February 14, 2002. Following the publishing of the U.S. EPA's action in the Federal Register, the FHWA and the FTA approved the 2001 RTP on March 18, 2002 as being in conformance with the SIP, which ended the transportation conformity lapse and made advancement of transportation projects possible again.

3.4.1.3 Existing Air Quality and Regulatory Status

Air quality on any given day is influenced by both meteorological conditions and pollutant emissions. In general, meteorological conditions vary more than emissions from day-to-day and, therefore, tend to have a greater influence on changes in measured concentrations. The influence of emissions tends to be greatest for CO and PM_{10}, two pollutants for which ambient concentrations are particularly influenced by local sources. Air quality monitored in the project vicinity is shown in Table 3.4-2 for 2001. Data are reported for air quality monitoring stations located in Oakland, Hayward, and Freemont. Data are also reported for the Bay Area in total.

Ozone is generally regarded as the most important air quality problem in the Bay Area. While ozone serves a beneficial purpose in the stratosphere, it is damaging to the human respiratory system and to sensitive species of plants when it reaches elevated concentrations in the lower atmosphere. Elevated ozone levels threaten the health of the most vulnerable people in the population, including children, the elderly, those with heart and lung disease and exercising adults. Short-term exposure to high levels of ozone can add stress to the body by forcing it to work harder to breathe, which aggravates existing respiratory and heart ailments and causes shortness of breath. Long-term exposure can accelerate the lung's natural aging process, resulting in lost breathing capacity. Ambient air quality standards are established to protect human health; however, ozone concentrations at or below the level of the health-based standards are also damaging to sensitive agricultural crops and to some forest species.

Ozone is produced in the lower atmosphere by complex photochemical reactions that require both nitrogen oxides (NO_x) and hydrocarbons (HC). Because ozone is formed in the atmosphere and is not directly emitted it is regarded as a secondary pollutant. Transported emissions mix with locally generated emissions as they move downwind. Ozone concentrations tend to be highest downwind of the major urban

areas in the Bay Area, because of the time needed for the various pollutants to react with one another to form ozone.

As shown in Table 3.4-1, the Bay Area is designated as nonattainment for the California 1-hour ozone standard, and nonattainment with no classification for the Federal 1-hour standard. Table 3.4-2 shows the number of days of unhealthful ozone levels at monitoring locations in the project area, and exceedances of the ozone standards for the ten-year period from 1992 to 2001 are shown in Table 3.4-3. Ozone trends are an important component of the air quality situation because they reflect the effectiveness of ongoing air pollution control efforts.

As shown in Table 3.4-1, the Bay Area is in attainment for the Federal standards of particulates (PM_{10}), and unclassified for $PM_{2.5}$. Violations of the more stringent state standard are frequent and widespread throughout the Bay Area (see Tables 3.4-2 and 3.4-3). The Bay Area is classified as nonattainment for the state PM_{10} standard. The particulate matter problem is complex in terms of its character and cause. There are both directly emitted or primary particles, and secondary particles. Each category of PM_{10} can be found in multiple chemical types. PM_{10} is both a localized and regional pollutant; some of the particles found in any given PM_{10} monitor originate from nearby sources while others have been transported from a distance. PM_{10} concentrations vary in both magnitude and chemical nature by season. Concentrations of some types increase under windy conditions while others form during stagnant periods. Given the complex cause of high PM_{10} levels, it is not surprising that PM_{10} control strategies are less well-advanced and generally less effective than strategies to reduce other pollutants.

PM_{10} causes health problems when it overcomes the body's filtration and other defense mechanisms and becomes lodged in the human respiratory system. In high concentrations, fine particulates can cause stress in sensitive or vulnerable people. The state 24-hour PM_{10} standard (50 micrograms per cubic meter or $\mu g/m^3$), which is more stringent than the comparable federal standard (150 micrograms per cubic meter), was established since studies showed an association between fine particulate levels above 50 $\mu g/m^3$ and elevated mortality rates among patients with severe respiratory problems. More recently, studies have focused on the effects of particular chemical types of particulates. PM_{10}, particularly in smaller size ranges, also reduces visibility by both absorbing and scattering light, depending on the type of particle.

The federal 8-hour ozone and $PM_{2.5}$ standards were promulgated by the U.S. EPA in 1997. These standards do not currently affect the project, because the U.S. EPA for either pollutant has not yet made the official attainment status. Final area designations for the federal 8-hour ozone and $PM_{2.5}$ standards are expected in April 2004 and January 2005, respectively. Conformity requirements will apply one year after area designations are made.

Table 3.4-2 Air Pollution Summary – 2001

Pollutant	Oakland	Hayward	Fremont	Bay Area
Ozone (O3) (1-hour)				
Days > Cal Std	0	2	3	15
Days > Fed Std	0	0	0	1
3 yr. Avg.	0	0	0.3	
Ozone (O3) (8-hour)				
Days > Fed Std	0	1	0	7
3 yr. Avg.	4.2	6.6	6.2	
Carbon Monoxide (CO) (1-hour)				
Days > Cal Std	0		0	0
Days > Fed Std	0		0	0
3 yr. Avg.				
Carbon Monoxide (CO) (8-hour)				
Days > Cal Std	0		0	0
Days > Fed Std	0		0	0
Nitrogen Dioxide (NO2) (1-hour)				
Days > Cal Std			0	0
Days > Fed Std			0	0
Nitrogen Dioxide (NO2) (Ann Avg.)				
Days > Cal Std			0	0
Days > Fed Std			0	0
Sulfur Dioxide (SO2) (24-hour)				
Days > Cal Std				0
Days > Fed Std				0
Sulfur Dioxide (SO2) (Ann Avg.)				
Days > Cal Std				0
Days > Fed Std				0
PM10 (Ann)				
Days > Fed Std		0		
PM10 (Ann Geo)				
Days > Cal Std		0		
PM10 (24-hour)				
Days > Cal Std		3/18(a)		10/60(a)
Days > Fed Std		0		0

(a) [sampled/estimated] -- PM10 is sampled every six days – the actual days of exceedance is estimated at 6 times the sampled exceedance.

Table 3.4-3 Air Pollution Summary – 1992 - 2001

Pollutant	Bay Area
Ozone (O3) (1-hour)	
Days > Cal Std	201
Days > Fed Std	41
Ozone (O3) (8-hour) (a)	
Days > Fed Std	36
PM10 (24-hour) (b)	
Days > Cal Std	85
Days > Fed Std	0

(a) U.S. EPA promulgated the 8-hour standard in mid-1997
(b) PM10 is sampled every six days – the actual days of exceedance are estimated at 6 times the sampled exceedance listed.

Carbon monoxide concentrations tend to be dominated by mobile source emissions in the immediate vicinity of the monitor location. Meteorological conditions are important in that CO concentrations are highest during periods of stagnation. Vehicles also emit higher levels of CO during cold weather. For these reasons, CO levels are of greatest concern in the winter months (November through February) when the Bay Area can experience both cooler temperatures and extended periods of air stagnation. The CO designation for the project area is "attainment" for the state standards, and "attainment-maintenance" for the federal standards, with applicable conformity requirements. The air quality standard for CO is designed to adequately protect public health. In the human body, carbon monoxide can restrict the blood's ability to transport oxygen, posing a threat for people suffering from respiratory problems and heart disease.

The project area (Bay Area) is in attainment of federal and state standards for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). Emissions of SO_2 and nitrogen oxides (NO_x) are still of concern because SO_2 emissions contribute to the formation of secondary particulates and NO_x are precursors to ozone and the nitrate fraction of PM_{10}.

Toxic Air Contaminants (air toxics) are airborne materials known to cause cancer or other illness. Many air toxics are organic compounds that also fall under the overall category of volatile organic compounds (VOCs), which can contribute to ozone formation. There are many sources of air toxics, including industries, small businesses, consumer products, and natural sources; however, most of the air

pollution-related health risk for the general populace in urban areas is associated with motor vehicles. Toxic substances are emitted by mobile sources, especially diesel-powered on- and off-road vehicles. The CARB has undertaken efforts to further identify risks associated with toxic air pollutants and development of control measures to reduce public health risks.

In the 10-year period 1992 to 2002, there was no exceedance in the San Francisco Bay Area air basin of the federal standards for nitrogen dioxide or the federal and state standards for sulfur dioxide. For carbon monoxide, the last exceedance of the 8-hour federal, and the 8-hour state standard were in 1991; and the last exceedance of the 1-hour federal and the 1-hour state standard were more than ten years ago.

Naturally occurring asbestos, associated with serpentine or ultramafic bedrock, can be a source of airborne asbestos when bedrock or soils are excavated or otherwise disturbed. A review of Caltrans data indicates that the project is not within an area where naturally occurring asbestos would be present in underlying bedrock or soils.

Emission Control Strategies. Control measures to reduce motor vehicle emissions have and will continue to have the greatest impact on Bay Area air quality, including the project area. Despite California's stringent control requirements, motor vehicles still produce well over half of the NO_x and HC emissions not found in nature in the Bay Area. In addition, vehicles produce approximately 90 percent of the Bay Area's CO emissions. The most important vehicle emission control programs are as follow:

- the low emissions vehicle program—a series of increasingly stringent tailpipe emission standards for new light duty vehicles that extends until 2002 to reduce emissions of HC, NO_x, and CO
- reformulated gasoline requirements—a major reformulation of existing gasoline took effect in 1996 to reduce emissions of HC, NO_x and CO from all gasoline vehicles
- wintertime oxygenates—a requirement, which began in 1992, that gasoline be blended with increased oxygen content in the winter "CO season" to reduce CO emissions from all gasoline vehicles
- inspection and maintenance programs ("Smog Check")—a previous program, required by federal law and recently upgraded, to further reduce HC, NO_x and CO emissions and to require the inspection of heavy duty trucks to reduce particulate emissions

- reformulated diesel fuel—a requirement that took effect in 1994 to modify the formulation of diesel fuel to reduce SO_2, NO_x and particulate emissions

Diesel engine exhaust contains a number of toxic air pollutants. Gasoline engines emit air toxics, but the amounts tend to be smaller than those emitted by diesel engines. The CARB has found that diesel particulate matter (PM) poses the greatest cancer risks among all identified air toxics, and accounts for 70 percent of the known risk from air toxics. Diesel trucks contribute more than half of the total diesel PM emissions, with the remainder coming from stationary and other diesel combustion sources.

Studies indicate that diesel exhaust exposure substantially increases cancer risk. Gasoline engines emit air toxics, but the amounts tend to be smaller than those emitted by diesel engines. Risk is a function of exposure. The risk of cancer increases for people who are exposed for extended periods over the long term. (It should be noted that diesel PM is only one of many environmental toxics, and those of other toxics and other pollutants in various environmental media may overshadow its cancer risks.)

To address this risk of cancer concern, the CARB has initiated programs to reduce diesel PM emissions through requirements for cleaner fuels and cleaner diesel engines. Efforts to reduce toxic air pollutant emissions include the Diesel Risk Reduction Plan (DRRP) (which has a goal of reducing diesel PM emissions by 75 percent by 2010), cleaner burning gasoline, and replacement of older, more polluting diesel engines in existing vehicle fleets with cleaner burning technology. The DRRP has a goal that would reduce of reducing the overall diesel PM emissions by about 85 percent from 2000 to 2020.

The CARB has also adopted a series of requirements to reduce HC emissions from over two dozen categories of consumer products, and has established future effective standards to reduce HC and NO_x emissions from various engines used in off-road vehicles and utility equipment. These requirements were phased in during the mid-to-late 1990s.

Finally, the BAAQMD is responsible for numerous control measures that apply to stationary sources of air emissions. These controls address HC, NO_x, PM_{10} and SO_2. The BAAQMD also has the responsibility to reduce fugitive PM_{10} emissions.

Construction Emissions. Caltrans has not adopted any threshold values for construction emissions. The BAAQMD has established a set of standard PM_{10} control measures for construction sites. These controls are to be considered for implementation at construction sites and are to be evaluated on a site-specific basis to determine the extent of PM_{10} control measures required.

The as-built drawings for existing interchange structures indicate the presence of asbestos sheet packing between expansion plates at the hinge between concrete girders, and as asbestos-cement components in the abutments. Asbestos in these forms is non-friable and, thus, non-hazardous, but could become hazardous when structural sections are demolished and reduced to rubble.

3.4.2 Permanent Impacts

3.4.2.1 Meteorology

The build alternatives have combination retaining/sound walls up to 6.8 m (22-24 feet) in height adjacent to existing neighborhoods and residences. These sound walls would have shading impacts on residences. The degree of shading experienced at any one location is dependent upon the season and time of day.

3.4.2.2 Air Quality

Motor vehicles are an important source of emissions of carbon monoxide and the precursors to ozone (i.e., oxides of nitrogen and reactive organic gases). Changes in traffic conditions within a region can influence ground level concentrations of these pollutants.

The methodology for assessing the on-going air quality impacts of a proposed transportation project begins with a check of whether the project is included in a transportation plan and a TIP that conform with the SIP. If it is, the project's emissions have already been modeled at the regional level and found not to cause: a greater number of exceedances of federal standards; more severe exceedances of federal standards; and, a lengthening in the amount of time required to meet federal standards. Consequently, the project also conforms to the SIP if it is unchanged in concept and scope from the project listed in the transportation plan and TIP.

The I-880/Route 92 interchange project is included in the 2001 RTP and 2003 TIP that conform to the SIP. The current RTP is 2001 (approved by the FHWA and Federal Transit Administration in March 2002), and the most recent TIP is 2003

(adopted by the MTC in January 2003). The I-880/Route 92 interchange project is listed in the current RTP and TIP. The design concept and scope of the project has not changed from that identified in the plan and program documents and has been sufficiently defined to determine the project's air emissions. Thus, the project meets the screening criteria of conformity with the SIP.

The next step of the air quality assessment entails "hot spot" or localized analyses for CO and PM_{10}, if the air basin is a federal nonattainment or maintenance area for these two pollutants. With respect to hot spot analyses, CO analyses are required in the San Francisco Bay Area air basin, but not PM_{10} because the San Francisco Bay Area air basin is a maintenance area for CO, and an attainment area of the federal standard for PM_{10}. The 1997 DEIS/R used the CALINE 4 computer program for an analysis of CO emissions at twelve intersections and found that I-880/Route 92 interchange Alternatives 2C and 2D Variations result in 66 fewer exceedances of California standards and 70 percent fewer exceedances of the federal CO standards than the No Build alternative.

Since the DEIS/R in 1997, a protocol for qualitative assessments of CO impacts was approved by the MTC on June 24, 1998 and by the U.S. EPA on September 1, 1998. This protocol may be used if the proposed project meets the regional tests for conformity with the SIP. The protocol's localized CO impact assessment allows qualitative comparisons with other, existing facilities in the same air basin if that other existing facility has already been modeled and found to meet the federal and state air quality standards for CO for the highest 1-hour and 8-hour periods. This 1998 air quality study for the I-880/Route 92 interchange project used the protocol's analysis by comparison approach for CO analysis. For mainline comparison purposes, the study used Route 101 in Santa Clara County between Story and Tully Roads. For intersection comparison purposes, the study used the Foothill/Mission Boulevard intersection. The air quality study concluded that the I-880/92 interchange improvement project is smaller and less congested than the comparable facilities—Route 101 in Santa Clara County and the Foothill/Mission Boulevard intersection. Since the comparable facilities are in an area that meets air quality standards (maintenance area) the proposed project also meets microscale air quality requirements. The build alternatives have no impact on air quality and do not cause exceedance of federal and state CO standards.

Although the project is not located in a federal PM_{10} nonattainment area, and thus is not subject to federal conformity rules for PM_{10}, it is located in a state PM_{10} nonattainment area. However, because the project is a reconstruction of an existing

interchange, operation will not constitute a new or modified source of PM_{10} emissions. In addition, it is anticipated that the proposed interchange improvements, by reducing congestion and improving throughput volumes, will reduce current use of local streets. Currently, traffic overflows onto local streets because of interchange congestion during peak periods.

While there are currently no quantitative tools to assess the project's air toxic impact, we can evaluate whether there may be any potential impacts from the project by qualitatively comparing the build scenario to the no build scenario. We conclude that the project would not have a negative air toxic impact, based on the following comparisons:

(a) There will not be any substantial increase in truck traffic in the build scenario compared to the no build scenario.

(b) The build scenario would reduce congestion with its stop-and-go conditions and change them into more free-flow conditions, and should therefore decrease the acceleration events that cause the highest per-vehicle exhaust emissions.

3.4.3 Temporary Impacts

The construction of any of the build alternatives has potential air quality impacts including dust generation from clearing, grubbing, excavation, grading, and other activities in unpaved areas, emissions of hydrocarbons, oxides of nitrogen, carbon monoxide, and particulate matters. The dust generated by the construction of the project would be localized and is not expected to have an impact on air quality because construction work will be stopped when dust becomes visibly airborne, and dust control measures (application of water or dust palliatives) will be implemented. Operation of diesel-powered construction equipment contributes to the emission of air toxics associated with diesel engine exhaust. Although diesel emissions are a concern with regard to public health risk, there are no established protocols for evaluating construction-related emissions at this time.

There are other potential hazardous waste exposure impacts associated with the demolition of ramps and bridges (such as asbestos components in structural sections) and with chemicals and fuels used in construction. These impacts can be minimized by contractor implementation of health and safety plan measures to minimize the exposure of workers, other people, and the environment to the hazardous materials. Potential risk of exposure to hazardous materials or wastes is discussed in Section 3.3.

3.4.4 Mitigation Measures

Caltrans has not established a CEQA significance threshold for construction PM_{10} emissions. Dust is not immediately dangerous to the life and health of workers and the public. The BAAQMD has developed standard PM_{10} control measures to be considered by construction projects. The construction contract Special Provisions would include specifications for air quality monitoring during excavation, grading, and other dust generating construction operations and the implementation of dust control measures to minimize dust emissions. The BAAQMD guidance on PM_{10} controls would be considered in development of appropriate mitigation.

Dust control measures implemented during construction could include, but are not limited to, general watering using reclaimed water in active excavation and grading areas, use of chemical stabilizers on completed cuts and fills and on temporary construction roads, and cultivation of ground cover on completed cuts and fills. The construction contract would include requirements for air quality control measures. Examples of these measures include:

- watering disturbed (graded or excavated) surfaces as necessary, increasing frequency when weather conditions require
- watering disturbed areas to form a compact surface after grading and earth working
- using chemical dust suppressants when watering is not sufficient
- requiring all trucks hauling soil or other loose material to be covered, or maintain at least two feet of freeboard
- limiting areas to be cleared to facilities required for the project and necessary equipment and materials stockpile areas
- limiting the speed limit of construction equipment and vehicles on unpaved roads when conditions permit
- sweeping of paved parking areas, staging areas, and access roads
- sweeping of local streets if soil material is carried from the construction site onto local streets
- erosion control planting on exposed slopes
- incorporation of standard erosion control measures as part of the contract

The Caltrans Resident Engineer has responsibility for overseeing construction and ensuring that dust control measures are implemented when necessary. The Caltrans Resident Engineer also has the responsibility (and authority) for stopping construction activities before visibility becomes affected. The need to control dust

is to be included in the TMP, which is project specific, prepared prior to construction, and addresses construction impacts and mitigation measures.

Prior to construction, structures to be demolished are tested to ascertain the presence and condition of asbestos-containing material and to specify handling and disposal requirements. All asbestos containing materials are handled in accordance with regulatory requirements established to protect public and worker health and safety. If asbestos is present, construction contractors take additional precautions to prevent the material from becoming friable, airborne, and inhaled by workers and the public. There are also regulatory requirements for notifications, transport, disposal, and recordkeeping.

Air quality monitoring is specified in construction contracts when there are extraordinary air quality concerns (i.e., asbestos, lead fumes) for workers and the public. The I-880/Route 92 project does not have extraordinary air quality concerns, but to address public concern, an air quality-monitoring program would be developed as a required element of the construction contractor's Health and Safety plan.. The plan would be prepared by a Certified Industrial Hygienist (CIH) and would require Caltrans approval. The CIH is responsible for the monitoring of instrumentation, the recordation of measurements, and for stopping work when thresholds are approached. CIHs have little reason to continue work activities when standards are approached because it is in the contractor's interest to protect construction workers (who receive the greatest exposure to chemicals and substances) as well as the public. The air quality monitoring data are kept in the contractor's records, which are subject to inspection by the Caltrans Resident Engineer and possibly by OSHA personnel. Caltrans retains such records for an extended period of time in the event that there may be health related lawsuits.

Project operation is not predicted to have a notable effect on CO concentrations. There currently are no protocol requirements for analysis of PM_{10}, $PM_{2.5}$, or air toxics at the project level. However, the CARB's DRRP will contain a number of control measures, such as those that require cleaner diesel trucks and equipment and the use of reformulated diesel fuels, which would help reduce the toxics risks from freeway operations in the future.

3.5 Noise

3.5.1 Affected Environment

3.5.1.1 Study Area

The study area for existing noise levels is defined as the area bounded by the project limits and an additional 500 feet outside the proposed right-of-way. This corridor width is sufficient to determine impacts, because in almost all cases, the first row of homes (all within a few hundred feet of the roadway) experiences the highest noise levels with or without sound walls. The study area, shown in Figure 3.5-1, is bounded on the north by Winton Avenue, to the south by Tennyson Road, to the west by Industrial Boulevard, and to the east by Santa Clara Street. The four regions for discussion of the existing and future noise environments are the four quadrants of the interchange.

3.5.1.2 Noise – Characteristics

A number of factors affect sound as the human ear perceives it. These include the actual level of sound (or noise), the frequencies involved, the period of exposure to the noise, and the changes or fluctuations in the noise levels during exposure. Levels of noise are measured in units called decibels. Since the human ear cannot perceive all pitches or frequencies equally well, measured sound levels are adjusted or weighted to correspond to human hearing. This adjusted unit is known as the "A-weighted" decibel. All references to noise in this report refer to A-weighted decibel levels, or dBA.

A single value of noise level in dBA describes a noise level at just one moment, but since very few noises are constant, other ways of describing noise over extended periods are used. One way of describing fluctuating sound is to present the fluctuating noise heard over a specific time period as if it had been a steady unchanging sound. For this condition, a descriptor called the equivalent sound level, L_{eq}, is computed. The equivalent sound level is the constant sound level (A-weighted) that, in a given situation and time period (e.g., 1 hour -$L_{eq}(1)$, or 24 hours - $L_{eq}(24)$) contains the same acoustical energy as the time-varying sound level during the same period. The L_{eq} during a peak noise period is often used to determine necessary mitigation measures, while 24-hour cumulative L_{eq} averaging methods are used to evaluate typical noise exposure in an area.

3.5.1.3 Noise Criteria

Federal Highway Administration (FHWA) noise abatement criteria for various land use ratings (called activity categories) are indicated in Table 3.5-1. Noise abatement criteria are assigned to both exterior and interior activities. Activity Category B, which includes residential land uses, requires consideration of noise abatement when traffic noise approaches or exceeds 67 dBA. The term "approach" in this context, is defined by Caltrans as one dBA below the FHWA noise abatement criteria. Therefore, a noise level at or above 66 dBA triggers consideration of noise abatement. Noise attenuation provided by most residential structures normally leads to compliance with the interior design noise level if the exterior criterion is attained (FHWA 1982).

Table 3.5-1 FHWA Noise Abatement Criteria

Activity Category	$L_{eq}(h)$**	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	60 (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 to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal Highway Administration 1982.

* Either $L_{10}(h)$ or $L_{eq}(h)$ (but not both) may be used on a project.

** Hourly A-weighted Sound Level for the noisiest hour of the day in the design year.

3.5.2 Existing Noise Environment

The existing noise environment in the study area can be characterized by three types of conditions: the well-shielded environment which comprises areas behind the existing Caltrans sound walls; the less shielded environment which consists of areas on both sides of Route 92 west of I-880, beyond Caltrans sound walls but behind sound walls built by other entities; and the area along Route 92 east of I-880, the Southland Mall, and St. Rose Hospital, all of which are unshielded.

Noise Measurements

Measurements of the existing noise environment were made to characterize the study area adjacent to the interchange and to document the existing conditions. A number of noise studies were conducted to support the previous EIS/R documents and project design studies. These noise studies were designed to evaluate potential noise impacts and recommend abatement measures for the interchange designs being evaluated. As such, the location and number of noise monitoring and receptor locations is not necessarily consistent between the studies.

The analysis presented in the 1997 DEIS/R included twenty-three long-term (up to 1 week in duration) noise surveys conducted near residences, and an additional set of short-term (15-minute) measurements of the existing noise levels were made at these and other locations for a total of 28 measurement locations. The receptors selected for noise evaluation were considered representative of a group (typically a row) of homes, and noise levels recorded or estimated for a receptor were considered typical of all homes in that group/row. An addendum to the initial noise study was conducted to further evaluate noise in the areas immediately adjacent to the interchange. This addendum was developed to aid in evaluation of Alternative H, and the findings of this study were included in the Supplement to the DEIS/R. In addition, some locations contained in a study for the San Mateo-Hayward Bridge and East Approach Project were included for evaluation of the area west of the Calaroga Avenue Overcrossing. Locations for noise measurements taken for the various studies in the project area are shown in Figure 3.5-2. Measured peak hour noise levels are provided in Tables 3.5-2 through 3.5-4.

Table 3.5-2 Noise Levels and Noise Abatement – Alternative 2C Variation

Receptor	Location	Existing Noise Level L_{eq} (dBA)[1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA)[1] (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
	Northwest Quadrant							
R-1	705 Poinciana Street	-		-	81		65**	Existing
R-1B	24704 Magnolia Street	61 to 63 (1)	4.3 m (14 ft.)	64	83	4.3 m (14 ft.)	67	Barrier 1A
R-1C	753 Poinciana Street	-		-	74	no change 4.3 m (14 ft.)	70	Existing
R-15	24745 Magnolia Street	61 (1)	4.3 m (14 ft.)	62	64[a]	no change 4.3 m (14 ft.)	64	Existing
R-16	Southgate Swim Club	63 to 65* (1)		66	68[a]	no change 4.3 m (14 ft.)	68	Existing
R-17	25164 Lindenwood Way	60 (1)	4.3 m (14 ft.)	61	63[a]	no change 4.3 m (14 ft.)	63	Existing
R-3	1056 Edgemere Lane	62 (1)	4.3 m (14 ft.)	62	65[a]	no change 4.3 m (14 ft.)	65	Existing
R-18	25592 Lindenwood Way	66 (1)	3.7 m (12 ft.)	66	72	3.7 m (12 ft.) to 4.3 m (14 ft.)	65	Barrier 1B
R-2	1234 Stanhope Lane	68 (1)	3.7 m (12 ft.)	70	77	3.7 m (12 ft.) to 4.3 m (14 ft.)	70	Barrier 1B
R-5	25938 Kay Avenue	72 (1)	1.8 m (6 ft.)	75	N/A	3.7 m (12 ft.) to 4.3 m (14 ft.)	N/A	Barrier 1B
R-5B	Pool @25938 Kay Ave	-		-	70[a]	3.7 m (12 ft.) to 4.3 m (14 ft.)	70	Barrier 1B
R-5C	Balcony @ 25930 Kay Ave	-		-	79[a]	3.7 m (12 ft.) to 4.3 m (14 ft.)	79	Barrier 1B
	Condo complex @ 26088 Kay Avenue	68 (2)	1.8 m (6 ft.)	71	71	Replacement 1.8 m (6 ft.)	71	
	Southwest Quadrant							
	SW quadrant Calaroga Avenue Overcrossing	68 (2)	2.4 m (8 ft.)	71	71	Replacement 1.8 m (6 ft.)	71	
	26739 Wauchula Way @ Hesperian on-ramp	67 (2)	None	73	73	New 2.4 m (8 ft.)	70	
R-19	25888 Peterman Avenue	69 (1)	2.4 to 3.7 m (8 to 12 ft.)	70	74[a]	3.05 m (10 ft.) to 4.9 m (16 ft.)	65	Barrier 2B
R-6B	Peterman Ave	-		-	72[a]	3.05 m (10 ft.) to	66	Barrier 2B

Receptor	Location	Existing Noise Level L_{eq} (dBA)[1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA)[1] (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
						4.9 m (16 ft.)		S. Barrier 1 S. Barrier 3
R-6	25981 Peterman Avenue	60 (1)	3.0 m (10 ft.)	61	72 [a]	3.05 m (10 ft.) to 4.9 m (16 ft.)	66	Barrier 2B S. Barrier 1 S. Barrier 3
R-20	26062 Peterman Avenue	61 to 63 (1)	4.9 m (16 ft.)	63	78	3.05 m (10 ft.) to 4.9 m (16 ft.)	65	Barrier 2B S. Barrier 1 S. Barrier 3
R-7	Eden Greenway (west)	62 (1)	4.9 m (16 ft.)	64	77	4.9 m (16 ft.)	64	Barrier 2A
R-7B	Peterman Ave	-		-	81	4.9 m (16 ft.)	64	Barrier 2A
R-21	26736 Peterman Avenue	63 (1)	3.7 m (12 ft.)	64	82	no change 3.7 m (12 ft.)	66	Existing
R-28B	26890 Peterman Avenue	64 (1)	3.7 m (12 ft.)	64	66 [a]	no change 3.7 m (12 ft.)	66	Existing
R-8B	St. Rose Hospital	-		-	73 [a]		73	
	Southeast Quadrant							
R-11	End of Harder Road	67 (1)	None	69	76	3.7 m (12 ft.) to 3.05 m (10 ft.)	61	Barrier 3B
R-11B	25731 Booker Way	-		-	77	3.7 m (12 ft.) to 3.05 m (10 ft.)	61	Barrier 3B
R-10	25869 Booker Way	60 (1)	none	60	76	3.7 m (12 ft.) to 3.05 m (10 ft.)	64	Barrier 3B
R-10C	25833 Booker Way	-		-	77	3.7 m (12 ft.) to 3.05 m (10 ft.)	65	Barrier 3B
R-23	26073 Eldridge Avenue	60 (1)	4.9 m (16 ft.)	61	78	no change 4.9 m (16 ft.)	62	Barrier 3A Existing
R-9	Eden Greenway (east)	63 (1)	4.9 m (16 ft.)	64	65 [a]	no change 4.9 m (16 ft.)	65	Barrier 3A Existing
R-22	26713 Eldridge Avenue	63 *(1)	3.7 m (12 ft.)	64	65 [a]	no change 3.7 m (12 ft.)	65	Barrier 3A Existing
	Northeast Quadrant							
R-29	Willimet Way	-		-	79		68	Barrier 4
R-27	24593 Willimet Way	63 to 65 (1)	3.7 m (12 ft.)	66	N/A	3.7 m (12 ft.) to 4.3 m (14 ft.)	N/A	Barrier 4
R-14	24682 Willimet Way	59 (1)	3.7 m (12 ft.)	60	80	3.7 m (12 ft.) to 4.3 m (14 ft.)	68	Barrier 4
R-26	24745 Willimet Way	64 to 66 (1)	3.7 m (12 ft.)	67	N/A	3.7 m (12 ft.) to	N/A	Barrier 4

Receptor	Location	Existing Noise Level L_{eq} (dBA)[1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA)[1] (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
						4.3 m (14 ft.)		
R-4	24802 Willimet Way	59 (1)	3.7 m (12 ft.)	60	81	3.7 m (12 ft.) to 4.3 m (14 ft.)	69	Barrier 4
R-13	24906 Willimet Way	60 (1)	3.7 m (12 ft.)	61	80	3.7 m (12 ft.) to 4.3 m (14 ft.)	68	Barrier 4 S. Barrier 2
R-25	24985 Willimet Way	64 (1)	3.7 m (12 ft.)	65	N/A	3.7 m (12 ft.) to 4.3 m (14 ft.)	N/A	Barrier 4 S. Barrier 2
R-25B	249770 Willimet Way	-		-	80	3.7 m (12 ft.) to 4.3 m (14 ft.)	70	Barrier 4 S. Barrier 2
R-12	25026 Willimet Way	60 (1)	none	61	78	3.7 m (12 ft.) to 4.3 m (14 ft.)	68	Barrier 4 S. Barrier 2
R-24	24976 Townsend Avenue	67* (1)	none	69	76	3.7 m (12 ft.) to 4.3 m (14 ft.)	65	Barrier 4
R-24B	Townsend Avenue	-		-	76	3.7 m (12 ft.) to 4.3 m (14 ft.)	64	Barrier 4

Existing Noise Measurements:

(1) Wilson, Ihrig, and Associates (1992) for Alternatives 2C and 2D of the I-880/Route 92 IC Project
(2) Caltrans (1996) for the San Mateo-Hayward Bridge and East Approach Project

[1] Measured existing and predicted future no build noise levels taking existing sound wall into account
[2] Future noise level without abatement or mitigation – areas shaded gray represent substantial noise impact (12 dBA or greater increase) subject to noise mitigation
[3] Predicted noise levels with recommended sound walls
* Estimated from short-term data and nearby long-term data
** Estimated from nearby receptors
[a] Predicted noise levels, with existing Caltrans/developer walls

Table 3.5-3 Noise Levels and Noise Abatement – Alternative 2D Variation

Receptor	Location	Existing Noise Level L_{eq} (dBA)[1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA)[1] (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
	Northwest Quadrant							
R-1	705 Poinciana Street	-		-	85		65	Barrier 1A
R-1B	24704 Magnolia Street	61 to 63 (1)	4.3 m (14 ft.)	64	N/A	4.3 m (14 ft.)	N/A	Barrier 1A
R-1C	753 Poinciana Street	-		-	75	4.3 m (14 ft.)	70	Barrier 1A
R-15	24745 Magnolia Street	61 (1)	4.3 m (14 ft.)	62	74	4.3 m (14 ft.)	67	Barrier 1A
R-16	Southgate Swim Club	63 to 65* (1)		66	N/A	4.3 m (14 ft.)	N/A	Barrier 1A
R-17	25164 Lindenwood Way	60 (1)	4.3 m (14 ft.)	61	64 [a]	No change 4.3 m (14 ft.)	64	Existing
R-3	1056 Edgemere Lane	62 (1)	4.3 m (14 ft.)	62	66 [a]	No change 4.3 m (14 ft.)	66	Existing
R-18	25592 Lindenwood Way	66 (1)	3.7 m (12 ft.)	66	72	4.3 m (14 ft.) to 3.7 m (12 ft.)	67	Barrier 1B
R-2	1234 Stanhope Lane	68 (1)	3.7 m (12 ft.)	70	77	4.3 m (14 ft.) to 3.7 m (12 ft.)	70	Barrier 1B
R-5	25938 Kay Avenue	72 (1)	1.8 m (6 ft.)	75	N/A	4.3 m (14 ft.) to 3.7 m (12 ft.)	N/A	Barrier 1B
R-5B	Pool @25938 Kay Ave	-		-	70 [a]	4.3 m (14 ft.) to 3.7 m (12 ft.)	70	Barrier 1B
R-5C	Balcony @ 25930 Kay Ave	-		-	79 [a]	4.3 m (14 ft.) to 3.7 m (12 ft.)	79	Barrier 1B
	Condo complex @ 26088 Kay Avenue	68 (2)	1.8 m (6 ft.)	71	71	Replacement 1.8 m (6 ft.)	71	
	Southwest Quadrant							
	SW quadrant Calaroga Avenue Overcrossing	68 (2)	2.4 m (8 ft.)	71	71	Replacement 1.8 m (6 ft.)	71	
	26739 Wauchula Way @ Hesperian on-ramp	67 (2)	None	73	73	New 2.4 m (8 ft.)	70	
R-19	25888 Peterman Avenue	69 (1)	2.4 to 3.7 m (8 to 12 ft.)	70	74 [a]	3.05 m (10 ft.) to 4.9 m (16 ft.)	65	Barrier 2B
R-6B	Peterman Ave	-		-	72 [a]	3.05 m (10 ft.) to 4.9 m (16 ft.)	66	Barrier 2B S. Barrier 1

Receptor	Location	Existing Noise Level L_{eq} (dBA) [1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA) (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
								S. Barrier 3
R-6	25981 Peterman Avenue	60 (1)	3.0 m (10 ft.)	61	72 [a]	3.05 m (10 ft.) to 4.9 m (16 ft.)	66	Barrier 2B S. Barrier 1 S. Barrier 3
R-20	26062 Peterman Avenue	61 to 63 (1)	4.9 m (16 ft.)	63	78	3.05 m (10 ft.) to 4.9 m (16 ft.)	65	Barrier 2B S. Barrier 1 S. Barrier 3
R-7	Eden Greenway (west)	62 (1)	4.9 m (16 ft.)	64	76	4.9 m (16 ft.)	64	Barrier 2A
R-7B	Peterman Ave	-		-	81	4.9 m (16 ft.)	64	Barrier 2A
R-21	26736 Peterman Avenue	63 (1)	3.7 m (12 ft.)	64	82	no change 3.7 m (12 ft.)	66	Existing
R-28B	26890 Peterman Avenue	64 (1)	3.7 m (12 ft.)	64	66 [a]	no change 3.7 m (12 ft.)	66	Existing
R-8B	St. Rose Hospital	-		-	73 [a]		73	
	Southeast Quadrant							
R-11	End of Harder Road	67 (1)	None	69	75	3.7 m (12 ft.) to 3.05 m (10 ft.)	62	Barrier 3B
R-11B	25731 Booker Way	-		-	76	3.7 m (12 ft.) to 3.05 m (10 ft.)	62	Barrier 3B
R-10	25869 Booker Way	60 (1)	-	60	76	3.7 m (12 ft.) to 3.05 m (10 ft.)	64	Barrier 3B
R-10C	25833 Booker Way	-		-	77	3.7 m (12 ft.) to 3.05 m (10 ft.)	65	Barrier 3B
R-23	26073 Eldridge Avenue	60 (1)	4.9 m (16 ft.)	61	78	no change 4.9 m (16 ft.)	62	Barrier 3A Existing
R-9	Eden Greenway (east)	63 (1)	4.9 m (16 ft.)	64	65 [a]	no change 4.9 m (16 ft.)	65	Barrier 3A Existing
R-22	26713 Eldridge Avenue	63 *(1)	3.7 m (12 ft.)	64	65 [a]	no change 3.7 m (12 ft.)	65	Barrier 3A Existing
	Northeast Quadrant							
R-29	Willimet Way	-		-	69 [a]		69	Existing
R-27	24593 Willimet Way	63 to 65 (1)	3.7 m (12 ft.)	66	67 [a]	no change 3.7 m (12 ft.)	67	Existing
R-14	24682 Willimet Way	59 (1)	3.7 m (12 ft.)	60	64 [a]	no change 3.7 m (12 ft.)	64	Existing
R-26	24745 Willimet Way	64 to 66 (1)	3.7 m (12 ft.)	67	66 [a]	no change 3.7 m (12 ft.)	66	Existing

Receptor	Location	Existing Noise Level L_{eq} (dBA) [1]	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA) [1] (No Build)	Future Noise Level L_{eq} (dBA) w/o Abatement[2] (Build)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[3]	Sound Wall Designation
R-4	24802 Willimet Way	59 (1)	3.7 m (12 ft.)	60	71	3.7 m (12 ft.) to 4.3 m (14 ft.)	63	Barrier 4 S. Barrier 2
R-13	24906 Willimet Way	60 (1)	3.7 m (12 ft.)	61	73	3.7 m (12 ft.) to 4.3 m (14 ft.)	66	Barrier 4 S. Barrier 2
R-25	24985 Willimet Way	64 (1)	3.7 m (12 ft.)	65	71 [a]	3.7 m (12 ft.) to 4.3 m (14 ft.)	70	Barrier 4 S. Barrier 2
R-25B	249770 Willimet Way	-		-	70 [a]	3.7 m (12 ft.) to 4.3 m (14 ft.)	70	Barrier 4 S. Barrier 2
R-12	25026 Willimet Way	60 (1)	none	61	72	3.7 m (12 ft.) to 4.3 m (14 ft.)	66	Barrier 4 S. Barrier 2
R-24	24976 Townsend Avenue	67* (1)	none	69	74	3.7 m (12 ft.) to 4.3 m (14 ft.)	65	Barrier 4
R-24B	Townsend Avenue	-		-	74	3.7 m (12 ft.) to 4.3 m (14 ft.)	63	Barrier 4

Existing Noise Measurements:

(1) Wilson, Ihrig, and Associates (1992) for Alternatives 2C and 2D of the I-880/Route 92 IC Project
(2) Caltrans (1996) for the San Mateo-Hayward Bridge and East Approach Project

[1] Measured existing and predicted future no build noise levels taking existing sound wall into account
[2] Future noise level without abatement or mitigation – areas shaded gray represent substantial noise impact (12 dBA or greater increase) subject to noise mitigation
[3] Predicted noise levels with recommended sound walls
* Estimated from short-term data and nearby long-term data
** Estimated from nearby receptors
[a] Predicted noise levels, with existing Caltrans/developer walls

Table 3.5-4 Noise Levels and Noise Abatement – Alternative H

Location	Existing Noise Level L_{eq} (dBA)	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (No Build)	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (Alt. H)[1] (4)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[2] (4)	Sound Wall Designation
Northwest Quadrant							
(R-1B) 24704 Magnolia Street	61 to 63 (1)	4.3 m (14 ft.)	64	67 (1)	no change 4.3 m (14 ft.)	67	
(R-15) 24745 Magnolia Street	61 (1)	4.3 m (14 ft.)	62	64 (1)	no change 4.3 m (14 ft.)	64	
(R-17) 25164 Lindenwood Way	60 (1)	4.3 m (14 ft.)	61	63 (1)	no change 4.3 m (14 ft.)	63	
(R-3) 1056 Edgemere Lane	62 (1)	4.3 m (14 ft.)	62	65 (1)	no change 4.3 m (14 ft.)	65	
(R-18) 25592 Lindenwood Way	66 (1)	3.0 m (10 ft.)	66	72 (1)	no change 3.0 m (10 ft.)	72	
(NW 2) 25610 Lindenwood Way	(3)	3.0 m (10 ft.)	(3)	74 (4)	no change 3.0 m (10 ft.)	74	
(R-2) 1234 Stanhope Lane (Condominium Complex – Ground Level)	68 (1)	1.8m (6 ft.)	70	73 (4)	no change 1.8 m (6 ft.)	73	
(R-5) 25938 Kay Avenue (Condominium Complex – Ground Level)	72 (1)	1.8 m (6 ft.)	75	NA	no change 1.8 m (6 ft.)	NA	
(NW 1) 25938 Kay Avenue (Condominium Complex – Ground Level)	(3)	1.8 m (6 ft.)	(3)	73 (4)	no change 1.8 m (6 ft.)	73	
26088 Kay Avenue (Condominium Complex – Ground Level)	68 (2)	1.8 m (6 ft.)	71	74 (4)	no change 1.8 m (6 ft.)	74	
Southwest Quadrant							
SW quadrant Calaroga Avenue Overcrossing	68 (2)	2.4 m (8 ft.)	71	71 (4)	Replacement 1.8 m (6 ft.)	71	
26739 Wauchula Way @ Hesperian on-ramp	67 (2)	None	73	73 (4)	New 2.4 m (8 ft.)	70	
(R-19) 25888 Peterman Avenue	69 (1)	2.4 to 3.7 m (8 to 12 ft.)	70	77 (4)	Replacement 2.4 m (8 ft.)	70	SW Wall #1
(SW 1) 25906 Peterman	(3)	2.4 to 3.7 m	(3)	79 (4)	Replacement	69	SW Wall #2

Location	Existing Noise Level L_{eq} (dBA)	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (No Build)	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (Alt. H)[1] (4)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[2] (4)	Sound Wall Designation
Avenue		(8 to 12 ft.)			3.0 m (10 ft.)		
(SW 2) 25946 Peterman Avenue	(3)	2.4 to 3.7 m (8 to 12 ft.)	(3)	77 (4)	Replacement 3.7 m (12 ft.)	68	SW Wall #3
(SW 3) 25957 Peterman Avenue	(3)	3.0 m (10 ft.)	(3)	72 (4)	Replacement 3.7 m (12 ft.)	67	SW Wall #3
(SW 4) 25975 Peterman Avenue	(3)	3.0 m (10 ft.)	(3)	73 (4)	Replacement 4.3 m (14 ft.)	66	SW Wall #4
(R-6) 25981 Peterman Avenue	60 (1)	3.0 m (10 ft.)	61	73 (4)	Replacement 4.3 m (14 ft.)	66	SW Wall #4
(SW 5) 25991 Peterman Avenue	(3)	3.0 m (10 ft.)	(3)	73 (4)	Replacement 4.3 m (14 ft.)	66	SW Wall #4
(SW 6) 26021 Peterman Avenue	(3)	4.9 m (16 ft.)	(3)	74 (4)	Replacement 4.3 m (14 ft.)	67	SW Wall #4
(SW 7) 26077 Peterman Avenue	(3)	4.9 m (16 ft.)	(3)	73 (4)	Replacement 4.3 m (14 ft.)	68	SW Wall #4
(R-20) 26062 Peterman Avenue	61 to 63 (1)	4.9 m (16 ft.)	63	79 (4)	Replacement 4.3 m (14 ft.)	68	SW Wall #4
(SW 8) 26074 Peterman Avenue	(3)	4.9 m (16 ft.)	(3)	77 (4)	Replacement 4.3 m (14 ft.)	68	SW Wall #4
(R-7) Eden Greenway (west)	62 (1)	4.9 m (16 ft.)	64	64 (1)	no change 4.9 m (16 ft.)	64	
(R-21) 26736 Peterman Avenue	63 (1)	3.7 m (12 ft.)	64	66 (1)	no change 3.7 m (12 ft.)	66	
(R-28B) 26890 Peterman Avenue	64 (1)	3.7 m (12 ft.)	64	66 (1)	no change 3.7 m (12 ft.)	66	
Southeast Quadrant							
(R-11) End of Harder Road	67 (1)	None	69	NA	new, 2.4 m (8 ft.)	NA	SE Wall #3
(SE 5) 25731 Booker Way	(3)	None	(3)	72 (4)	new, 2.4 m (8 ft.)	69	SE Wall #3
(SE 4) 25755 Booker Way	(3)	none	(3)	72 (4)	new, 2.4 m (8 ft.)	67	SE Wall #3
(SE 3) 25821 Booker Way	(3)	none	(3)	70 (4)	new, 2.4 m (8 ft.)	64	SE Wall #2
(SE 2) 25845 Booker Way	(3)	none	(3)	78 (4)	new, 4.9 m (16 ft.)	64	SE Wall #1
(R-10) 25869 Booker Way	60 (1)	none	60	NA	new, 4.9 m (16	NA	SE Wall #1

Location	Existing Noise Level L_{eq} (dBA)	Existing Sound Wall Height	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (No Build)	Future Noise Level L_{eq} (dBA) w/o Additional Abatement (Alt. H)[1] (4)	Recommended Sound Wall Height	Future Noise Level L_{eq} (dBA) w/ Sound Wall[2] (4)	Sound Wall Designation
(front yard)					ft.)		
(SE 1) 25869 Booker Way (backyard)	(3)	none	(3)	77 (4)	new, 4.9 m (16 ft.)	65	SE Wall #1
(R-23) 26073 Eldridge Avenue	60 (1)	4.9 m (16 ft.)	61	62 (1)	no change, 4.9 m (16 ft.)	62	
(R-9) Eden Greenway (east)	63 (1)	4.9 m (16 ft.)	64	65 (1)	no change, 4.9 m (16 ft.)	65	
(R-22) 26713 Eldridge Avenue	63 (1)	3.7 m (12 ft.)	64	65 (1)	no change, 3.7 m (12 ft.)	65	
Northeast Quadrant							
(R-27) 24593 Willimet Way	63 to 65 (1)	3.7 m (12 ft.)	66	NA	no change, 3.7 m (12 ft.)	NA	
(R-14) 24682 Willimet Way	59 (1)	3.7 m (12 ft.)	60	68 (1)	no change, 3.7 m (12 ft.)	68	
(R-26) 24745 Willimet Way	64 to 66 (1)	3.7 m (12 ft.)	67	NA	no change, 3.7 m (12 ft.)	NA	
(R-4) 24802 Willimet Way	59 (1)	3.7 m (12 ft.)	60	63 (1)	no change, 3.7 m (12 ft.)	63	
(R-13) 24906 Willimet Way	60 (1)	3.7 m (12 ft.)	61	66 (1)	no change, 3.7 m (12 ft.)	66	
(R-25) 24985 Willimet Way	64 (1)	3.7 m (12 ft.)	65	81 (4)	replace, 3.7 m (12 ft.)	68	NE Wall #2
(NE 5) 25001 Willimet Way	(3)	none	(3)	79 (4)	new, 3.7 m (12 ft.)	69	NE Wall #2
(R-12) 25026 Willimet Way (front yard)	60 (1)	none	61	NA	new, 3.7 m (12 ft.)	NA	NE Wall #2
(NE 4) 25033 Willimet Way	(3)	none	(3)	76 (4)	new, 3.7 m (12 ft.)	69	NE Wall #1
(NE 3) 24992 Willimet Way	(3)	none	(3)	76 (4)	new, 3.7 m (12 ft.)	67	NE Wall #1
(R-24) 24976 Townsend Avenue	67 (1)	none	69	76 (4)	new, 3.7 m (12 ft.)	67	NE Wall #1
(NE 2) 24960 Townsend Avenue	(3)	none	(3)	74 (4)	new, 3.7 m (12 ft.)	67	NE Wall #1
(NE 1) 500 Teasdale Place	(3)	none	(3)	75 (4)	new, 3.7 m (12 ft.)	67	NE Wall #1

Existing Noise Measurements:

(1) Wilson, Ihrig, and Associates (1992) for Alternatives 2C and 2D of the I-880/Route 92 IC Project
(2) Caltrans (1996) for the San Mateo-Hayward Bridge and East Approach Project
(3) Caltrans (1998) for Alternative H (existing measurements were unrecorded or unanalyzed in the noise study report)
(4) Caltrans (2003) re-analysis of Alternative H

[1] Future noise level without abatement or mitigation – areas shaded gray represent substantial noise impact (12 dBA or greater increase) subject to noise mitigation
[2] Predicted noise levels with recommended or existing sound walls

Noise Source

The dominant noise sources for the study area are the motor vehicles on I-880 and Route 92. Most of the receptor locations investigated have no line-of-sight to the nearest existing roadway because they are behind existing highway sound walls. For receptors shielded by sound walls, most existing noise levels are less than the FHWA and Caltrans noise abatement criterion of 67 dBA for Category "B" land use.

The following section provides a discussion of the existing ambient noise environment for the neighborhoods in the study area.

Project Area Characteristics

For discussion purposes, the project area is divided into quadrants defined by the interchanges configuration. On the west side of I-880 are the northwestern and southwestern quadrants, and on the east side of I-880 are the northeastern and southeastern quadrants. North and south designation is defined by location relative to Route 92. The characteristics of each of the quadrants are discussed in the following text. The location of receptors is shown in Figure 3.5-2.

Northwestern Quadrant. A total of eleven (11) locations were selected to represent noise sensitive receptors in the northwestern quadrant of the interchange. Eight receptors were identified for use in evaluation of Alternatives 2C and 2D Variations and three additional receptors were used to evaluate Alternative H.

- The northernmost receptors, R-1B, R15, and R-16, are located closest to the southbound lanes of I-880. All of these receptors along Magnolia Street are currently shielded from highway noise by the existing sound wall, which is 4.3 m (14 feet) high in this area. Two of these receptors (R-1B and R-16) are representative of the back yards of the first row of homes on Magnolia and Poinciana Streets, and are currently exposed to a peak hour L_{eq} between 61 and 63 dBA. Receptors representative of the front yards of homes (first and second rows) (R-15) on Magnolia Street are exposed to a peak hour L_{eq} of 61 dBA.

- Receptors R-17, R-3, and R-18, are closer to the connector of I-880 southbound to Route 92 westbound. These receptors are located along Lindenwood Way. Receptors R-17 and R-3 behind the existing sound wall are exposed to a peak hour L_{eq} from 60 dBA to 62 dBA. The backyards of first row homes further west along the connector are exposed to a peak hour L_{eq} of 66 dBA, as measured at

location R-18. The higher level is due to the fact that the existing sound wall (built by other entities) in this area is only 3.0 m (10 feet) tall.

- Receptors R-5 and R-2 are located along the westbound lanes of Route 92. These receptors are exposed to a peak hour L_{eq} of between 68 and 72 dBA. This is primarily due to the height of the existing sound wall (built by other entities), which is 1.8 m (6 feet) high. Receptors NW1, NW2, and a condominium complex located on Kay Avenue also are located along westbound lanes of Route 92. The condominium complex receptor is exposed to a peak hour L_{eq} of 68 dBA

Receptors R-2 and the condominium complex on Kay Avenue, at 68 dBA, and R-5, at 72 dBA, have peak hour noise levels above the noise abatement criterion. Receptor R-18, at 66 dBA is approaching the criterion for noise abatement.

There is currently no sound wall along I-880 southbound near Southland Mall.

Southwestern Quadrant. Sixteen (16) measurement locations have been used to characterize the noise environment in the southwestern quadrant. Six measurement locations were used to characterize this area for evaluation of Alternatives 2C and 2D Variations, and ten locations were used for evaluation of Alternative H.

- Three receptors (R-7, R-21, and R-28B) are located closest to the southbound lanes of I-880 and represent the backyard of first row homes. Along I-880 southbound, the existing sound wall becomes 4.9 m (16 feet) before descending to 3.7 m (12 feet) near the Eldridge-Cheney Pedestrian Overcrossing. These receptors are exposed to peak hour L_{eq} from 62 to 64 dBA.

- Two receptors (R-6 and R-20) are closest to the connector of Route 92 eastbound to I-880 southbound. R-6, exposed to a peak hour L_{eq} of 60 dBA, represents the front yard of second row homes in this area. This area is shielded from highway noise by a masonry wall built by other entities approximately 2.4 m (8 feet) in height. A highway sound wall approximately 4.9 m (16 feet) in height starts just east of this location. Receptor R-20, exposed to a peak hour L_{eq} of 61 dBA, is representative of the backyards of first row homes on Peterman Avenue shielded by this wall.

- R-19 is representative of backyard noise at the first row of homes located on Peterman Avenue closest to the eastbound lanes of Route 92. It is exposed to a

peak hour L_{eq} of about 69 dBA. The residences on Peterman Avenue near the Calaroga Avenue Overcrossing are shielded by a sound wall 1.8 m (6 feet) in height. This wall continues to the east, rising to 3.0 m (10 feet), and then to 4.9 m (16 feet) near I-880.

- Receptors SW1 through SW8 represent homes adjacent to the Route 92 eastbound to I-880 southbound connector. These receptors are located along the first and second row of homes on Peterman Avenue as shown in Figure 3.5-2 Two additional receptors along Wauchula Avenue between the Calaroga Overcrossing and Hesperian Boulevard were included. These later receptors are currently exposed to a peak hour L_{eq} of between 67 and 68 dBA.

Receptor R-19 at 69 dBA, and homes in the southwest quadrant of the Calaroga Overcrossing, at 67 and 68 dBA, have peak hour noise levels at or above the noise abatement criterion. There currently are no sound walls on I-880 near St. Rose Hospital.

Southeastern Quadrant. A total of ten (10) measurement locations have been used in the southeastern quadrant to characterize this area. Five measurement locations were used to evaluate Alternatives 2C and 2D Variations, and an additional five measurement locations were used to evaluate Alternative H.

- Receptors along I-880, R-22 and R-9, are closest to the northbound lanes of I-880 and represent the backyard of first row homes on Eldridge Avenue, which are shielded by the existing sound wall. The sound wall height is 3.7 m (12 feet) in the vicinity of R-22 and rises to 4.9 m (16 feet) near R-9. The peak hour L_{eq} at both of these receptors is 63 dBA.

- Two receptors, R-23 and R-10, are located closest to the ramp on I-880 northbound to Route 92 eastbound. The sound wall adjacent to I-880 northbound and behind the residences in the 26000 to 26500 blocks of Eldridge Avenue is 4.9 m (16 feet), then decreases to 3.7 m (12 feet) adjacent to I-880 northbound and behind the residences in the 26600 to 26700 blocks of Eldridge Avenue. R-23 is representative of first row homes on Eldridge Avenue shielded by the existing 4.9 m (16-foot)-high sound wall, which extends up to the middle of this ramp. R-23 is exposed to a peak hour L_{eq} of 60 dBA. Receptor R-10 represents the second row homes along Booker way. The peak hour L_{eq} at this receptor was measured to be 60 dBA.

- Receptor R-11 is representative of the backyards of first row homes at the western end of Harder Road. R-11 is currently not shielded from highway noise by any sound walls. The peak hour L_{eq} is 67 dBA.

- Receptors SE1 through SE5 are located along the ramp from I-880 northbound and Route 92 eastbound. They represent the backyard of the first row of homes along Booker Way, between Booker Way and the interchange.

Receptor R-11, representative of the backyards of first row homes at the western end of Harder Road, is not shielded from highway noise by any sound walls. The peak hour L_{eq} at this location is at the noise abatement criterion of 67 dBA. There are no noise-sensitive receptors in the triangular area formed by Santa Clara Street, Harder Road and Jackson Street.

There are currently no sound walls along Route 92 eastbound behind residences from Booker Way to West Harder Road.

Northeastern Quadrant. A total of thirteen (13) locations were used to characterize noise levels in the northeastern quadrant. Eight locations were used for evaluation of Alternatives 2C and 2D, and 5 additional locations were used for evaluation of Alternative H.

- Five receptors (R-26, R-27, R-13, R-4, and R-14) are located along Willimet Way, adjacent to the northbound lanes of I-880. Three receptors (R-13, R-4, and R-14) represent the front yards of second row homes. They are exposed to a peak hour L_{eq} of 59 to 60 dBA. Two other receptors (R-26 and R-27) represent the backyards of first row homes and are exposed to a peak hour L_{eq} between 63 and 66 dBA. Homes on Willimet Way along the northbound lanes of I-880 are shielded by a 3.7 m (12-foot)-high sound wall that runs along the freeway right-of-way.

- Three receptors (R-24, R-12, and R-25) on Willimet Way are close to the ramp between Route 92 westbound and I-880 northbound. There is currently no sound wall along the eastern half of this ramp, and the measured peak hour L_{eq} at the backyard of first row homes along this ramp, represented by receptor R-24, is 67 dBA. Second row homes, which are shielded by first row homes, are exposed to a peak hour L_{eq} of 60 dBA, based on the noise level estimated for R-12 located in

the front yard of the first row of homes. Homes located along the west part of the ramp are shielded by a sound wall 3.7 m (12 feet) high and exposed to a peak hour L_{eq} of 64 dBA.

- The addenda to the initial noise study included receptor locations NE1 through NE5. These receptors are along the same ramp area as R-24, R-12, and R-25.

Receptors R-24 at 67 dBA, and R-26 at 66 dBA have peak hour noise levels approaching or at the noise abatement criterion. As noted above, there is currently no sound wall along the eastern half of the Route 92 westbound to I-880 northbound ramp, generally behind residences in the 25000 block of Willimet Way to Townsend Avenue.

Hesperian Boulevard to Mt. Eden Overhead. This area already has sound walls 3.7 to 4.3 m (12 to 14 feet) high that were constructed in conjunction with a previous Caltrans project on both sides of Route 92 between Industrial Boulevard and Hesperian Boulevard. There are three residences on Wauchula Avenue next to the Hesperian Boulevard on-ramp for which there is no sound wall coverage.

3.5.3 Permanent Impacts

3.5.3.1 Noise Impact Criteria

The Federal Highway Administration (FHWA) Title 23 of the Code of Federal Regulations, Part 772 (23 CFR 772) stipulates procedures and criteria for noise assessment studies. It requires that noise abatement measures be considered on all major transportation projects if the project will cause a substantial increase in existing noise levels, or if projected noise levels "approach or exceed" the noise abatement criteria level for activities occurring on adjacent lands. A "substantial increase" is defined by Caltrans as when the predicted design year noise level increases by 12 dBA over the existing level. Specific noise criterion values are based on land use ratings (called activity categories by FHWA) as given in Table 3.5-1. FHWA assigns noise criteria to both exterior and interior activities. However, noise attenuation provided by most residential structures normally leads to compliance with the interior noise criterion if the exterior criterion is satisfied (FHWA 1982).

The FHWA activity categories have been applied to neighborhoods in the study area. Two quadrants (northeastern and southwestern) are almost exclusively residential in terms of land use. The other two quadrants contain a mix of residential and

commercial land uses. A school (Eldridge Elementary School) and a hospital (St. Rose Hospital) are also located within the study area. In addition, there are areas within the study area that are under recreational land use (privately-owned). All of these land uses are normally considered to be noise sensitive.

Residential and recreational land uses define areas where people can be expected to spend a great amount of time outdoors, and as such may be classified as an activity category "B." The exterior noise abatement criterion for Category "B" is a peak hour L_{eq} of 67 dBA (see Table 3.5-1). Traffic noise impacts occur when this criterion is approached or exceeded. Commercial and office buildings are not considered noise sensitive unless there is frequent outdoor usage. No commercial or office building in the study area was determined to have frequent outdoor use and consequently to be noise sensitive.

3.5.3.2 Impact Evaluation Method

Noise impacts for the build alternatives were evaluated by preparing noise predictions based on the Caltrans noise prediction computer program SOUND32. This computer program calculates noise levels based on a theoretical model which includes highway geometry, traffic volume and speed, receptor locations, natural and constructed sound barriers, and natural attenuation of noise due to propagation effects.

Measured ambient noise level data, together with traffic volumes and vehicle mix (including trucks) data were used to develop a computer noise model for the existing highway alignment through a calibration process. The calibration process involves a comparison of predicted noise levels with measured noise levels for the same traffic condition. Highway noise impacts of the no build alternative were also predicted using the calibrated model. For analysis purposes, the development of a representative future worst case traffic noise condition was based upon assumed traffic conditions, including volume, average vehicle speed, and mix of vehicle types (e.g., automobiles, medium and heavy trucks). The most recent noise re-analysis for Alternative H, after it was identified as the Preferred Alternative, assumed the worst case traffic conditions, with regard to noise levels, would be 2,000 vehicles per hour per lane, comprised of 93.4 percent automobiles, 2.6 percent medium trucks and 4 percent heavy trucks for I-880 traffic, and 1800 vehicles per hour per lane, comprised of 97.9 percent automobiles, 1.4 percent medium trucks

and 0.7 percent heavy trucks for Route 92. The average speeds of travel were assumed to be at 105 km (65 miles) per hour on both routes.

A summary of the existing noise levels and predicted future noise levels as determined by all noise studies is presented in Tables 3.5-2 through 3.5-4. Future noise levels along the project alignment were predicted for the no build and three build alternatives (2C Variation, 2D Variation, and H) with and without sound walls. The interchange project is unusual in that much of the study area (i.e., the area directly adjacent to I-880) is already shielded by recently constructed sound walls consisting of 3.7 to 4.9 m (12 to 16 feet) high prefabricated concrete walls. These sound walls were constructed as part of other I-880 and Route 92 projects. Sound walls constructed by other entities shield other portions of the study area. Figure 3.5-2 presents the location of all existing sound walls in the study area. The build alternatives require that some of these sound walls be rebuilt to allow for interchange modifications.

For the modeling noise levels under the no build alternative, all existing sound walls in the study area were taken into consideration. For the build alternatives, noise levels were predicted with and without sound walls. In some parts of the study area, project construction does not require the removal of existing sound walls. At these locations, noise levels under the build alternatives were modeled with the sound attenuation that the existing sound walls provide. These predicted noise levels are footnoted in Tables 3.5-2 through 3.5-4. In other parts of the study area, the existing sound walls need to be rebuilt to facilitate construction and roadway widening under the build alternatives. At these locations, predicted noise levels were estimated for the build alternatives assuming no sound walls.

3.5.3.3 Operational Noise Impact

Alternative 2C Variation. The noise analysis presented in Table 3.5-2 indicates that some receptors investigated in the study area would have noise levels exceeding the impact criterion of 66 dBA without abatement. Additionally, because of removal of existing walls, noise impacts at some locations would be substantial. The predicted peak hour L_{eq} for the study area ranges from 63 dBA to 83 dBA.

St. Rose Hospital is currently unshielded. The outdoor use of the facility is infrequent. Interior noise levels with the project remains within the Caltrans criterion of 52 dBA of interior noise at hospitals. This is based on the evaluation of noise level changes at receptor R-8B at the hospital. Impacts at Eden Greenway

were modeled using receptors R-7 and R-9. Noise levels at R-9 are below noise criterion for parks, and with proposed abatement, noise levels at R-7 also meets this criterion. A receptor at the Eldridge School was not modeled because the project does not result in changes to the roadway near the school.

Alternative 2D Variation. Movement of the I-880 alignment north of Route 92 to the west eliminates all of the homes in the first row on Magnolia Street. This diminishes the shielding provided to the second row of homes on this street. With implementation of this alternative, assuming no sound walls, some of the homes directly adjacent to the roadway in all quadrants (as indicated in Table 3.5-3) would experience noise levels that exceed the noise impact criterion and would be considered substantial increases. The predicted peak hour L_{eq} ranges from 64 dBA to 85 dBA.

Impacts to St. Rose Hospital, Eden Greenway, and Eldridge School are similar to those resulting from Alternative 2C Variation.

Alternative H. The predicted noise levels for Alternative H are shown in Table 3.5-4. The analysis indicates that most receptors have noise levels exceeding the impact criterion of 66 dBA without abatement and a number of receptors would be subject to substantial noise increase. The highest predicted noise level was 81 dBA, which is louder than a gas lawn mower at 15 m (50 feet) or a vacuum cleaner at 1.5 m (about 5 feet), in the northeast quadrant, on Willimet Way, near the end of the existing sound wall.

The noise impacts of Alternative H upon St. Rose Hospital, the Eden Greenway, and Eldridge Park/Eldridge School are consistent with Alternatives 2C and 2D Variations because the changes to I-880 in the vicinity of these areas are the same for these three build alternatives.

3.5.4 Temporary Impacts

3.5.4.1 Construction Phase Impacts

Construction of the proposed project would generate noise over a period of three to four years. Most of the construction noise would occur during daytime hours and would be associated with trucks/heavy vehicles and construction equipment. Caltrans Standard Specifications (Section 7-1.01I) require all internal combustion engines and equipment to have a noise muffler recommended by the manufacturer.

That Caltrans Special Provision also requires the contractor to comply with local sound control regulations and ordinances. Consequently, the impact of most of the daytime construction noise on neighboring areas is expected to be similar to the construction of other projects. The current construction plan for the project anticipates the construction of new sound walls and combination sound/retaining walls in the first stages, which have the potential to attenuate much of the noise from subsequent stages of construction.

The most intense construction noises are associated with driving piles for the foundations of bridge structures and demolition of structures. The intensity of the noise levels from construction activities is highly dependent upon the distance the receptor is from the noise source (e.g., pile driver) and any attenuation of noise as a result of topography, vegetation, or structures (e.g., buildings, sound walls). There are possibly several weekend nights over one to two months in which piles would be driven in the median of I-880 for the Route 92/I-880 separation structure if traffic conditions and safety prevent lane closures during the daytime on weekdays.

3.5.5 Abatement/Mitigation Measures

For exterior areas of Activity Category B land uses, noise abatement must be considered when predicted traffic noise levels for the noisiest hour L_{eq} (h) approach (within 1 dBA) the FHWA noise abatement criteria of 67 dBA. For substantial noise increases (sound level increases of 12 dBA or greater) mitigation of noise impacts is considered. Sound walls were evaluated as the means of noise mitigation and abatement. Alternative wall heights were also evaluated as well as constructing earthen berms instead of walls where space permits.

New and replacement sound walls would be considered in accordance with Caltrans policy [Highway Design Manual, Chapter 1100 (November 2001) and Project Development Procedures Manual, Chapter 30 (July 1999)], which is based on FHWA regulations (Title 23 of the Code of Federal Regulations, Section 772), and Caltrans' Traffic Noise Analysis Protocol (October 1998). The sound walls must be *feasible* and *reasonable*.

Feasibleness relates to engineering considerations–lateral clearances, sight distance requirements, and a minimum noise level reduction of 5 dBA. A number of factors can affect feasibility including, topography, access requirements (e.g., for driveways and ramps), local street configuration, other noise sources in the area, and safety considerations. The minimum height of sound walls should be 1.8 m (6 feet)

measured from the top of the wall to the top of the foundation; the maximum height should be 4.9 m (16 feet) measured from the pavement surface. Caltrans also considers sound wall design with regard to ability to intercept the line of sight from receptors to the top of exhaust stacks of trucks passing by (since exhaust stacks of trucks are a source of noise that is considered to be an annoyance). Sound walls are not usually intended to attenuate noise levels of second, or higher stories, of residences unless the sound walls meet the above reasonable and feasible criteria.

The determination of reasonableness of noise abatement is more subjective than the determination of feasibility. Noise abatement is only considered where noise impacts are predicted and where frequent human use occurs in a manner that lower noise levels would be of benefit. Among the factors to be considered for reasonableness are cost effectiveness, absolute noise levels, change in noise levels, noise abatement benefits, the age and characteristics of the surrounding development, and impacts that would result from abatement (e.g., environmental impacts from construction and visual impacts). Input from public and local agencies is considered, as well as the desires of residents and property owners (noise abatement will not be provided if it is opposed by 50 percent or more of the affected residents) are also part of the reasonableness determination.

New walls would not replace existing sound walls, unless a minimum 5 dBA noise reduction could be achieved, except when a wall must be replaced because of interchange modifications. Sound walls are most effective for the first two rows of buildings (e. g., residences). The design details for each sound wall were established using Caltrans noise abatement policies and the SOUND32 computer model.

Tables 3.5-2 through 3.5-4 show the recommended height of sound walls that are needed for the build alternatives to abate noise when peak period noise levels are above federal noise abatement criteria for Category B land uses (residential areas, parks and recreational facilities, and other sensitive receptors) and at locations where substantial noise increases are identified. The dimensions and locations of the recommended sound walls are subject to modification during development of detailed design and based on input received from meetings with affected land owners/residents. All sound walls are designed pursuant to requirements listed in Caltrans Highway Design Manual.

[Note: With regard to areas along Route 92 with no sound wall coverage, Caltrans made a previous commitment to extend the sound walls to provide shielding for residences at these locations in a project (Expenditure Authorization 127720) under the HB 311 Community Noise Abatement Program. The intent of Caltrans is to carry out that commitment under the I-880/Route 92 Interchange Project.]

Alternative 2C Variation

Figure 3.5-3 indicates the location and heights of sound walls recommended for abatement and mitigation of noise impacts.

Northwestern quadrant

- In the northwestern quadrant, the existing sound wall shields the entire area except near the northern extent (near La Playa Drive), where the existing wall would be replaced by a new 4.3 m (14-foot) high wall (Barrier 1A) about 116 m (380 feet) in length, and near the I-880 connector to Route 92, where the wall would be replaced with new 3.7 and 4.3 m (12- and 14-foot) high wall segments (Barrier 1B) with a total length of about 335 m (1,100 feet). No sound wall is proposed for the Southland Mall area.

Northeastern quadrant

- In the northeastern quadrant, the existing wall would be replaced by a new sound wall Barrier 4, which begins about 76 m (250 feet) west of Santa Clara Street and follows the right-of-way line for a length of 1347 m (4,420 feet). The first 220 m (720 feet) of the wall would be 3.7 m (12 feet) high and the remainder 4.3 m (14 feet) high.

Southwestern quadrant

- The recommended wall for sound Barrier 2A, in the southwestern quadrant (Southgate neighborhood), runs along the right-of-way line to just north of Eden Greenway. The wall would be 4.9 m (16 feet) high and 457 m (1,500 feet) in length.

- Barrier 2B would have four segments varying in height from 3.05 m (10 feet) on the westernmost end to 4.9 m (16 feet) in the middle segment just south of the interchange and then down to 3.7 m (12 feet) on the southern end of the wall.

The noise levels for all receptors behind the recommended sound wall are predicted to be less than 67 dBA.

No sound wall is necessary for St. Rose Hospital, because there is no frequent outdoor use of the facility and the interior noise levels are predicted to be below the noise abatement criterion. Interior noise level at the hospital was computed to be approximately 50 dBA using the methodology presented in the FHWA publication Highway Traffic Noise Analysis and Abatement, dated June 1995. This interior noise level was estimated using a predicted exterior noise level of 70 dBA at the closest point of the hospital structure to the roadway, and a conservative assumption of the noise reduction of 20 dBA due to the building structure.

- The recommended sound wall Supplementary Barrier 1 (a hingepoint sound wall) would be located in the southwestern quadrant on the Route 92 westbound to I-880 southbound connector. This would intercept the truck stack line-of-sight and provide additional shielding to homes on Peterman Avenue. The wall would be about 3.7 m (12 feet) in height and about 345 m (1,130 feet) in length.

- Supplementary Barrier 3 would be located on the elevated portion of Route 92 eastbound for about 183 m (600 feet). This wall would also intercept the truck stack line-of-sight and the intermittent noise from trucks on Route 92 eastbound for receptors in the southwestern quadrant.

Southeastern quadrant

- The existing sound wall (Barrier 3A) along I-880 would shield most of the southeastern quadrant (Harder-Tennyson/Schafer Park neighborhood).

- The recommended wall for sound Barrier 3B runs along the right-of-way line adjacent to the proposed I-880 northbound to Jackson Street ramp and terminates near the Gateway Plaza property line on Jackson Street. Barrier 3B has two segments varying in height from 3.7 m (12 feet) for the southern 244 m (800-foot) section to 3.05 m (10 feet) for the northern 366 m (1,200-foot) section of the wall. The noise levels with the recommended wall are predicted to be 65 dBA or less.

The proposed sound walls achieve a 5 dBA or greater reduction in noise level at 24 locations (see Figure 3.5-2 and Table 3.5-2 for locations and sound levels). Future

noise levels at all receptor locations would remain below the 12 dBA criteria defining substantial noise impacts. It would not be feasible to build walls high enough to shield the upper balconies at the apartments/condominiums on Kay Avenue.

Noise levels at R-8B (St. Rose Hospital) would be 73 dBA. The interior noise levels at St. Rose Hospital (predicted to be approximately 50 dBA) satisfy the Caltrans criterion of 52 dBA for interior noise at hospitals.

Alternative 2D Variation

Figure 3.5-4 indicates the general location and heights of the sound walls of the recommended abatement and mitigation of noise impacts. There would be new sound walls in some portions of each of the four interchange quadrants, along with two supplementary sound walls adjacent to connectors and one supplementary sound wall on the elevated portion of Route 92 eastbound. In some portions, existing sound walls could be retained. Each of the recommended sound walls is divided into segments with each segment representing a different wall height.

Northwestern quadrant

- The recommended wall for sound wall 1A, in the northwestern quadrant (Southgate neighborhood), would follow the right-of-way line from a point approximately 121.9 m (400 feet) north of the southern edge of the Southland Mall property line for about 670.5 m (2,200 feet). Barrier 1A would be 4.3 m (14 feet) high. The existing sound wall adjacent to the I-880 southbound to Route 92 westbound connector remains in place.

- Barrier 1B also in the northwestern quadrant would follow the right-of-way line and would shield receptors located on Linden Way between Merritt Lane and Stanhope Lane. For the first 213.3 m (700 feet) the wall would be 4.3 m (14 feet) high and for the next 121.9 m (400 feet) it would be 3.7 m (12 feet) high. The recommended sound walls would generally reduce noise levels in this quadrant.

Northeastern quadrant

- The recommended wall for sound Barrier 4, in the northeastern quadrant (Santa Clara neighborhood), runs along the right-of-way line from a point approximately 61 m (200 feet) west of Santa Clara Street for a distance of 860 m (2,820 feet). Beyond this point, the existing sound wall would shield the neighborhood. Barrier 4 has two segments that are 3.7 and 4.3 m (12 and 14 feet) high.

- The recommended Supplementary Barrier 2 would be located on the Route 92 eastbound to I-880 northbound direct connector. This wall would be placed on the outer edge of the connector, and would be about 3.7 m (12 feet) high and 488 m (1,600 feet) long. For receptors in the northeastern quadrant, the wall would intercept the truck stack line-of-sight and intermittent noise from trucks on the connector.

Southwestern and Southeastern quadrants – The recommended sound walls for the southwestern and southeastern quadrants and the three supplementary sound walls are identical to the corresponding walls recommended for Alternative 2C Variation.

The proposed sound walls achieve a 5 dBA or greater reduction in noise level at 22 locations (see Figure 3.5-2 and Table 3.5-3 for locations and sound levels). Future noise levels at all receptor locations would remain below the 12-dBA criteria defining substantial noise impacts. It would not be cost-effective to achieve additional noise reduction for the receptors on Poinciana Street, Stanhope Lane, Willimet Way, and Magnolia Way. It would not be feasible to build walls high enough to shield the upper balconies at the apartments/condominiums on Kay Avenue.

Impacts and abatement at St. Rose Hospital is the same as discussed for Alternative 2C.

Alternative H

Based on noise abatement criteria, and reasonable and feasible considerations, the noise study for Alternative H found that existing sound walls fronting on I-880 should be retained because the sound walls would still be effective for their intended

purpose. The noise study recommended the following replacement and new sound walls (see Figure 3.5-5):

Northwestern quadrant – Previous noise analysis provided in the Supplemental EIS/R recommended replacement of existing sound walls described as NW Wall #1, NW Wall #2, and NW Wall #3. After Alternative H was identified as the Preferred Alternative, Caltrans explored ways to minimize parking impacts associated with the construction of these walls and decided to reduce the shoulder width of Route 92 eastbound and realign the retaining wall adjacent to Route 92 westbound. Consequently, the existing walls can remain in place and therefore no new or replacement walls are recommended. The existing sound walls would provide a 5 dBA or more reduction in noise levels for some residences facing Route 92 in the multi-story condominium complexes. Those units with predicted exterior noise levels of 75 dBA or higher that cannot be effectively abated with sound walls will be considered for other noise abatement. Other noise abatement measures such as double-paned windows and noise insulation are approved on a case-by-case basis by FHWA.

(Note: Sound wall design in the vicinity of the condominium complex on Kay Avenue would be reviewed with local residents (Condominium Association) and the City of Hayward. If local residents prefer increased sound wall height, and Caltrans determines that increased height is feasible and reasonable, increased sound wall height would be further evaluated.)

Northeastern quadrant – Two new walls extend from the existing wall alongside the Route 92 westbound to I-880 northbound on-ramp.

- NE Wall #1 has a total length of 250 m (820+ feet) and is 3.7 m (12 feet) high.

- NE Wall #2 has a length of 220 m (722 feet) and a height of 3.7 m (12 feet) and is on top of a retaining wall.

Southwestern quadrant – One wall adjacent to the Hesperian Boulevard on-ramp to Route 92 eastbound is to be extended; four new sound walls are proposed to accommodate the new collector-distributor/direct connector to I-880 southbound and northbound. The walls may not meet the truck stack line-of-sight requirement in some areas.

- Hesperian On-ramp Wall has a length of 36.6 m (120 feet), a height of 2.4 m (8 feet), and would be constructed on top of a retaining wall. This sound wall provides less than 5 dBA noise reduction, but was a prior commitment to the residents. The height of the sound wall matches the height at the end of the existing wall.

- SW Wall #1 has a length of approximately 58 m (190 feet) and a height of 2.4 m (8 feet). This wall would be constructed on top of a retaining wall.

- SW Wall #2 is approximately 66 m (215 feet) in length, 3.0 m (10 feet) in height and on top of a retaining wall.

- SW Wall #3 is approximately 104 m (340 feet) in length and 3.7 m (12 feet) in height. This is generally an increase in height relative to the existing wall.

- SW Wall #4 has a length of approximately 220 m (720 feet) and a height of 4.3 m (14 feet). This wall would be constructed on top of a retaining wall.

Southeastern quadrant – Three new walls would extend from the existing wall alongside I-880 northbound/Route 92 eastbound off-ramp. The walls may not meet truck stacks line-of-sight requirement in some areas.

- SE Wall #1 is 87 m (285+ feet) in length and 4.9 m (16 feet) high.

- SE Wall #2 has a length of 107 m (351 feet) and a height of 2.4 m (8 feet). It would be constructed on top of a retaining wall that varies in height from 3.2 m under a portion of SE Wall #1, to 4.87 m, and then to 4.16 m. The combination retaining wall/sound wall height is 7.07 m (22 to 24 feet).

- SE Wall #3 is 175 m (574 feet) in length, 2.4 m (8 feet) high.

(Note: Wall#2 and Wall #3 were lowered from 3.7 m (12 feet) in height per a request by the City of Hayward. The lowering of the wall height would still achieve a 5-dBA reduction of predicted noise levels, but may not intercept the top of truck stacks from the line of sight of receptors. Wall #1 was raised from 3.7 m (12 feet) to match the height of existing wall and Wall #2 on top of a retaining wall.)

The proposed sound walls achieve a 5 dBA or greater reduction in noise level at all modeled locations with only three exceptions (see Figure 3.5-2 and Table 3.5-4 for locations and sound levels). The sound wall at receptor R-2 achieves only a 4 dBA reduction, and sound walls at the southwest quadrant of the Calaroga Avenue Overcrossing and the Hesperian Avenue on-ramp fail to meet the 5 dBA goal. The sound wall adjacent to the Hesperian Boulevard/Route 92 on-ramp was designed in accordance with a prior commitment to residents on Wauchula Way. As noted earlier, previous studies under community sound wall program HB 311 program indicated that these houses needed shielding. A commitment was made to local residents that a sound wall would be built as part of the interchange project and would match height of existing walls.

With mitigation, the future noise levels at all receptors modeled would remain below the 12-dBA criteria defining substantial noise impacts. Noise impacts to residential units at the multi-story condominium complex on Kay Avenue would be reviewed with local residents, the condominium association, and the City of Hayward. Additional sound wall height, if requested by the majority of local residents, would be evaluated during the detailed design phase.

Impacts and abatement at St. Rose Hospital are the same as discussed for Alternative 2C.

3.5.5.1 Construction Noise Mitigation

With respect to construction noise, Caltrans will work with the City of Hayward and the surrounding neighborhoods regarding piledriving, demolition, and other noise-intensive activities. Where possible, Caltrans would use construction methods—such as cast-in-drilled-hole (CIDH) piles—that are less noise intensive. There is to be an outreach program as a part of the Transportation Management Plan. This outreach program provides notification to people in the surrounding neighborhoods in advance of piledriving, demolition, and other noise-intensive activities that are 6 dB above the local ambient level and which are prohibited from being performed between the period from 7:00 PM and 7:00 AM (or between 6:00 PM and 10:00 AM on Sundays and holidays) per the noise ordinance of the City of Hayward, which is more restrictive than Caltrans' Special Provisions S5-300:

> The noise level from the Contractor's operations, between the hours of 9:00 PM and 6:00 AM, shall not exceed 86 dBA at a distance of 15 m.

Where feasible, sound walls would be built during the early stage of the project to attenuate noise from heavy construction equipment.

3.6 Energy

3.6.1 Affected Environment

Expanding demand for and use of vehicular fuels and electric power generally characterize the energy setting for the study area and the rest of the Bay Area and California. This trend began to occur in the late 1980s and throughout the 1990s as California experienced a period of substantial economic growth. This growth, accompanied by increased population, resulted in increased demand for motor vehicle fuels and transportation services. In addition, consumers began to buy more sports utility vehicles (SUVs), vans, and trucks than sedans, decreasing the efficiency of motor vehicle fuel usage. During this same time period, computers and other electric consuming equipment also became widespread in businesses and homes. Another trend in the 1980s and 1990s was the deregulation of the petroleum and electric power industries in the belief that increased competition results in lower prices.

Approximately, 51 percent of all energy used in California is used by the transportation sector. Automobiles in California consume more than 14 billion gallons of gasoline annually. In 2000, the prices of gasoline and transportation fuels in California rose and remained higher than almost everywhere else in the United States. A California Energy Commission draft staff report notes that from 1980 through 2000, California's population grew by an average of 1.9 percent per year, and the number of on-road vehicles grew at nearly the same rate. Recent trends in increased consumer use of light trucks (e.g., SUVs, minivans, and pickup trucks), which have lower fuel economy than passenger cars, has caused the fleet average fuel economy to level off for the first time since 1973.

The deregulation of electricity in California resulted in ultra-high prices paid by the Pacific Gas & Electric (PG&E) and the Southern California Edison Companies for electricity generated from outside of California to meet the peak Summer 2000 demands of their customers. Because of a cap on the costs of electricity that PG&E and Southern California Edison could pass on to ratepayers, PG&E and Southern California Edison saw their financial resources eroded. By January and March

2001, there were rolling electric power outages in the service areas of the PG&E and the Southern California Edison for the first time since World War II as the two utility companies were unable to secure credit to purchase enough peak period power to meet demands. This electric power situation necessitated that the State of California intercede on behalf of PG&E and Southern California Edison to purchase electricity. The State of California warned people about the possibility of future rolling electrical power outages when peak electric power demands are reached. Since the electricity crisis in 2000-2001, the State of California has renegotiated power purchase contractors with major suppliers, and is pursuing investigation of overcharging and electric grid/supply manipulation by specific members of the power industry. With additional energy generating capacity coming on line in the next few years, availability of out-of-state power, and the economic slow-down, the crisis California experienced in 2001 is not anticipated to reoccur.

3.6.2 Permanent Impacts

Population growth and economic conditions are key factors affecting current and future transportation energy demand. Vehicle miles traveled and consumer choices in vehicle type (i.e., fuel efficiency) will continue to have an effect on transportation fuel use.

There is likely to be a reduction in energy usage in the operation of vehicles through the interchange under the any of the proposed build alternatives compared to the existing situation because of the improvement in vehicular speeds and traffic operations. But, based upon previous energy studies for interchange projects involving structures, the reduction in energy usage is not expected to offset the amount of energy used to construct the project.

3.6.3 Temporary Impacts

The build alternatives require a substantial amount of energy resources for the construction of interchange structures and facilities and for the operation of vehicles through the interchange.

3.6.4 Mitigation Measures

No specific energy mitigation measures are proposed for the construction of the project so as to allow the construction contractor flexibility in reducing energy usage while constructing the project. Nevertheless, Caltrans plans to stress to the

contractor the importance of energy conservation practices, shifting electric loads to off-peak periods, and use of alternative energy sources and backup electric generators.

3.7 Wetlands and Other Waters of the United States

3.7.1 Affected Environment

The first wetland survey for the I-880/92 interchange project was conducted in 1992, and resulted in no evidence of wetland vegetation in the project area. Subsequent surveying in January and February 1997 revealed areas with seasonal standing water and wetland vegetation had become established in three of four quadrants of the existing interchange (northwest, northeast, and southeast) in association with man-made roadway drainages in those locations. Biological surveys and assessments of wetlands in 1997, 1998, and 1999 concluded that there were no vernal pool fairy shrimp, tadpole shrimp, California red-legged frog, or other sensitive aquatic species present. In May 2000, the U.S. Army Corps of Engineers (ACOE) delineated these areas and found 0.132 hectare (.326 acre) of jurisdictional wetland (wetland that falls under the jurisdiction of Section 404 of the Clean Water Act of 1977). Based on the size and quality of the wetlands, ACOE staff concurred with Caltrans (see letter in Appendix E) that the proposed project is likely qualified for a Nationwide Permit for discharges into wetlands.

In addition to the above, as part of the San Mateo-Hayward Bridge and Trestle Widening Project, the ACOE delineated a jurisdictional wetland located west of the Industrial Boulevard interchange and the Union Pacific Rail Road tracks. This wetland was designated as an environmentally sensitive area (ESA) and requires continued protection under the I-880/92 Interchange Project.

3.7.2 Permanent Impacts

The impacts to jurisdictional wetlands are the same for each alternative. Wetlands located in the northwest, northeast, and southeast quadrants (see Appendix D) of the I-880/92 interchange are permanently and adversely affected. Impacts include traversing the wetlands with vehicles and equipment, staging of materials near or within the wetlands, and erection of temporary structures and embankments near or within the wetlands. Upon completion of the project, none of the wetlands in three

quadrants are expected to remain intact. There are no practicable alternatives for avoiding adverse impacts to the wetlands (see Finding in Appendix D).

The wetlands total less than 0.132 ha (0.326 acre) in size and lack important wetland species. Creating a new wetland within the project area is proposed to offset the loss of the existing wetlands.

None of the alternatives have permanent, construction, temporary or other impacts upon this wetland area west of the Industrial Boulevard interchange and the Union Pacific Rail Road tracks (as identified for the San Mateo-Hayward Bridge and Trestle Widening Project).

3.7.3 Temporary Impacts

All project impacts to wetlands are permanent.

3.7.4 Mitigation Measures

A wetland mitigation plan has been initiated to mitigate the loss of 0.132 ha (0.326 acre) of jurisdictional wetlands identified by the ACOE. The mitigation proposed establishes a single new wetland at a 2:1 ratio to be located adjacent to the berm in the southeast quadrant (see Appendix D). The new wetland is more isolated from roadways, has a potentially higher quality than the existing wetland areas, and is expected to be self-sustaining. Appropriate actions would be taken to ensure the establishment and viability of the wetland by monitoring and recommending changes as needed. Maintenance is to be provided to protect the wetland as needed.

The wetland located west of the Industrial Boulevard interchange and the Union Pacific Rail Road tracks (near the Mt. Eden Overhead), identified as part of the San Mateo-Hayward Bridge and Trestle Widening Project, would not be affected as a result of the I-880/Route 92 Interchange Reconstruction Project, and would continue to be designated as an ESA under this project as well.

3.8 Vegetation

The project study area contains two general biotic communities. The first is ruderal grass fields, composed primarily of exotic species that are opportunistic and rapidly populate new and disturbed habitats. Dominant species present include ripgut brome (*Bromus diandrus*) and barley (*Hodeum depressum*), with a mature height of

approximately 1.06 m (3.5 feet). Additional species include cheese weed (*Malva parviflora*) and wild radish (*Raphanus raphanistrum*), ice plant (*Carpobrutus edulis*), English ivy (*Hedera helix*), photinia (*Photinia sp.*), and melaleuca (*Melaleuca sp.*). No invasive species have been identified in the project area, but should such species be discovered they would be controlled in accordance with procedures described in the federal government's Invasive Species Management Plan, established by Executive Order 13112 in February, 1999. That order defines "control" as "eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions."

The second community is mature landscaped vegetation, consisting of ornamental trees and shrubs, and is primarily located along the edges of the existing interchange on- and off-ramps, and within the existing interchange ramp loops. Small- to large-sized trees are also scattered throughout the study area and include coastal redwoods (*Sequoia sempervirens*), eucalyptus (*Eucalyptus sp.),* Monterey pine (*Pinus radiata*), Australian tea tree (*Leptospermum laevigatum*), willows (*Salix sp.*), oaks (*Quercus sp.*), and acacia (*Acacia sp.*).

The impacts to vegetation are the same for each alternative.

3.8.1 Affected Environment

Most of the area in the I-880 right-of-way was graded and paved in conjunction with the I-880 widening project. Sound walls have replaced much of the vegetation that previously existed. The majority of existing vegetation is located within and adjacent to the cloverleaf loop ramps of the existing interchange. Landscaping outside of the project right-of-way occurs in the backyards of adjacent homes.

3.8.2 Permanent Impacts

For all alternatives, there are no undisturbed, cultivated or landscaped areas within or adjacent to the project limits with natural or unique special vegetation that would suffer permanent and adverse impacts. The areas encircled by the loop ramps of the existing interchange and some of the yards of properties to be acquired for the project contain mature trees. The removal of these mature trees constitutes a permanent impact.

3.8.3 Temporary Impacts

The removal of vegetation from some of the yards to be acquired constitutes a short-term, adverse impact.

3.8.4 Mitigation Measures

Where possible, uprooted and mature trees are to be saved for replanting in other locations. For all alternatives, interchange areas would be landscaped and replanted with native and other appropriate species. Plantings would be monitored and maintained regularly until they are established. A landscape plan that is to be developed as part of a future landscape project would include replacement plantings with irrigation where feasible within the new project right-of-way. The City of Hayward would be consulted in the development of the landscape plan. Caltrans is responsible for the maintenance of the landscaped areas, but the City of Hayward may accept responsibility and perform the maintenance.

3.9 Wildlife

The project's impacts on wildlife are the same for each alternative.

3.9.1 Affected Environment

Observed wildlife in the project area includes birds that live in and forage on vegetation in the area such as house finch (*Capodacus mexicanus*), house sparrow (*Passer domesticus*), rock dove (*Columba livia*), and European starling (*Surnus vulgaris*).

Other wildlife in the area may include raccoons, opossums, rodents, and other animals that have adapted to urban environments.

3.9.2 Impacts

None of the alternatives have permanent or temporary impacts, or adversely affect native, unique, or protected wildlife habitat areas in the project limits.

3.9.3 Mitigation Measures

Prior to construction the project area will be surveyed for nesting habitats. If habitats are identified, removal of vegetation will be delayed until the end of the nesting season.

3.10 Threatened and Endangered Species

The project's impacts on threatened and endangered species are the same for each alternative.

3.10.1 Affected Environment

In 1992, field surveys and review of sighting records yielded a determination of no sensitive plant or animal species in the study area. A list of threatened and endangered species with potential to exist within the I-880/Route 92 project area was obtained from the United States Fish and Wildlife Service (U.S. FWS). No sensitive species were identified by the U.S. FWS as occurring in the project area (see copy of the letter in Appendix F).

In 1997, an updated list was requested from U.S. FWS (see Appendix F) and wetland areas that had developed in association with roadway drainage in three of four quadrants and were surveyed. No sensitive species were identified at the project site.

An updated list was received from the U.S. FWS in 1999 (see Appendix F), and subsequent species list updates available on the U.S. FWS website were reviewed. No threatened or endangered species were identified as occurring in the project area.

No Federal or California endangered, threatened, candidate or other sensitive species occur in the project area. In a letter dated November 8, 2000, the U.S. FWS concurred with Caltrans' finding (see Appendix F) that the proposed project is not likely to adversely affect vernal pool tadpole shrimp (*Lepidurus packardi*), California Red-legged frog (*Rana aurora draytonii*), or vernal pool fairy shrimp (*Branchenicta lynch*), which are known to occur in the region. In 2002, the sensitive species list, which is now available for viewing on the U.S. FWS website, was reviewed again and found to be unchanged since 2000 with respect to the project location.

3.10.2 Impacts

The project does not have permanent or temporary impacts on threatened, endangered or other sensitive species.

3.10.3 Mitigation Measures

Since there are no expected impacts on sensitive species, no mitigation measures are proposed.

3.11 Land Use, Planning, and Growth

Hayward is an urbanized city on the eastern side of the San Francisco Bay between the cities of San Lorenzo to the northwest, Castro Valley to the northeast and Union City to the south. The land was originally developed in the 1850s and supported farming and ranching. Over the years, Hayward became more and more urban, with intercontinental train service and an influx of automobile traffic with the opening of the Hayward-San Mateo Bridge in 1919. In the 1950s, the Nimitz freeway was opened and the city's population increased 5-fold to 72,000 in 1960. Industrial development in the 1960s and 1970s further increased housing needs and the city accommodated this growth with multifamily housing. Townhouse and infill development was prevalent in the 1990s.

The study area extends along either side of I-880 (between the West Winton Avenue Interchange and West Tennyson Road Interchange) and Route 92 (between the Santa Clara Street intersection and the Industrial Boulevard Interchange). There is no land available for development or redevelopment for commercial/industrial uses in the study area.

3.11.1 Affected Environment

The land uses adjacent to Route 92 (see Figure 3.11-1) are predominantly single-family residences. Nearby land uses north of Route 92 include a condominium complex, Eden Garden Elementary School, Ochoa Intermediate School, Chabot College, Rancho Arroyo Park, and Mount Eden Cemetery. South of Route 92, land uses include Mt. Eden Park, and an electric transmission line corridor within the Eden Greenway. To the west and beyond the Route 92/Industrial Boulevard interchange are industrial uses and a railroad corridor. See Figures 3.11-1 and 3.11-2 for surrounding land uses and public facilities.

The neighborhoods in the area are the Mt. Eden Neighborhood Planning Area (adjoining Route 92 to the north) and the Glen Eden Neighborhood Planning Area (adjoining Route 92 to the south). The Southgate Neighborhood Planning Area is to the east of the Mt. Eden and Glen Eden Neighborhood Planning Areas. The Santa Clara Neighborhood Planning Area is bounded on the west by I-880 and the south by Route 92. Also located in the study area is the Schafer Park area of the Harder/Tennyson Neighborhood Planning Area. It is bounded on the west and south by I-880, north by Route 92 and West Harder Road, east by Underwood Avenue and Jennings Way. Figure 3.11-3 shows the locations of the planning areas. Figure 3.11.4 shows the census tracts surrounding the project area.

The Santa Clara Neighborhood Planning Area is located in the northeastern quadrant and east of I-880, with A Street as its northern boundary and Route 92/Jackson Street along its southeast boundary. To the east, this neighborhood planning area is bounded by the Union Pacific Railroad tracks. The Santa Clara Neighborhood Planning Area includes Census Tract 4368 of the study area as well as another Census Tract not included in the study area. A large collection of county and other public agency offices forms this area's employment center. Also located in this planning area is Birchfield Park, a neighborhood park encompassing 2.26 ha (5.6 acres), bordering a section of single-family residences that were built in the 1950s and 1960s. Within the planning area, the residential area west of Amador Street is also known as the Parkmead/Parkwood neighborhood. To the east of Santa Clara Street, other single-family residences are located adjacent to high-density residential and commercial areas. Park Elementary School and playground are situated in the center portion of the Santa Clara Neighborhood Planning Area.

The Southgate Neighborhood Planning Area is located in the southwestern and northwestern quadrants of the study area and is bounded by West Winton Street on the north, Hesperian Boulevard on the west, West Tennyson Road on the south, and I-880 in the east. Census Tracts 4370 and 4373 comprise this area and encompass a number of nonresidential and residential uses, which are characterized by single family residences built in the 1950s and 1960s. The Southland Shopping Center, with large parking areas, occupies the northern section of the Southgate Neighborhood Planning Area. The Southgate Swim Club, a private nonprofit recreational facility, and the Alameda County Maintenance Yard are also located in this area. Crossing this area south of Route 92 is a segment of Eden Greenway, which is a linear park mainly consisting of grassy areas through which high voltage, overhead electric lines run. The Greenway has a length of several kilometers in Hayward. The Greenway segments in the study area do not appear to be as intensely used as some of the other parks in the study area such as Birchfield Park. Two public schools (Southgate Elementary and Martin Luther King, Jr. Intermediate School) and St. Rose Hospital are also located in this part of the Southgate Neighborhood Planning Area.

A portion of a third neighborhood planning area, the Harder-Tennyson Planning Area is also located in the study area. This portion is the Schafer Park neighborhood, a triangular area bounded on the north by Harder Road, on the west and south by I-880, and on the east by Underwood Avenue and Jennings Way. It

contains low and medium density housing, built in the 1950s and 1960s, and has other nonresidential uses including the office/retail area at the Jackson Street and Santa Clara Street intersection. A segment of the Eden Greenway, which is described above, and two neighborhood parks (Eldridge and Schafer parks) are located adjacent to two school sites (Eldridge Elementary and Schafer Park schools) in the neighborhood. The one fire station in the study area is located in the vicinity of the office/retail area where Santa Clara Street, Jackson Street, and Harder Road converge.

The neighborhood plans for each of these planning areas conform to the City of Hayward General Plan. The General Plan also supports the upgrade of the I-880/Route 92 interchange under strategy 2.3.2 of Policy 2.3 (improve and complete freeway interchanges to facilitate traffic flow) and Goal 2 (expand or reconfigure the regional road network to reduce through traffic on city streets) of the Circulation Element (as amended 2/24/98). Figure 3.11-3 shows these planning areas around the proposed build alternatives.

3.11.1.1 Land Use Trends

The City of Hayward has grown from its incorporation in 1876 into a thriving city incorporating residential, commercial and industrial land use components. During the 1950s Hayward experienced explosive growth during the post-war housing construction boom, transforming the City into a suburban bedroom community. During the late 1960s and 1970s industrial development within Hayward increased, creating numerous employment opportunities. This was followed by a focus on development of multifamily housing to accommodate population increases. Multifamily housing construction continued into the 1980s, giving way to single-family detached home infill development that dominated in the 1990s. Because most available land in Hayward has been developed for housing, commercial, industrial or other urban uses, the City is now focusing on maintaining and enhancing existing neighborhoods, business districts, and surrounding open space.

More than 70 percent of Hayward's single-family detached homes were built between 1950 and 1960, followed by gradual development in the period between 1960 and 1990. Development of single-family homes increased between 1990 and 2000, whereas relatively few multi-family units were built. A recent estimate is that as of January 2001, there were 46,345 housing units in Hayward. Annual average housing construction since 1990 has been approximately 272 units, increasing to 318

units if only considering 1999 through 2001. It is estimated that Hayward could potentially see an additional 5,000 housing units developed, based on existing General Plan policies.

New commercial and industrial space development increased between 1995 and 1998 when it peaked at 1.2 million sq. ft. during 1998. Since 1998, development of new commercial and industrial space has gradually declined, reaching a level of 0.46 million sq. ft. in 2000 (based on building permit application approvals). The City of Hayward General Plan (adopted and amended in 2002) states that the current estimate of warehouse, manufacturing, and research and development building space totals approximately 45.6 million sq. ft.

The pattern of land development in the study area along with both I-880 and Route 92 has evolved along with the land use changes experienced city-wide, transitioning from a rural network that once served agricultural activities conducted in and around the city of Hayward to what is now primarily residential.

Association of Bay Area Governments' (ABAG) projections provide information on future development potential. As of 1985, the study area was estimated to contain 2 ha (5 acres) available for residential development. Assuming a high-density development of buildable acres, approximately 140 additional dwelling units could be built on this acreage. Some of these may have already been developed as of 1996. Most housing units for future construction in Hayward are expected to be single-family residences in subdivisions, and to a lesser extent, condominiums, town homes, and single-lot infill.

No land is noted to be available for development or redevelopment for commercial or industrial uses in the study area.

3.11.2 Impacts to Plans and Policies

The City of Hayward General Policies Plan, amended in February 1998, identified the I-880/Route 92 interchange upgrade as an important element in the city's transportation improvements program. The policies plan established Policy 2.3 Improve and complete freeway interchanges to facilitate traffic flow, which included a commitment to "upgrade the I-880/Route 92 interchange consistent with City requirements for ensuring access to Winton Avenue and minimizing adverse impacts on surrounding neighborhoods" (Strategy 2.3.2). With a stated goal of "minimizing adverse impacts of regional traffic on existing neighborhoods," the General Policies

Plan further established Policy 3.1: "Regional traffic which travels through Hayward to and from the San Mateo Bridge and along Mission Boulevard should be addressed in order to reduce long-standing congestion while protecting the quality of life and integrity of the downtown and existing neighborhoods."

Neighborhood plans throughout the study area have addressed proposed major transportation improvements and have anticipated impacts associated with improvement alternatives. In each case, planning groups were focused on preservation of neighborhood character.

The 1996 Southgate Neighborhood Plan identified the I-880/Route 92 interchange project as an issue of primary focus. The Southgate Task Force supported the "no build" alternative, expressing concerns that the proposed new interchange "would unduly affect the neighborhood with new sound walls and structures up to 33 feet above the existing structure and would require the taking of several homes in the area to enlarge the freeway right-of-way." The plan also acknowledged task force concerns regarding "severe congestion of the local arterial streets" and "increased noise and air pollution problems" during construction of the new interchange. Neighborhood Preservation Policy 1.2 stated: "The Southgate neighborhood strongly opposes the proposed Interstate 880/Route 92 Flyover and supports the 'no build' alternative as the only acceptable project."

The 1995 Santa Clara Neighborhood Plan addressed the need for the "92 flyover" to alleviate congestion on Jackson Street. It recognized the Route 92/I-880 Citizens Advisory Committee as responsible for liaising with Caltrans to address neighborhood concerns regarding flyover alignment, structure height, and potential property acquisition requirements.

The 1996 Glen Eden Neighborhood Plan recognized the need for the interchange improvement project to "eliminate weaving, provide an HOV connection and provide added capacity for traffic eastbound Route 92 to northbound I-880 and southbound I-880 to westbound Route 92." The plan acknowledged the City's Citizen Advisory Committee for working with Caltrans to select a preferred alignment alternative.

The 1990 Mt. Eden Neighborhood Plan established a policy to "channel through traffic onto arterials" and away from residential streets. Suggestions for addressing neighborhood concerns included provision of an "overpass, underpass or fly over at Winton and Hesperian" streets, an important arterial intersection near the I-

880/Route 92 interchange that becomes congested when traffic flow on I-880 and Route 92 breaks down during peak periods.

The 1989 Harder-Tennyson Neighborhood Plan addressed the possibility that additional right-of-way may be required to accommodate improvements to the Nimitz Freeway.

Even given the concerns referenced above, the proposed project generally conforms to the requirements for transportation improvement projects set forth by the City of Hayward General Plan as well as those of the impacted neighborhoods.

3.11.2.1 Land Use/Housing Policies

A build alternative would be in conformance with the Hayward General plan inasmuch as it improves the capacity of the regional road network, is a state project addressing regionally caused traffic congestion, minimizes diversion of freeway traffic to local streets, and contributes to providing adequate road capacity to meet the needs of Hayward.

The build alternatives support the planning policies for preserving existing housing to the extent that they have been designed to cause the least possible impacts on existing housing. However, given that the build alternatives do not completely avoid the displacement of housing, the project is not fully compatible with this aspect of the general plan policy.

Other elements of local and neighborhood plans relate indirectly to land use, such as coordinating and improving the circulation system, lessening through-traffic on city streets, and encouraging state and federal projects that address traffic congestion caused by regional travel patterns. The build alternatives support these elements of plans and policies.

3.11.2.2 Circulation/Transportation Policies

Hayward's 2000 General Plan Circulation Element states a policy to reduce through traffic on major arterials. A comprehensive, integrated approach is desired to reduce congestion. One strategy mentioned in the Plan is to improve and complete freeway interchange projects to facilitate traffic flow. The "880/92 Interchange Reconstruction Project" is listed as a proposed transportation improvement in the Plan.

3.11.2.3 Economic Development Policies

The City of Hayward's Economic Development Element in the 2000 General Plan lists, among others, supporting economic growth and providing necessary support to businesses as goals to encourage Hayward's long-term health and vitality. Traffic congestion can be seen as a discouragement to development by hindering the movement of people and goods to, from, and through Hayward. The General Plan also cited service by regional highway and transit systems as one of the top three criteria that businesses considered most important when considering an office location. Other policies include adaptive reuse and redevelopment of existing facilities and increasing mixed land uses, given the scarcity of vacant land for redevelopment.

3.11.2.4 Property Values

All alternatives are expected to have minimal impact to property values in the neighborhoods that are directly affected. Those neighborhoods are already contiguous to highway facilities and would not be divided or isolated by any facilities of the build alternatives. Values of the properties to be partially acquired may decrease slightly. The owners of such properties would be financially compensated for this impact to their properties. The general impacts presented by all the build alternatives—noise and visual—have little effect on property values in surrounding neighborhoods including those with minority and low income populations.

3.11.2.5 Neighborhood Planning Districts

Hayward's 1990 General Plan provided for the preparation of neighborhood plans. Three of the seventeen planning areas in the City are in the study area for the I-880/Route 92 interchange project. These three planning areas are the Santa Clara, Southgate and Harder-Tennyson Neighborhood Areas. The Santa Clara Neighborhood Plan, adopted in July 1995, set forth policies to preserve to the greatest extent possible, the existing housing stock and to mitigate noise and visual impacts of projects according to CEQA. Alternative 2C Variation and Alternative 2D Variation both result in the loss of housing units in the Santa Clara Neighborhood planning area, while Alternative H, the preferred alternative, does not. The Harder-Tennyson Neighborhood Plan was completed in October, 1989, and did not set forth policies which conflict with the project. The most recent Southgate Neighborhood Plan was prepared in October, 1996 and supported the No Build

Alternative to the I-880/Route 92 interchange project. It should be noted that this document was published before the completion and circulation of the Supplement to the Draft Environmental Impact Statement/Report, which offered an additional build alternative, Alternative H, with less impacts than the build alternatives that were being considered in 1996.

3.11.2.6 Population Growth Policies

The City of Hayward's "Growth Management Element," adopted July 13, 1993, with amendments as of December 14, 1993, discusses growth issues, noting the potential to accommodate new population growth in the hillside areas. Although there is a potential to accommodate new population growth by infill and redevelopment in the flatlands area, this may be offset by the need to provide recreational open space in some flatlands area. The Housing Element of the 2000 Hayward General Plan proposes that an adequate supply of all housing types is made available to all living in the city. The City's Growth Management Element urges consideration of alternative modes of transportation and improved traffic circulation as long as it does not adversely affect existing, established neighborhoods. Planned land use with respect to growth in Hayward, according to the Land Use Element of the 2000 General Plan, takes on the principles of "smart growth," the basic concept of which proposes a more efficient use of the existing built environment to reduce unnecessary sprawl.

3.11.3 Land Use Impacts

Partial and total acquisitions vary according to alternative, as summarized in Table 3.11-1 and presented in Figures 3.11-5 through 3.11-10. Full acquisitions involve acquisitions of the entire affected parcel of land (including structures), while partial acquisitions involve acquisition of a portion of the property, often land only, without affecting the structures.

Each of the alternatives presented below involve temporary or permanent construction easements (see Table 3.11-1). A temporary construction easement is an easement to provide temporary access to perform construction. The resident/owner retains ownership, and the easement expires upon completion of construction. A permanent easement is an easement in which Caltrans retains permanent rights to access and performs maintenance when necessary.

3.11.3.1 Land Use Impacts for Alternative 2C

Alternative 2C Variation involves fifty-seven full and three partial acquisitions. The partial acquisitions are not expected to cause a discontinuation of the existing land use.

Table 3.11-1 Right of Way Requirements – Comparison of the Build Alternatives

	Alternative 2C Variation	Alternative 2D Variation	Alternative H
Full Acquisitions	57 residential	14 residential, 1 non-residential	12 residential
Partial Acquisitions and Easements	3 residential, 3 business	3 residential, 5 business	6 residential, 5 non-residential
Permanent and Temporary Easements	7 residential	21 residential	39 residential, 1 utility
Temporary Easements Only	120 residential	148 residential	15 residential
Other	0	0	1 aerial easement over a railroad corridor and portions of three streets

3.11.3.2 Land Use Impacts for Alternative 2D

Alternative 2D Variation involves full acquisition of fourteen residential properties and one non-residential property (Southgate Swim Club), and three partial acquisitions [including the acquisition of an approximately 7.06 m^2 (76 sq. ft.) strip of the condominium parking area on Stanhope Lane]. The partial acquisitions are not expected to affect the existing land use or the amount of parking.

3.11.3.3 Land Use Impacts for Alternative H

The right-of-way requirements of Alternative H include twelve full acquisitions, eleven partial acquisitions, forty temporary/permanent easements, fifteen temporary easements, one aerial easement, and portions of three streets. (These are listed in Appendix G.) Only the full acquisitions involve a conversion of land use. The partial acquisitions and easements usually require only a small amount of property and allow existing land uses to be retained on the remainder of the properties.

The widening of Route 92 eastbound, the realignment of the Route 92 eastbound to I-880 southbound connector, and the provision of new sound walls along Route 92 require:

- Full acquisitions and removal of twelve residences from 25966 to 26050 Peterman Avenue
- Partial acquisitions and permanent easements of residential properties at the ends of these twelve residences
- A partial acquisition of a small portion of Peterman Avenue in front of the twelve residences
- Temporary [3.0m (10 feet) during construction] and permanent easements [1.22m (4 feet)] of additional residences on Peterman Avenue, Wauchula Way, and Tallahassee Street (see Figures 3.11-7 and 3.11-8 for right-of-way requirements on Peterman Avenue and Wauchula Way)

The widening and realignment of Route 92 westbound requires partial acquisitions and easements of condominium developments in the vicinity of Calaroga Avenue and Stanhope Lane, and temporary/permanent easements of residential properties on Lindenwood Way (Figure 3.11-8).

Construction work west of the Route 92/Industrial Boulevard interchange requires an aerial easement above the tracks of the Union Pacific Railroad (Figure 3.11-9).

East of the I-880/Route 92 interchange, the construction of new sound walls along Route 92 westbound requires ten temporary/permanent easements on Willimet Way, and twelve temporary easements of residences on Willimet Way, Townsend Avenue, and Teasdale Place (Figure 3.11-10).

To accommodate sound walls and the widening of Route 92 eastbound from the interchange to the terminus of the freeway at the intersection of Jackson and Santa Clara Streets and the receiving lane downstream from the intersection, Alternative H requires three temporary easements on Booker Way, seven permanent easements on Booker Way, and partial acquisitions of small portions of West Harder Avenue, Santa Clara Street, Gateway Plaza (three parcels), and a service station at the corner of Santa Clara and Jackson Streets (Figure 3.11-10).

3.11.4 Growth Inducement Impacts

Despite the economic downturn and population declines in the Bay Area since 2001, the Bay Area remains a desirable place to live in the long-term because of physical,

natural, and socio-economic factors. ABAG, in Projections 2000, has projected continued population growth in the Bay Area through 2025. To accommodate the projected growth, local governments, congestion management agencies, utility districts and companies in the Bay Area adopt plans and approve projects for additional homes, businesses, infrastructures, and roads.

Population growth is factored into trip generation and traffic forecast models such as MTC's "Baycast." MTC's traffic modeling is in turn used in regional air quality modeling for projects in the RTP and the TIP. The environmental impact report for the most recent RTP (2001) concludes that the air quality impacts of the projects in the "Environmentally Superior Alternative" of the RTP, including the proposed I-880/Route 92 Interchange Project, are less than significant. The significant impacts of the Environmentally Superior Alternative relate to cumulative energy usage, loss of critical habitats for endangered, threatened, candidate, and/or special status plant and animal species, potentially adverse views/aesthetics and visual character in freeway and transportation corridors, and conversion of agricultural and open space lands to transportation uses and new developments.

The I-880/Route 92 interchange is centrally located in the Bay Area and facilitates travel in the north, west, south, and east directions. The areas around the interchange are built-out, and the potential for additional growth in the city of Hayward is limited. According to the Hayward General Plan, about 214 acres of currently vacant land is zoned for residential development. This translates into 5,000 additional housing units, none of which are contingent on the construction of the proposed I-880/Route 92 interchange project. Thus, construction of the proposed I-880/Route 92 interchange project would not provide access to land that was previously inaccessible, or open up areas that are undeveloped, or induce unexpected growth in the surrounding areas.

The proposed I-880/Route 92 interchange project does provide some additional capacity for projected growth in traffic as well as some congestion relief. However, the proposed project does not add so much more capacity nor relieve traffic congestion to such an extent that people would want to live further away. The main reasons that people would want to live further away in places such as Danville-San Ramon-Dublin-Pleasanton-Livermore, Walnut Creek-Concord-Pittsburg-Antioch, Vallejo-Fairfield, Tracy, and Gilroy-Morgan Hill are affordable housing, better quality schools, and less inner city core problems. These are more meaningful than any reductions in commute time, fuel usage, and expenditures for fuel that can be

provided by the proposed project. Thus, the proposed I-880/Route 92 interchange project itself would not be growth inducing to the suburban communities of the Bay Area or to outlying counties.

3.11.5 Growth Inducement Mitigation Measures

No mitigation is proposed.

3.11.6 Land Use Planning and Policy Mitigation Measures

Selection of a build alternative is compatible with most city and neighborhood plans and policies. No land use mitigation measures are proposed to offset the land use conversions that occur with any build alternative.

3.12 Community Impacts (Social, Economic) and Environmental Justice

3.12.1 Affected Environment

City of Hayward Planning Areas located in the combined study area for all alternatives include the Mt. Eden, Glen Eden, Southgate, Santa Clara/Parkmead, Jackson Triangle, and Shafer Park/Harder Tennyson Neighborhood Planning Areas. Socioeconomic characteristics of these neighborhoods were obtained from neighborhood plans, field observations, and 2000 Census data:

- Jackson Triangle neighborhood from Census Tract #4366
- Santa Clara/Parkmead neighborhood from Census Tract #4368
- Schafer Park/Harder-Tennyson neighborhood from Census Tract #4374
- Southgate neighborhood from Census Tracts #4370 and #4373
- Glen Eden neighborhood from Census Tract #4371
- Mt. Eden neighborhood from Census Tract #4372

Tables 3.12-1 to 3.12-3 summarize demographic data, income data, residential characteristics, and housing inventory from the 2000 Census for these census tracts.

Together, these neighborhoods/census tracts account for 28% of the total year 2000 population for the city of Hayward. They also accounted for 29% of the minority population in Hayward. Census tract #4366 ranked first in number of minorities in 1990, but that tract was split into Census tracts #4366.01 and #4366.02 in 2000. Census tract #4366.01 ranked first in number of minorities in 2000, but is excluded

from the study because it no longer adjacent to any area bordering any of the build alternatives. Census tract #4371, Hayward's largest census tract at 48.4 km^2 (18.7 mi2), ranked 10^{th} in number of minorities.

The 2000 housing inventory data show that in five of the seven Census Tracts surrounding the project area (#4370, #4371, #4372, #4373, #4374) the percentage of single-family units was greater than the city of Hayward average of 56.95%. The remaining census tracts (#4366.02 and #4368) have a high number of multi-family housing with five or more units. In 2000, all seven of the census tracts surrounding the project area had vacancy rates lower than the city of Hayward average of 2.36%.

The 2000 data on residential characteristics show that all the census tracts surrounding the project area, except #4366.02 and #4368, have higher percentages of owner-occupied housing units than for all of Hayward (53.35%). All of the census tracts, except #4371, #4370 and #4374, have median housing values greater than for all of Hayward ($223,800). The median contract rent for all census tracts exceeds the median contract rent for Hayward ($849), except for census tracts #4366.02, #4368, and #4373.

The 1999 income data shows that all of the census tracts surrounding the build alternatives have per capita incomes greater than the median for all of Hayward ($19,695), except for #4374, $34373, and #4366.02 which fell consecutively after the City of Hayward average at $18,779, $18,357 and $17,783, respectively.

Table 3.12-1 Demographic Characteristics

2000		Census Tract						
		4371	4372	4366.02	4368	4370	4373	4374
	Hayward	Glen Eden	Mt. Eden	Jackson Tri.	Santa Clara	Southgate	Southgate	Schafer Park
Total Population	140,030	8,721	6,239	4,344	3,790	3,430	3,720	3,357
Number of Households	44,804	2,704	2,172	1,554	1,337	1,252	951	948
Average Household Size	3.08	3.22	2.80	2.80	2.83	2.73	3.43	3.54
Number of Families	31,931	2,076	1,500	1,002	910	838	792	793
Persons per Family	3.58	3.67	3.35	3.44	3.36	3.36	3.71	3.79
Families: Households	71.27%	76.78%	69.06%	64.48%	68.06%	66.93%	83.28%	83.65%
Population Composition								
White alone	29.21%	23.92%	34.22%	17.98%	28.42%	38.28%	26.67%	31.81%
Black alone	10.60%	9.47%	9.25%	15.77%	13.54%	9.83%	9.69%	5.66%
American Indian/Alaskan alone	0.41%	0.40%	0.27%	0.41%	0.45%	0.58%	0.55%	0.66%
Asian/Pacific Islander alone	20.50%	34.61%	32.54%	20.23%	18.13%	21.34%	27.25%	14.42%
Other alone and Two or more	5.12%	6.65%	4.92%	5.11%	5.59%	6.88%	7.28%	4.29%
Hispanic origin, any race	34.17%	24.95%	18.80%	40.49%	33.88%	23.09%	28.56%	43.16%
Age Composition								
under 5 years	7.86%	7.19%	6.06%	9.88%	7.86%	6.03%	7.16%	7.80%
5-17 years	18.92%	18.55%	16.36%	17.73%	16.94%	17.29%	22.97%	20.23%
18-24 years	10.87%	10.11%	9.31%	12.50%	12.01%	7.70%	10.52%	9.77%
25-44 years	33.37%	30.46%	30.93%	39.55%	35.36%	32.39%	29.66%	29.67%
45-64 years	18.82%	22.34%	22.39%	13.24%	17.70%	22.89%	20.21%	20.32%
65+ years	10.16%	11.35%	14.94%	7.11%	10.13%	13.70%	9.48%	12.21%
Median age (years)	31.9	34.5	36.5	28.9	32.0	37.9	32.8	34.1

Table 3.12-2 Income and Poverty Characteristics

2000		Census Tract						
	Hayward	4371 Glen Eden	4372 Mt. Eden	4366.02 Jackson Tri.	4368 Santa Clara	4370 Southgate	4373 Southgate	4374 Schafer Park
Total Number of Households	44,902	2,704	2,172	1,554	1,337	1,252	951	948
1999 Median Household Income	$51,177	$56,403	$54,056	$38,969	$52,022	$56,719	$58,250	$56,488
1999 Percentage of Households Earning								
<$15,000	10.14%	8.01%	10.00%	14.07%	11.75%	5.41%	5.40%	6.39%
$15,000- 24,999	9.63%	7.42%	12.62%	14.13%	6.69%	4.94%	7.62%	10.26%
$25,000- 34,999	10.82%	8.41%	6.75%	15.67%	14.05%	7.32%	11.53%	8.69%
$35,000- 49,999	17.59%	18.27%	17.12%	17.28%	15.46%	18.95%	15.66%	16.34%
$50,000- 74,999	23.57%	29.15%	19.37%	18.24%	23.12%	32.01%	26.46%	30.16%
$75,000+	28.26%	28.75%	34.14%	20.62%	28.92%	31.37%	33.33%	28.17%
Percentage of Persons Below Poverty Level	10.01%	6.42%	7.21%	9.36%	8.44%	5.37%	5.24%	7.25%
Total Number of Families	32,228	2,075	1,512	994	935	850	793	798
1999 Median Family Income	$54,712	$60,691	$62,500	$44,821	$55,938	$62,611	$61,027	$57,500
Percentage of Families Below Poverty Level	7.18%	7.82%	5.03%	6.94%	8.56%	3.53%	4.16%	5.26%

Notes:

-- The data for Tracts #4371 and #4372 include portions of San Lorenzo and Alameda County.

-- Low income (poverty) is defined by the Federal Highway Administration as “household income at or below the Department of Health and Human Services poverty guidelines.” The guidelines are a simplification of the poverty thresholds updated annually by the Census Bureau.

Table 3.12-3 Housing Characteristics

2000	Hayward	Census Tract 4371 Glen Eden	4372 Mt. Eden	4366.02 Jackson Tri.	4368 Santa Clara	4370 Southgate	4373 Southgate	4374 Schafer Park
Total Number of Housing Units	45,960	2,731	2,209	1,584	1,361	1,273	961	953
Single Family Units								
Detached	22,773	1,312	1,286	324	641	847	620	939
Attached	3,401	574	104	79	102	96	4	7
Multi-Family Units								
2-4 Units	3,352	196	30	50	53	27	119	0
5+ Units	14,133	522	427	1,131	565	297	210	7
Mobile Homes & Other	2,301	127	362	0	0	6	8	0
Percentage Single Family Units Attached and Detached	56.95%	69.06%	62.92%	25.44%	54.59%	74.08%	64.93%	99.27%
Total Occupied Housing Units	44,902	2,704	2,172	1,554	1,337	1,252	951	948
Percentage Owner-Occupied	53.35%	68.08%	65.79%	23.35%	50.26%	82.91%	61.41%	87.45%
Vacant Units	1,058	27	37	30	24	21	10	5
Percent Vacancy	2.36%	1.00%	1.70%	1.93%	1.80%	1.68%	1.05%	0.53%
Median Housing Value	$223,800	$205,300	$273,700	$229,700	$242,300	$221,700	$258,200	$218,300
Median Contract Rent	$849	$944	$1,016	$786	$836	$1,014	$605	$1,059

3.12.2 Permanent Community Impacts- Social and Economic

3.12.2.1 Community Impacts- Alternatives 2C and 2D Variations

The number of people displaced varies by alternative. Alternative 2C Variation, based on 2.76[1] persons/household and 57 residences affected, displaces an estimated 157 people. Alternative 2D Variation, based on the same assumption results in fourteen residences affected an estimated 39 people displaced.

Alternatives 2C and 2D Variations also require the partial acquisition of 3 non-residential parcels located in the southeastern quadrant along Jackson and Santa Clara streets. Two of the parcels are occupied by a service station and a shopping center (Gateway Plaza). The third lot is vacant and owned by the state. Narrow strips of land on these parcels along the streets are required for the project and the existing uses would not be affected. No structures would be displaced. In sum, no notable impairment of the use of these nonresidential properties occurs as a result of these partial acquisitions.

In addition to the displacements already mentioned, Alternative 2D Variation requires a portion of the Southland Mall and the Alameda County Maintenance Yard. The portion at Southland Mall is a portion containing parking spaces located relatively distant from the retail locations. Approximately 200 parking spaces would be lost, but no structures would be affected. This parking loss does not jeopardize the Mall's compliance with the City of Hayward's parking compliance, but may affect Southland Mall's ability to provide sufficient parking with future expansion. In addition, approximately 253.6 m^2 (2,730 sq. ft.) would be acquired from the maintenance yard but not any structures. Other impacts include loss of local access from Winton Avenue for vehicles using the Route 92 eastbound to I-880 northbound direct connector. The loss of Mall access at Winton Avenue could result in a decrease of patronage to the Mall, which is a source of revenue for the City.

Most notably, Alternative 2D Variation requires the full acquisition of the Southgate Swim Club. The swim club is located on a parcel about 0.53 ha (1.3 acres) in size and contains a large swimming pool, clubhouse, other facilities and parking area. The club operates on a limited membership basis and its members are largely residents of the Southgate neighborhood. Residents could feel an impact if there are

1 - According to 2000 Census data, a the number of households in census tracts #4368 and #4370 are 1,337 and 1,252, respectively, with average household sizes of 2.83 and 2.73, respectively.

no sites available for relocation in close proximity to the area and the swim club is forced to relocate outside the area or terminate operations. Other impacts include a loss of dues and possibly a loss of membership during the relocation. Also of concern were questions if there would be adequate mitigation funds to support building a new facility at a new site.

Changes to the character of each of the surrounding communities would be limited and localized. The reconstruction of the interchange would not divide or isolate portions of existing neighborhoods, nor change local circulation patterns. Fifty-seven residences on Willimet Way in Alternative 2C Variation and fourteen residences on Magnolia Street in Alternative 2D Variation would be demolished and replaced with sound walls or combination retaining walls/sound walls. This would result in a loss of neighbors, visual changes, and, possibly, a sense of community disruption for the remaining residences across and adjacent to the new sound walls. Also, with Alternative 2D Variation, the loss of the Southgate Swim Club would reduce recreational opportunities for the Southgate neighborhood and the members of the Southgate Swim Club.

3.12.2.2 Community Impacts- Alternative H

Alternative H requires the acquisition of twelve residences and displaces an estimated 38 individuals (based on 3.16 people/household , which is the average for Census Tract #4373, Block Group 1, according to Census 2000 population data).

As with Alternatives 2C and 2D Variations, the change to the character of the surrounding communities would be limited and localized with Alternative H. The proposed project would not divide or isolate portions of existing neighborhoods, nor change local circulation patterns. Alternative H results in the demolition and replacement of twelve residences on Peterman Avenue with a sound wall. Since Alternative H results in fewer residences replaced with a sound wall than Alternatives 2C and 2D Variations, the loss of neighbors, the visual changes, and the possible disruption to the community would be less severe. Also, Alternative H would not require the demolition of the Southgate Swim Club, thus retaining recreation opportunities for the Southgate neighborhood and members of the club.

3.12.2.3 Mitigation for Community Impacts- Social and Economic

The estimated maximum displacement for all alternatives of 157 people (Alternative 2C Variation—number of full acquisitions multiplied by the average number of

people per household for that block group) represents less than 0.5% of the study area's population and 0.11% of the city's population.

The estimated maximum number of persons displaced by the project is small relative to the population of Hayward.

According to Caltrans Guidelines regarding neighborhood cohesion, threats to such cohesion stem from the physical division of a neighborhood or to the isolation of a section of a homogeneous neighborhood. Because the project is a modification of an existing interchange in an established road system, the project neither bisects nor isolates areas within any identified neighborhood. Accessibility to and from the neighborhood in the project area remains unchanged. The build alternative may alleviate some of the congestion on local streets and, therefore, improve circulation patterns in the neighborhoods.

The impacts of Alternative H upon the housing stock, population, and the property tax base of Hayward is negligible because the number of residences (twelve) and occupants displaced (38, based on an average household size of 3.16 persons/household) is relatively small in comparison to the overall housing stock, population, and property taxes collected in Hayward.

Acquisitions and relocations would occur in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The State Uniform Relocation Assistance Program has been developed to assist displacees in successfully relocating homes and businesses, thereby mitigating relocation impacts. This program aims at meeting or exceeding the requirements of the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646). More information outlining the features of the State Uniform Relocation Assistance Program can be found in Appendix H.

Relocation assistance lessens the fiscal impacts of displacement. Impacts associated with displacement out of familiar neighborhoods and away from familiar neighborhood services are considered unavoidable adverse impacts.

No other measures beyond these are proposed for the acquisitions and relocations stated. Because of the concerns over potential impacts to the Southgate Swim Club and Southland Mall, Caltrans developed Alternative H. Alternative H maintains current access to Winton Avenue. With regard to noise barrier impacts on Mall visibility, the barrier may be eliminated if the sole beneficiaries of the noise barrier

are commercial properties. Alternative H avoids all impacts to the Southland Mall and Southgate Swim Club.

3.12.3 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President Clinton on February 11, 1994, directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse impacts of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

To determine if there are disproportionately high and adverse impacts to minority and low-income populations resulting from the proposed project, Year 2000 U. S. Census Bureau data for race and income characteristics were examined.

For evaluation of local population characteristics, the smallest geographic unit for which race and income characteristics are readily available is the census tract block group. Figure 3.12-1 shows the census tract block groups surrounding the project area. The census data of census tract block groups were compared with their parent census tract to gauge whether minority and low-income populations may be isolated or clustered within a census tract block group. If the percentage of minority or low-income populations in a census tract block group was more than three percent of the percentage of minority and low-income populations in the parent census tract, we surmised that a potential minority or low-income population cluster may be present, and Environmental Justice impacts could occur. If the percentage was less than three percent, an interpretation was made that minority and low-income populations are more dispersed or integrated over a larger area and impacts may be borne proportionately between minority and non-minority populations and low-income and non-low-income populations.

The I-880/Route 92 interchange is a component of the regional transportation network and an integral part of the transportation system providing for movement between the San Francisco East Bay and Peninsula communities. Therefore, the project has potential to affect not only those in the immediately surrounding communities, but also those using the interchange from the surrounding region. To evaluate whether there could be potentially disproportionate impacts to minority populations in the surrounding region, the Census data for surrounding counties was

examined. County and Census county division (CCD)[2] data were used to characterize minority populations in adjacent counties, and in adjacent areas within Alameda County.

3.12.3.1 Minority Populations

Local Area

Table 3.12-4 shows the racial composition of the populations of the seven census tracts and nine census tract block groups used to evaluate the surrounding project area. The data shows that the census tract block groups and their parent census tracts are quite diverse in racial composition. All the census tract block groups and their parent census tracts have more minorities—single-race, multi-race, and Hispanic-origin—than White/non-minorities. Three of the nine census tract block groups—#4366.02, Block Group 1, #4370, Block Group 1, and #4373, Block Group 3—have a comparable percentage of minorities as their parent census tracts; the other six census tract block groups have a percentage difference of between three and fourteen percent fewer minorities than their parent census tracts.

Within the project area, only two census tract block groups have specific minority groups whose percentage is more than three percent greater than the percentage of that minority group in their parent census tracts; these are Census Tract #4372, Block Group 3 with 21.99% of the population that is of Hispanic origin compared to 18.8% for its parent census tract, and Census Tract #4370, Block Group 2 with a 10.52% of its population that is "Other ethnic" alone or multi-race compared with 6.88% of its parent census tract. Thus, these two census tract block groups may have a cluster of a specific minority group. The other seven census tract block groups more closely reflect the population characteristics of their parent census tract.

Region

Review of County and CCD Census data showed that the Oakland CCD and the Fremont CCD to the north and south of the Hayward CCD, respectively, have higher percentages of minorities (single-race, multi-race, and Hispanic-origin) than White/non-minorities (74% minorities for Oakland CCD, 62% for Fremont CCD,

[2] A Census county division is a subdivision of a county that is a relatively permanent statistical area established cooperatively by the Census Bureau and state and local government authorities. The CCDs in which Alameda County is divided include Berkeley, Alameda, Oakland, Hayward, Livermore/Pleasanton, and Fremont.

59.5% for Hayward CCD); but the Livermore/Pleasanton CCD to the east of the Hayward CCD has a higher percentage of White/non-minorities than minorities (27.5% minorities). Alameda County as well as San Mateo County to the west, Santa Clara County to the south, and San Joaquin County to the east all have higher percentages of minorities (single-race, multi-race, and Hispanic origin) than White/non-minorities (59% minorities for Alameda County, 50+% for San Mateo County, 55% for Santa Clara County, and 53% for San Joaquin County); only Contra Costa County to the north has more White/non-minorities than minorities (42.5% minorities).

The Census data above generally indicate that there is a higher minority population than White/non-minority population in the multi-county area surrounding the project area. Assuming that there is a direct relationship between the composition of the population residing in the multi-county area and the vehicular trips on the highway system in the multi-county area, an inference can be drawn that a larger proportion of the vehicular trips through the project would be attributed to minority populations than White/non-minority populations.

Table 3.12-4 Environmental Justice: Minority Populations—Population Characteristics

	Census Tracts							Census Tract Block Groups								
2000	**4366.02**	**4368**	**4370**	**4371**	**4372**	**4373**	**4374**	**4366.02 BG 1**	**4368 BG 2**	**4370 BG 1**	**4370 BG 2**	**4371 BG2**	**4372 BG 3**	**4373 BG 1**	**4373 BG 3**	**4374 BG 3**
Population	4,344	3,790	3,430	8,721	6,239	3,270	3,357	2,992	1,547	1,344	770	1,131	1,228	805	870	925
Population Composition																
White alone	17.98%	28.42%	38.28%	23.92%	34.22%	26.67%	31.81%	17.18%	36.78%	38.69%	41.95%	36.52%	48.05%	35.28%	28.85%	37.51%
Black alone	15.77%	13.54%	9.83%	9.47%	9.25%	9.69%	5.66%	16.68%	7.63%	11.90%	8.05%	7.52%	5.70%	11.55%	5.29%	5.95%
American Indian or Alaskan alone	0.41%	0.45%	0.58%	0.40%	0.27%	0.55%	0.66%	0.23%	0.65%	0.97%	0.65%	0.44%	0.41%	0.25%	0.23%	0.22%
Asian or Pacific Islander alone	20.23%	18.13%	21.34%	34.61%	32.54%	27.25%	14.42%	19.79%	16.55%	18.08%	16.75%	22.19%	20.85%	26.46%	28.28%	13.19%
Other alone or 2+ races	5.11%	5.59%	6.88%	6.65%	4.92%	7.28%	4.29%	5.28%	6.79%	6.70%	10.52%	7.43%	3.01%	5.96%	7.47%	5.08%
Hispanic origin	40.49%	33.88%	23.09%	24.95%	18.80%	28.56%	43.16%	40.84%	31.61%	23.66%	22.08%	25.91%	21.99%	20.50%	29.89%	38.05%
White alone	781	1077	1313	2086	2135	872	1068	514	569	520	323	413	590	284	251	347
Black alone	685	513	337	826	577	317	190	499	118	160	62	85	70	93	46	55
American Indian or Alaskan alone	18	17	20	35	17	18	22	7	10	13	5	5	5	2	2	2
Asian or Pacific Islander alone	879	687	732	3018	2030	891	484	592	256	243	129	251	256	213	246	122
Other alone or 2+ races	222	212	236	580	307	238	144	158	105	90	81	84	37	48	65	47
Hispanic origin	1759	1284	792	2176	1173	934	1449	1222	489	318	170	293	270	165	260	352

Table 3.12-5 Environmental Justice: Low-Income Populations—Population and Housing Characteristics

		Census Tracts							Census Tract Block Groups								
2000									4366.02	4368	4370	4370	4371	4372	4373	4373	4374
	City of Hayward	4366.02	4368	4370	4371	4372	4373	4374	BG 1	BG 2	BG 1	BG 2	BG 2	BG 3	BG 1	BG 3	BG 3
% Population with Income Below Poverty Level	10.01%	9.36%	8.44%	5.61%	6.42%	7.32%	5.24%	7.25%	9.92%	7.12%	7.57%	0.93%	0.78%	11.17%	9.24%	0.58%	4.99%
People With Income Below Poverty Level	13,805	404	319	184	560	444	170	242	302	114	101	7	8	138	74	5	41
People with Income At or Above Poverty Level	124,160	3,911	3,461	3,242	8,161	5,713	3,076	3,097	2,741	1,488	1,233	745	1,012	1,097	727	860	781
Per Capita Income in 1999	$19,695	$17,783	$20,487	$23,837	$20,136	$22,877	$18,357	$18,779	$18,021	$19,193	$26,467	$20,512	$24,208	$20,821	$22,100	$18,555	$17,651
With wage or salary income	115,119	3,716	3,136	2,738	7,119	4,799	2,775	2,566	2,546	1,600	1,070	605	831	953	626	798	642
No wage or salary income	24,701	721	657	609	1,607	1,433	495	796	531	387	269	150	189	281	186	81	197
% Population Receiving Social Security Income	22.03%	15.48%	23.43%	24.36%	22.26%	31.31%	26.03%	34.81%	16.38%	39.78%	28.32%	23.27%	31.67%	40.27%	20.24%	31.57%	34.26%
People With Social Security income	9,870	673	888	835	1,942	1,953	851	1,169	503	637	379	175	323	497	164	277	288
People with No Social Security income	34,939	3,765	2905	2594	6,785	4,279	2419	2193	2,574	963	960	580	698	737	648	602	576
% Population Receiving Pubic Assistance Income	4.26%	4.40%	3.42%	3.90%	3.10%	2.70%	5.18%	3.77%	4.34%	3.35%	5.74%	2.86%	0.00%	3.36%	5.84%	4.62%	0.42%
People with public assistance income	1,910	191	130	134	270	169	170	127	133	54	77	21	0	41	47	41	4
People with No Public Assistance Income	42,899	4,247	3,663	3,295	8,456	6,063	3,100	3,235	2,944	1,547	1,262	734	1,020	1,193	765	838	835
% Owner Occupied	53.35%	19.11%	50.26%	82.91%	68.08%	65.80%	57.62%	87.45%	14.51%	85.71%	83.17%	84.33%	91.30%	80.34%	89.54%	48.99%	87.10%
Owner Occupied housing units	23,955	297	672	1,038	1,841	1,429	548	829	163	408	415	226	294	335	214	121	216
% Vacant Housing Units	2.30%	1.89%	1.76%	1.65%	0.99%	1.67%	1.04%	0.52%	1.92%	1.04%	1.77%	0.00%	0.00%	0.00%	0.00%	1.98%	0.00%
Vacant Housing Units	1,058	30	24	37	21	10	27	5	22	5	9	0	0	0	0	5	0
Median Home Value	223,800	229,700	242,300	221,300	273,700	258,200	218,300	223,800	222,200	245,600	196,000	252,900	228,900	261,000	263,400	242,900	222,100

3.12.3.2 Low Income Populations

Low-income is defined by the Federal Highway Administration as "household income at or below the Department of Health and Human Services poverty guidelines." The Department of Health and Human Services guidelines are, in turn, based on poverty thresholds updated annually by the U. S. Census Bureau. Table 3.12-5 includes information from census data for populations with income below poverty level for the census tracts and the census tract block groups adjacent to the project area. Included in Table 3.12-5 is information on income—wages, social security, and public assistance—and housing—owner-occupation, vacancy rates, and median house value—that can be indirect indicators of low-income populations.

The census data show that the percentage of the population with income below poverty level is less than ten percent for all census tracts and census tract block groups in the project area, except for Census Tract #4372, Block Group 3 (11.17%). Census Tract #4372, Block Group 3 is also one of two census tract block groups in which the percentage of the low-income population is more than three percent greater than the percentage of the low-income population in the parent census tract; the other is Census Tract #4373, Block Group 1. Census Tract #4372, Block Group 3 is adjacent to Chabot College, and Census Tract #4373, Block Group 1 extends from Peterman Avenue along the west side of I-880 to West Tennyson Road. Both of these census tract block groups have median home values that are above those of their parent census tracts and $38,000 to $40,000 more than the median home values for the entire city of Hayward. The 1999 per capita income of these two census tract block groups is also slightly more than the per capita income for Hayward. Just over forty percent of the population in Census Tract #4372, Block Group 3 receives social security income.

3.12.4 Impacts to Minority and Low Income Populations

The impacts of the proposed project that are of greatest concern to minority and low-income populations in the surrounding area are residential displacement, and air quality, visual, noise, and construction impacts. Other effects of the proposed project only occur within or are confined to the project area (I-880 and Route 92 rights-of-way) and will have no substantial impact on minority, non-minority, low-income, or non-low-income populations.

With regard to residential displacement, the preferred alternative has the most effect on the Peterman Avenue neighborhood in Census Tract #4373, Block Group 1,

Alternative 2C Variation on the Willimet Way neighborhood in Census Tract #4368, Block Group 2, and Alternative 2D Variation on Magnolia Street neighborhood in Census Tract #4370, Block Group 1. All three of these census tract block groups have more single-, multi-race, and Hispanic-origin minorities than White/non-minorities. The minority populations in these three census tract block groups are also eight to ten percent less than the minority populations in their parent census tracts. Consequently, these three census tract block groups are less likely to have clusters of minority populations. Therefore, the minority populations in these three census tract block groups are unlikely to bear residential displacement impacts that are disproportionately higher and more adverse than for White/non-minority populations in the same census tract block group.

From an income standpoint, of the three census tract block groups identified above, only Census Tract #4373, Block Group 1 has a potential low-income population cluster. According to the "*Update Relocation Impact Report and Addendum* (November 1998)," the houses to be acquired for the preferred alternative in this census tract block group have three to four bedrooms, two bathrooms, and 1,300 to more than 1,600 square feet of living area. This information generally indicates that these homes and their residents are above the low-income threshold. The other census tract block groups surrounding the project area that were previously identified as having potential clusters of minorities or low-income people—#4372, Block Group 3, #4370, Block Group 2—will be unaffected by residential displacements of the proposed project. In conclusion, the proposed project also does not pose disproportionately high and adverse residential displacement impacts on any minority or low-income populations in these census tract block groups.

Visual impacts resulting from the proposed project would be greatest for those neighborhoods where residential displacements occur. Following demolition of the residences, new freeway facilities will be constructed. The freeway facilities will be most visible to the remaining residences in the neighborhood. As discussed above, the affected neighborhoods have minority populations dispersed among White/non-minority populations, and do not appear to have any low-income population clusters. Census Tract #4372, Block Group 3 and Census Tract #4370, Block Group 2, which were previously identified as having a potential cluster of one specific minority group, will have views towards Route 92 that are essentially unchanged; the proposed project slightly realigns the existing sound walls, but retains the existing heights. Consequently, minority and low-income populations in census tract block groups adjacent to the project area are not expected to have visual impacts that are

disproportionately high and adverse relative to non-minority and non-low-income populations.

The proposed project would result in air quality, noise, and construction-related effects over both the local area as well as an extended multi-county area. The proposed project is expected to meet microscale air quality requirements and is not expected to cause exceedances of federal and state CO standards. The proposed project is anticipated to meet established air quality requirements by reducing traffic congestion, stop-and-go conditions, and acceleration events that generate higher per-vehicle exhaust and air toxic emissions, and by drawing traffic off local streets and arterials. The proposed project would provide new sound walls at residential locations that are currently unshielded and would rebuild some existing sound walls, as needed, to abate increased traffic noise. Construction impacts will be minimized to the extent possible through a project-specific Transportation Management Plan (TMP). The TMP will be developed with local community—including minorities—input and will address local concerns about noise, dust generation, and traffic detours. The TMP will also benefit commuters from outside the project area who will receive information on lane closures, alternative routes, and work hours during the construction of the project. In conclusion, project-related air quality, noise, and construction impacts are not expected to be significantly adverse. The air quality, noise, and construction impacts that do occur would be borne equally by minorities and non-minorities, and low-income and non-low-income populations. Air quality, noise, and construction impacts would be borne to a greater degree by the local population than by those traveling from surrounding counties through the project area.

Historical Perspective

Historically, the freeways and interchanges in the project area predate much of the adjacent residential development. The project area has not been the focus for industrial or other development with significantly adverse environmental impacts. The people who live in the area have not long-suffered from cumulative impacts of development. Local residents have been quick to characterize their neighborhoods as ethnically diverse and non-low-income. Minority and low-income people reside and are dispersed among non-minority and non-low-income people. These minority and low-income groups have been included along with non-minority and non-low-income populations throughout the project development process including, but not limited to, public hearings (see Chapter 11). Consequently, minority and low-

income populations in the project area would bear the impacts of projects, such as the proposed project, to the same extent as neighboring non-minority and non-low-income populations.

3.12.5 Mitigation

The project does not result in any notable impacts on social groups or minorities or on neighborhood cohesion. Therefore, no mitigation is proposed beyond the relocation assistance presented in Appendix H.

3.13 Utilities/Emergency Services

3.13.1 Affected Environment

The study area is served by a variety of utilities and emergency services. In all cases, the services are provided by agencies whose service area extends beyond the study area, sometimes beyond the City of Hayward.

More than 0.5 km from I-880 and Route 92 are Hayward's City Hall, and three fire stations. Figure 3.11-2 shows some of the hospitals, and other public facilities in the study area.

Emergency Services

The City of Hayward has a centralized police department with patrol units working out of its headquarters at 300 Winton Avenue, which is within the boundaries of the study area. These are approximately 170 sworn officers and 300 non-sworn staff (e.g., administrative).

Fire Station No. 2, one of Hayward's six fire stations, is located within the study area on Harder Road. Total staff at the station is 18, with six persons on duty during each shift.

Utility Services

Utility service providers have extensive water, electricity, natural gas, telecommunications, cable television, and sanitary sewer lines beneath the streets throughout the entire project area. Major utility lines in the vicinity of the interchange include:

- storm drain and water lines underneath I-880 both to the north and south of the I-880/Route 92 interchange;
- a sanitary sewer line beneath I-880 just north of the I-880/Route 92 interchange;
- 12 kV electric transmission lines paralleling and crossing over Route 92 as well as I-880 in the vicinity of the interchange;
- telecommunications and, possibly, cable TV lines crossing I-880 near the interchange;
- an overhead electric transmission line south of the interchange that continues within the Eden Greenway on both sides of I-880; and
- an underground natural gas line paralleling the Eden Greenway.

In Hayward, water and sewer services are provided by the city through the Utilities Division of the Hayward Department of Public Works.

3.13.2 Permanent Impacts

None of the build alternatives increase the need for emergency services, such as hospitals, police, and fire. If the build alternatives meet their objective to reduce the rate of merging and weaving accidents, the need for emergency services would probably decrease.

Utility lines throughout the project area may be adversely affected by the construction of any of the build alternatives. The impact upon utility lines is mitigable. All utility lines that conflict with the project would be moved with the planning, cooperation, and assistance of utility providers.

3.13.3 Mitigation Measures

Given that there would be no impacts to emergency services, no mitigation is proposed.

Prior to construction, subsurface utility lines would be located as necessary through potholing, consultation with utility companies and entities, and the services of utility line locators. Arrangements are to be made with utility companies and entities to move any utility lines that conflict with any of the build alternatives. Service disruptions to customers, if any, would be planned and minimized to the extent possible.

3.14 Traffic Transportation/Pedestrian and Bicycle Facilities

3.14.1 Affected Environment

3.14.1.1 Traffic Transportation

Interchange

The existing Interstate 880/92 interchange provides for the transfer of traffic between the I-880 freeway corridor and the Route 92 corridor. I-880 functions as the major north-south corridor in the East Bay serving communities as far as Oakland to the north and San Jose to the south. Route 92 serves as the major east-west corridor in the greater Hayward area beginning at Mission Boulevard in Hayward, continuing west across the San Francisco Bay to its junction with Route 101 in the City of San Mateo, and terminating at Route 1 in Half Moon Bay.

The existing interchange provides for all traffic movements to and from Route 92 and I-880 by means of a four-quadrant cloverleaf interchange. Collector distributor road systems are provided on I-880 to separate weaving sections from the freeway. Adjacent to the project are five points of local access:

- Hesperian Boulevard intersection on Route 92, 1097 m (3600 feet) west of I-880
- Industrial Boulevard intersection on Route 92, 2040 m (6700 feet) west of I-880
- Santa Clara Street intersection on Route 92, 549 m (1800 feet) east of I-880
- Winton Avenue intersection on I-880, 1463 m (4800 feet) north of Route 92
- Tennyson Road intersection on I-880, 1646 m (5400 feet) south of Route 92

I-880 within the project limits has been widened to ten lanes (six mixed flow, two HOV and two auxiliary) north of Route 92 and eight lanes (six mixed flow, two HOV) south of Route 92. The auxiliary lanes north of Route 92 continue through the Winton Avenue and A Street interchanges and extend up to the Route 238/I-880 Separation. These improvements have raised the conditions on I-880 from generally stop and go to restricted flow conditions and the operating conditions of the I-880/92 interchange ramps and connectors have improved.

Route 92 is a basic four-lane freeway facility east of I-880 to Santa Clara Street. From that point east, it becomes Jackson Street, a six-lane conventional highway. The Jackson Street/Santa Clara Street intersection is a signalized intersection. To the west of the I-880 interchange, Route 92 currently has six lanes from the Toll

Plaza to I-880 with the completion of the San Mateo-Hayward Bridge Trestle Widening Project. All of the I-880/Route 92 interchange ramps consist of one lane only.

Traffic Operations

I-880 and Route 92

Existing conditions were established using traffic count data collected in 1996 and 1997. Data collection included obtaining traffic count data for both the mainline portions of I-880 and Route 92, as well as all connecting on- and off-ramps.

Based on traffic count data for I-880 and Route 92, the peak hour was determined to be 7:00 a.m. to 8:00 a.m. in the morning and 5:00 p.m. to 6:00 p.m. in the evening. The existing (1996) LOS for I-880 and Route 92 in the study area are shown in Table 3.14-1. Morning peak hour conditions on I-880 fluctuate between level of service (LOS) E and F for both northbound and southbound directions. (See Appendix I for description of Basic Freeway Section level of service definitions. The minimum acceptable level of service is usually considered to be LOS D. Under LOS D conditions, speeds begin to decline slightly with increasing flows. Level of service E describes operation at capacity, with virtually no useable gaps in the traffic stream.) Route 92 operates between LOS C to E in the eastbound direction for the AM peak period; however, the westbound direction operated between LOS E and F between the I-880/92 interchange and the San Mateo Bridge.

During the evening peak hour I-880 operates at LOS E to F conditions in both directions. Route 92 operates at LOS F conditions eastbound, often with queues extending from the interchange upstream westward to the low-rise segment of the San Mateo Bridge. Route 92 westbound during the evening peak hour generally operates between LOS C and D, with the exception of the segment between I-880 and Hesperian Boulevard, which operates at LOS E.

Ramp influence areas are points at which on and off-ramps join the mainline freeway lanes. The LOS evaluation of ramp influence areas provides a measure of how smoothly traffic is able to transition between the mainline freeway and the on/off-ramp (see Appendix I-1 for description of Ramp Influence Area level of service definitions). The existing LOS for the I-880/Route 92 study area ramp influence areas are shown in Table 3.14-2. As illustrated in Table 3.14-2, ramp influence areas are generally operating at LOS E and F for westbound traffic along

Route 92 during the AM peak hour, and eastbound Route 92 during the PM peak hour. This generally characterizes the AM peak hour flow as westbound Route 92 and the PM peak hour flow as eastbound. I-880 ramp influence areas operate at LOS E and F for both AM and PM peak hours.

Due to the high levels of congestion during the peak periods, alternative routes are used to avoid bottleneck delays and the unstable nature of forced flow conditions. These alternative routes primarily consist of local arterials adjacent to the I-880/Route 92 interchange, namely Hesperian Boulevard, Santa Clara Street, Winton Avenue, and Tennyson Road.

Table 3.14-1 1996 Existing Conditions – Freeway Segment Level of Service (LOS)[1]

Freeway Segment	AM Peak	PM Peak
I-880		
Northbound		
Tennyson Road to Route 92	F	F
Route 92 to Winton Road	F	E
Southbound		
Winton Road to Route 92	F	F
Route 92 to Tennyson Road	E	E
Route 92		
Eastbound		
Toll Bridge to Clawiter Road	E	F
Clawiter Road to Industrial Blvd	E	F
Industrial Blvd to Hesperian Blvd	D	F
Hesperian Blvd to I-880	E	F
I-880 to Santa Clara Street	C	F
Westbound		
Santa Clara to I-880	E	C
I-880 to Hesperian Blvd	F	E
Hesperian Blvd to Industrial Blvd	F	D
Industrial Blvd and Clawiter Road	F	D
Toll Bridge to Clawiter Road	E	D

[1] See Appendix I-1 for level of service (LOS) definitions

Table 3.14-2 Existing Conditions – Ramp Influence Area Level of Service (LOS)[1]

Ramp Influence Area	AM Peak (Before off-ramp)	AM Peak (After on-ramp)	PM Peak (Before off-ramp)	PM Peak (After on-ramp)
I-880				
Northbound				
Route 92	E	F	E	F
Southbound				
Route 92	E	E	F	E
Route 92				
Eastbound				
Clawiter Road	E	D	E	F
Industrial Blvd	D	D	F	E
Hesperian Blvd	D	E	F	F
I-880 southbound	E	D	F	F
I-880 northbound	D	C	F	E
Westbound				
I-880 northbound	D	E	D	C
I-880 southbound	E	F	C	E
Hesperian Blvd	F	E	E	D
Industrial Blvd	E	E	D	D
Clawiter Road	F	E	D	D

[1] See Appendix I-1 for level of service (LOS) definitions

Local Intersections

In addition to I-880 and Route 92 (and the interchange ramps), traffic data were obtained for six intersections included in the operations study. These six intersections include:

- Jackson Street at Santa Clara Street
- Winton Avenue at Santa Clara Street
- Hesperian Boulevard at Route 92 eastbound off-ramp
- Hesperian Boulevard at Route 92 westbound off-ramp
- Winton Avenue at Hesperian Boulevard
- Hesperian Boulevard at Tennyson Road

Traffic data were taken for two two-hour periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) at each of the study intersections mid-week.

The operating conditions of the intersections identified above were evaluated through LOS calculations (see Appendix I-1 for description of Intersection level of service definitions). The existing traffic volumes were used with the existing lane configurations, and signal phasing and timing data obtained from the City of Hayward staff. The results of the LOS analysis are shown in Table 3.14-3. All six intersections currently operate at acceptable levels of service in both AM and PM peak hours. The intersection of Jackson Street and Santa Clara Street (PM peak) and Winton Avenue at Hesperian Boulevard (AM and PM peak) are on the threshold of unacceptable level of service under existing peak conditions.

Table 3.14-3 Existing Conditions – Intersection Levels of Service[1]

Intersection	AM Peak	PM Peak
Jackson St/Santa Clara St	C-	D+
Hesperian Blvd/Route 92 EB off-ramp	B	B
Hesperian Blvd/Route 92 WB off-ramp	A	A
Winton Ave/Santa Clara St	C	B-
Winton Ave/Hesperian Blvd	D	D+
Hesperian Blvd/Tennyson Rd	C	C-

[1] See Appendix I-1 for level of service (LOS) definitions

Local Streets

East-west vehicular access across I-880 is provided by two major arterials in the study area, Winton Avenue and Tennyson Road. Industrial Boulevard, Hesperian Boulevard, and Calaroga Avenue provide north-south vehicular access across Route 92. Hesperian Boulevard is of regional significance to circulation since it is the main north-south alternative to I-880 between San Leandro to Union City. Another north-south route is Santa Clara Street, which intersects with Route 92 where the latter becomes an arterial (Jackson Street).

One of the biggest attractors of vehicle trips in the study area is Southland Mall, which can be reached from Winton Avenue or Hesperian Boulevard. The Southland Shopping Center and its parking lot are bordered to the south and east by La Playa Drive. Motorists use La Playa Drive to access the shopping center from Winton Avenue from the neighborhoods south and east of the shopping center.

Parking

On-street parking is available next to sidewalks throughout the project area. There is off-street parking at major activity centers, such as Southland Mall, the Southgate Swim Club, the Gateway Plaza shopping area, and other community facilities.

Transit

The transit providers to Hayward include the San Francisco Bay Area Rapid Transit (BART) system with stations northeast and southeast of the I-880/Route 92 interchange. Alameda Contra Costa (AC) Transit has routes on Hesperian

Boulevard, Winton Avenue, Jackson, Santa Clara, Calaroga, Tennyson, Depot, and Industrial Boulevard. Until the summer of 1999, the San Mateo County Transit system (SamTrans) had one route over the San Mateo-Hayward Bridge to the Hayward BART Station by way of Hesperian Boulevard and Winton Avenue. A private consortium, supported financially by SamTrans, now serves this corridor. A commuter bicycle shuttle will be implemented in the future to provide public access on the San Mateo-Hayward Bridge.

3.14.1.2 Pedestrian and Bicycle Facilities

Pedestrians and bicyclists frequently use the sidewalks and bikeways in this area. There are a few streets, such as Jackson Street, where heavy traffic volumes present crossing problems for pedestrians and bicyclists. Many pedestrians and bicyclists are students from the surrounding neighborhoods going to and from schools in the area. There are Class II (marked in the street by the City of Hayward) bike lanes on Calaroga Avenue, West Tennyson Road, and West Harder Road. Eldridge Avenue and Cheney Lane are proposed Class III (indicated only by signs) bikeways.

It is possible for pedestrians and bicyclists to cross I-880 in three places, i.e., at Winton Avenue, Tennyson Road, and the Cheney/Eldridge overcrossing. The Cheney/Eldridge Pedestrian and Bicycle Overcrossing is located on I-880 south of Route 92. This facility primarily serves the Eldridge Elementary School located east of I-880 and adjacent to the crossing. The overcrossing has a ramp on either side for easy bicycle access. Pedestrians and bicyclists may cross Route 92 on Calaroga Avenue, Hesperian Boulevard, and Industrial Boulevard. Students also use these routes to attend two schools (Southgate Elementary and Martin Luther King, Jr. Intermediate schools) south of Route 92.

The Eden Greenway runs through the study area and walking and bicycling are facilitated by the Greenway. The Eden Greenway is a non-city bike path (owned by the Pacific Gas and Electric Company, but leased to the Hayward Area Recreation District). It is continuous except where it is intersected by I-880. Bicyclists and pedestrians use the Cheney/Eldridge overcrossing to continue on the Eden Greenway bike path.

3.14.2 Permanent Impacts

Permanent impacts from the proposed interchange alternatives, including no build, are presented in the following text. Changes in interchange configuration are discussed, followed by a discussion of anticipated future traffic conditions as estimated by computer traffic modeling.

3.14.2.1 Interchange Configuration

The following text summarizes the primary characteristics of the various alternatives evaluated in this Final EIS/R to help the reader identify how proposed interchange configurations could affect traffic operations between I-880 and Route 92. Figures 3.14-1 through 3.14-3 show traffic and transportation for all alternatives.

The overall goal of the interchange improvement alternatives is to improve interchange operation to relieve peak period congestion. The current interchange configuration is prone to extended periods of congestion during the morning and evening commute periods. Caltrans, in coordination with local agencies and community groups, has developed alternative design configurations for consideration.

Interchange design Alternatives 2D and 2C Variations and H are described in Chapter 2. Table 3.14-4 provides a summary comparison of the interchange characteristics with regard to number of lanes, connector configuration, ramp characteristics, and HOV lanes. The alternatives considered are discussed relative to the effect that configuration changes influence traffic flow through the interchange.

Table 3.14-4 Interchange and Roadway Characteristics

	EXISTING/NO BUILD	ALTERNATIVES 2C/2D VARIATIONS	ALTERNATIVE H
880 Southbound			
Number of MF lanes	Four from Winton to 92; three from 92 to Tennyson	Four from Winton to 92; three from 92 to Tennyson	Four from Winton to 92; three from 92 to Tennyson
Number of HOV lanes	One	One	One
Auxiliary lanes	None	One from 92 to Tennyson	One from Winton to 92, one from 92 to Tennyson
Collector-distributor lanes	One, carries traffic from 880 SB to 92 EB loop connector and 92 WB to 880 SB loop connector; merges with 92 EB to 880 SB diagonal connector, then merges with 880 SB #4 lane	One, feeds traffic to 92 EB loop connector	One, feeds traffic to 92 EB loop connector
Number of connector lanes:			
Diagonal connector to 92 WB	Merges traffic from #5 and #4 lanes of 880 into one lane	Two: one becomes #3 lane on 92 WB, one enters 92 WB auxiliary lane	Two: one becomes #3 lane on 92 WB, one enters 92 WB auxiliary lane
Loop connector to 92 EB	One	One, merges with 92 EB mainline #2 lane	One, becomes #3 lane on 92 EB mainline to Jackson/Santa Clara
880 Northbound			
Number of MF lanes	Three from Tennyson to 92, four from 92 to Winton	Three from Tennyson to 92, four from 92 to Winton	Three from Tennyson to 92, four from 92 to Winton
Number of HOV lanes	One	One	One
Auxiliary lanes	None	One, through restriping from Winton to A	One from Tennyson to 92, one from 92 to Winton
Collector-distributor lanes	One, carries traffic from 880 NB to 92 WB loop connector and 92 EB to 880 NB loop connector, merges with traffic from 92 WB to 880 NB on-ramp, enters 880 NB as #5 lane	Two: one carries traffic from 880 NB to Jackson/Santa Clara off-ramp and from 92 WB to 880 NB loop connector; a second carries traffic from 880 NB to Winton off-ramp and from 92 WB to 880 NB diagonal connector to the Winton IC	One, carries traffic from 880 NB to Jackson/Santa Clara off-ramp and 880 NB to 92 WB loop connector
Number of connector or ramp lanes:			
Ramp to Jackson/Santa Clara	One	One	One
Loop connector to 92 WB	One	One, merges with 92 WB mainline #2 lane	One, merges with 92 WB mainline #2 lane
Ramp to Winton	One	One, braided beneath 92 EB to 880 NB connector, without access from the connector	One auxiliary lane

Table 3.14-4 Interchange and Roadway Characteristics (Continued)

	EXISTING/NO BUILD	ALTERNATIVES 2C/2D VARIATIONS	ALTERNATIVE H
Route 92 Eastbound			
Connector to I-880 NB	One on loop connector, enters collector-distributor, merges with traffic from 880 NB to 92 WB loop connector, merges with traffic from 92 WB/Jackson Street, enters 880 NB as #5 lane	One HOV bypass lane and two MF lanes merge and become 880 NB #5 lane, has no access to Winton off-ramp, has ramp metering & CHP enforcement area;	Two lanes from west of Hesperian to west of Calaroga; adds a third lane (from Hesperian on-ramp) between Calaroga and 880; has one lane off-ramp to Hesperian; has one lane diagonal connector to 880 SB; has one lane slip off-ramp to Jackson/Santa Clara; continues with one HOV lane and two MF lanes (three MF lanes through future restriping); HOV lane merges with #4 lane on 880 NB; two MF lanes merge and become #5 lane on 880 NB; has ramp metering & CHP enforcement area on connector
Jackson/Santa Clara Intersection			
Number of lanes, eastbound	One left turn only, three through lanes (and three receiving lanes downstream), one right turn only	One left turn only, three through lanes (and three receiving lanes downstream), one right turn only	One left turn only (for vehicles from 92 mainline only), three though lanes (and four receiving lanes downstream), one optional through or right turn, one right turn only
Number of lanes, westbound	One left turn only, two through (three receiving lanes downstream on 92 WB), one optional through or right turn	One left turn only, two through (three receiving lanes downstream on 92 WB), one optional through or right turn	One left turn only, two through (three receiving lanes downstream on 92 WB), one optional through or right turn
Number of lanes, northbound	One left turn only to 92 WB, one optional left turn or through, one through (two receiving lanes downstream), one right turn only	Two left turn only to 92 WB, one through (two receiving lanes downstream), one right turn only	Two left turn only to 92 WB, one through (two receiving lanes downstream), one right turn only
Number of lanes, southbound	One right turn only, one through (three receiving lanes downstream), one optional through or left turn lane	One right turn only, one optional right turn or through, one through (two receiving lanes downstream), one left turn only	One right turn only, one optional right turn or through, one through (two receiving lanes downstream), one left turn only

Table 3.14-4 Interchange and Roadway Characteristics (Continued)

	EXISTING/NO BUILD	ALTERNATIVES 2C/2D VARIATIONS	ALTERNATIVE H
Hesperian/92 Intersection			
Number of lanes from 92 EB off-ramp	One lane exit that splits to one left turn lane to Hesperian NB (or optional through to 92 EB on-ramp) and one right turn lane to Hesperian SB	One lane exit that splits to one left turn lane to Hesperian NB (or optional through to 92 EB on-ramp) and one right turn lane to Hesperian SB	One lane exit that splits to one left turn lane to Hesperian NB (or optional through to 92 EB on-ramp) and one right turn lane to Hesperian SB
Number of lanes from 92 WB off-ramp	One lane diagonal off-ramp to Hesperian NB; one lane loop off-ramp to Hesperian SB	One lane diagonal off-ramp to Hesperian NB; one lane loop off-ramp to Hesperian SB	Two lane exit on modified loop off-ramp; two left turn lanes to Hesperian NB (or optional through to 92 EB on-ramp), one right turn to Hesperian SB
Number of lanes, Hesperian northbound	One left turn pocket to 92 WB, two through lanes, one right turn only to 92 EB	One left turn pocket to 92 WB, two through lanes, one right turn only to 92 EB	One left turn pocket to 92 WB, two through lanes, one right turn only to 92 EB
Number of lanes, Hesperian southbound	One right turn to 92 WB, three through lanes, one left turn pocket to 92 EB	One right turn to 92 WB, three through lanes, one left turn pocket to 92 EB	One right turn to 92 WB, three through lanes, one left turn pocket to 92 EB

I-880 Southbound to Route 92

The current configuration for I-880 southbound to Route 92 westbound traffic movement exits from the #5 or #4 lanes on I-880, and merges into a one-lane connector that enters Route 92 westbound as the #3 lane. Under the build alternatives, I-880 traffic exits to a two-lane connector that enters the Route 92 westbound #3 lane and auxiliary lane. The build alternatives provide added connector capacity, and facilitate more efficient merging with Route 92 westbound traffic and exiting at the Hesperian Boulevard off-ramp.

Movement from I-880 southbound to Route 92 eastbound is currently via a one-lane collector-distributor lane. Traffic continues south on the collector-distributor lane, weaves with traffic from the Route 92 eastbound to I-880 southbound connector, and then enters Route 92 eastbound lane #2 via the loop connector. Under the build alternatives, traffic exits I-880 southbound and continues south via a single lane loop connector to Route 92 eastbound. This loop connector under Alternative H becomes the Route 92 eastbound lane #3. Under Alternatives 2D and 2C, this loop connector merges with the #2 lane on Route 92 eastbound. Under the build alternatives, the weaving movement required with the Route 92 westbound to I-880 southbound under the current configuration is eliminated.

I-880 Northbound to Route 92

Existing I-880 northbound traffic exits I-880 onto a single lane connector-distributor lane for access to Route 92. From the collector-distributor lane, Route 92 eastbound traffic exits via a one-lane ramp to merge with Route 92 eastbound lane #3 just prior to the Jackson Street-Santa Clara Street intersection. Movements from I-880 northbound to Route 92 eastbound under the build alternatives are similar to the existing interchange.

Traffic moving from I-880 northbound to Route 92 westbound currently exits I-880 northbound from lane #4 onto the one-lane connector-distributor noted above, continues northbound, weaves with traffic entering from the Route 92 eastbound to I-880 northbound connector loop, and enters the #3 lane of Route 92 westbound via a loop connector. Under Alternatives 2C, 2D, and H the Route 92 eastbound to I-880 northbound loop connector is eliminated. This elimination allows I-880 northbound to Route 92 westbound traffic to exit I-880 via a collector-distributor lane, continue northbound, and enter an auxiliary lane (auxiliary lanes are not shown in Figures 3.14-2

and 3.14-3) on Route 92 westbound. The result of this is that the traffic is not required to weave with traffic moving from Route 92 eastbound to I-880 northbound.

Route 92/Jackson Street Westbound to I-880

Traffic moving from the Jackson Street-Santa Clara Street intersection westbound to I-880 currently exits from the #3 lane to either a single-lane ramp to I-880 northbound, or to a loop connector to I-880 southbound.

Connection to I-880 northbound is via a single-lane ramp that merges onto a single-lane connector-distributor lane. The collector-distributor lane is also carrying traffic from the Route 92 eastbound to I-880 northbound loop connector. This collector-distributor lane then becomes I-880 northbound lane #5. This traffic movement under the build alternatives changes in that traffic exits via a single lane ramp, which then enters the I-880 northbound auxiliary lane. The required merge with the Route 92 westbound to I-880 northbound traffic is eliminated.

Traffic movement to I-880 southbound is from the #3 lane of Route 92 westbound. This lane also receives traffic entering from the I-880 northbound to Route 92 westbound loop connector. This configuration creates a merging conflict between traffic entering Route 92 westbound and traffic trying to exit Route 92 westbound to the I-880 southbound loop connector. Traffic on the loop connector then enters the one-lane collector-distributor lane, which is also carrying traffic exiting I-880 southbound. Traffic must weave with the existing connector-distributor traffic and continue southbound, merge with traffic on the Route 92 eastbound to I-880 southbound connector, and then merge with the #4 lane of I-880 southbound. The number of merging and weaving movements to accomplish the transition from Route 92 westbound to I-880 southbound creates substantial potential for congestion.

The build alternatives modify this traffic movement by (1) separating traffic exiting Route 92 westbound from traffic entering Route 92 westbound and (2) replacing the existing loop connector and collector-distributor lane with direct connectors to I-880 southbound. The build alternatives accomplish this in different ways; however, the effect is that the merging and weaving conflicts associated with the current Route 92 westbound to I-880 southbound traffic movement are substantially reduced.

Route 92 Eastbound to I-880

Traffic movement from Route 92 eastbound to I-880 is currently from the #3 lane of Route 92 eastbound via a one-lane connector to I-880 southbound, or via a one-lane loop connector to I-880 northbound.

Route 92 eastbound to I-880 southbound traffic movement is from the #3 lane of Route 92 eastbound to a one-lane connector. This connector merges with the one-lane collector-distributor carrying Route 92 westbound to I-880 southbound traffic. After this merge, traffic then merges with the #4 lane of I-880 southbound. The build alternatives address the merge conflicts generated by the existing configuration by separating traffic from Route 92 westbound and Route 92 eastbound, or by adding an auxiliary lane on I-880 southbound.

Traffic movement to I-880 northbound is from the #3 lane of Route 92 eastbound. This lane also receives traffic entering from the I-880 southbound to Route 92 eastbound loop connector. This configuration creates a merging conflict between traffic entering Route 92 eastbound and traffic trying to exit Route 92 eastbound to the I-880 northbound loop connector. Traffic on the loop connector then enters the one-lane collector-distributor lane, which is also carrying traffic exiting I-880 northbound. Traffic must weave with the existing connector-distributor traffic and continue northbound, merge with traffic on the Route 92 westbound to I-880 northbound ramp, and then becomes the #5 lane of I-880 northbound. The number of merging and weaving movements to accomplish the transition from Route 92 eastbound to I-880 northbound creates substantial potential for congestion.

The build alternatives modify this traffic movement by (1) separating traffic exiting Route 92 eastbound from traffic entering Route 92 eastbound and (2) replacing the existing loop connector and collector-distributor lane with a direct connector to I-880 northbound. The build alternatives accomplish this in different ways; however, the effect is that the merging and weaving conflicts associated with the current Route 92 eastbound to I-880 northbound traffic movement are substantially reduced.

Route 92 Eastbound /Santa Clara Street Intersection

Currently, Route 92 eastbound traffic lanes approaching the Santa Clara intersection include one left turn only lane, three through lanes, and one right turn only lane. This configuration remains the same under build alternatives 2C and 2D; however, under Alternative H there is an addition of one optional through or right turn lane.

Operationally, Alternative H eliminates the ability of traffic exiting I-880 northbound to turn left onto Santa Clara Street (see Figure 3.14-3 and Table 3.14-4). In addition, the Hesperian Boulevard slip off-ramp under Alternative H, which merges with Route 92 eastbound, would also be prohibited from turning left onto Santa Clara Street. Under Alternative H, vehicles exiting I-880 northbound (or accessing Route 92 eastbound from the Hesperian Boulevard slip off-ramp) would need to either make a U-turn at the next intersection or utilize the Winton Avenue Interchange to access Santa Clara Street. The anticipated number of vehicles making this movement is low. The estimated year 2025 volumes are in the range of 20 vehicles per hour during A.M. peak and 90 vehicles per hour during the P.M. peak hour.

3.14.2.2 Traffic Transportation

This section presents the transportation impacts of the proposed project alternatives, including the No Build alternative, for the year 2025. The procedures, methodology, and assumptions used in this analysis are presented in the *Interstate 880/State Route 92 Interchange, Traffic Operations Analysis* (Parsons Transportation Group, Inc., 2001). Modeling inputs assume other proposed improvements have been implemented including:

Improvement Project	Status
• Route 92 Widening	Completed
• I-238 Widening	Environmental planning stage
• Route 238 Bypass	Project undergoing rescoping
• Westbound I-580 to Southbound Route 238 Direct Connector Ramp	Project dependent upon rescoping findings for Route 238 Bypass
• Route 84 – Preferred Alternative	FEIS/R completed, but project undergoing review with regard to state and federal participation
• I-880 widening an Interchange reconstruction	Completed
• Mission Boulevard Spot Widenings	Partially completed, some work ongoing
• Redwood Road Widening	Planning phase

Ramp Metering

The build alternatives include the installation and operation of ramp metering equipment because Caltrans policy [see Deputy Directive 35 in the District 4 Ramp Meter Development Plan (September 1997) in Appendix K] is to use ramp metering as a "…strategy to maintain an efficient freeway system and to protect the investment made in constructing freeways to keeping them operating at or near capacity flow rates." Additionally, Caltrans District 4's policy is to meter all freeway on-ramps and freeway-to-freeway connectors identified in the Ramp Meter Development Plan. District 4's policy is also to meter the HOV preferential lane. Caltrans meters all freeway on-ramps and freeway-to-freeway connectors with an optimum metering rate. The optimum metering rate, which ranges from the demand rate (almost equivalent to no metering) to very restrictive rate (to prevent traffic operations on the primary route from becoming excessively congested), is determined based on the severity of congestion on the freeway corridor and local jurisdictional concerns.

All the existing Route 92 ramps and connectors to I-880 are already metered including the Route 92 eastbound to I-880 northbound loop ramp connector. The metering lights of that connector are set on steady green to keep queues from becoming excessive.

The City of Hayward prefers that the metering lights on the Route 92 eastbound to I-880 northbound connector not be turned on with the opening of the new connector because of the possibility of lengthy, upstream queues causing the diversion of Route 92 traffic onto Hayward arterials and streets and that the metering lights be left off until future years when the traffic situation warrants. This is contrary to Caltrans policies and plans for that connector. Caltrans plans, however, to work with the City of Hayward to ensure that operation of the metering lights produces acceptable traffic operations on the connector as well as on arterials and streets.

Interchange

The mainline operations analysis was conducted using CORSIM, a computer simulation program developed for the FHWA. The Alameda County Planning Area 2 Subarea Model produced traffic volume projections used for input to CORSIM. The year 2025 traffic projections were compiled in the final *I-880/Route 92 Interchange Traffic Forecasts Report* (Parsons Transportation Group, Inc, 2000). The models were calibrated for the AM (7:00 to 8:00) and PM (5:00 to 6:00) peak periods. The model calibrations were based on traffic volume data that represented existing (1996/1997)

weekday traffic conditions, and travel time and speed run data collected in the field during peak periods.

No Build

The No Build alternative evaluation uses the traffic projections for the year 2025, but assumes no improvements to the existing I-880/Route 92 interchange. The analysis does include other roadway improvements including the widening of Route 92, which is nearing completion. Traffic volumes generated by the computer simulation and associated LOS are provided in Appendix I. Traffic throughput for the interchange, and traffic throughput for two peak hour traffic movements are shown in Table 3.14-5. Level of service for the No-build Alternative is shown in Tables 3.14-6 and 3.14-7.

Build Scenarios

To accommodate the increased traffic demand and eliminate the weaving problems between the two closely spaced loop ramps (on both eastbound and westbound Route 92), all build alternatives replace the eastbound to northbound and westbound to southbound loop ramps with flyover ramps.

Alternatives 2C and 2D are operationally identical. Primary differences between the 2C/2D alternatives and Alternative H are the height of the interchange and direct access to the Winton Avenue interchange. The 2D/2C alternative is a 3 level interchange, compared to 2 levels for alternative H. Operational performance of 2C/2D is similar to Alternative H.

Alternatives 2C, 2D, H, and No Build were evaluated using CORSIM. Changes in traffic throughput (vehicles per hour) during the AM and PM peak hours are shown in Table 3.14-5. Level of Service and associated traffic volume increases or decreases relative to the no build condition are shown in Table 3.14-6 (and Appendix I). Ramp influence area analysis results are shown in Table 3.14-7.

Table 3.14-5 I-880/Route 92 Interchange Throughput Volumes

Vehicles per Hour – AM and PM Peak Hours
Year 2025 Build and No Build

Traffic Throughput Period/Movement	No Build	H*	2C/D*
Total Throughput			
AM Peak Hour	17900	20300	21500
PM Peak Hour	17500	20800	21100
I-880 SB – Route 92 WB			
AM Peak Hour	2000	3200	3100
PM Peak Hour	2000	2300	3000
Route 92 EB – I-880 NB			
AM Peak Hour	1300	2100	2000
PM Peak Hour	1300	2200	2100

* Route 92 onto I-880 Metered

Table 3.14-6 Mainline Freeway Segment Level of Service (LOS)[a, 1]

Year 2025 Build and No Build

	AM Peak			PM Peak		
Freeway Segment	**No Build**	**H**	**2C/D**	**No Build**	**H**	**2C /D**
I-880						
Northbound						
Between Tennyson Road ramps	F	F	F	F	F	F
Between Route 92 ramps	D	C	C	C	C	C
Between Winton Road ramps	C	C	C	C	D	C
Southbound						
Between Winton Road ramps	F	F	F	F	E	D
Between Route 92 ramps	E	D	D	C	D	C
Between Tennyson Road ramps	D	D	D	C	D	C
Route 92						
Eastbound						
Before Clawiter Road	C	C	C	F	F	F
Between Clawiter Road ramps	C	C	C	F	F	F
Between Industrial Blvd ramps	F	F	B	F	F	F
Between Industrial and Hesperian Blvd	F	-	-	F	-	-
Between Hesperian Blvd ramps	F	-	-	F	-	-
Between slip off-ramp and I-880	-	A	-	-	B	-
After Southbound I-880 on-ramp	-	A	A	-	D	C
Slip off-ramp						
Before Southbound I-880 off-ramp	-	F	-	-	F	-
After Eastbound Rt. 92 off-ramp	-	F	-	-	F	-
Westbound						
Before Southbound I-880 on-ramp	-	E	D	-	C	C
Between I-880 and Hesperian Blvd	-	D	D	-	C	D
Between Hesperian Blvd ramps	D	D	D	C	B	C
Between Hesperian and Industrial Blvd	E	E	D	C	B	C
Between Industrial Blvd ramps	D	E	D	C	B	C
Between Clawiter Road ramps	D	D	D	C	C	C
After Clawiter Road	D	E	D	C	D	C

[a] Detailed CORSIM output results are provided in Appendix J.

[1] See Appendix I for level of service (LOS) definitions for freeways and ramp influence areas.

Table 3.14-7 Ramp Influence Area Level of Service (LOS) [a, 1]

Year 2025 Build and No Build

	AM Peak			PM Peak		
Ramp Influence Area	No Build	H	2C/D	No Build	H	2C/D
I-880						
Northbound						
Route 92						
Before off-ramp	F	F	F	F	F	F
After on-ramp	C	C	C	C	C	C
Southbound						
Route 92						
Before off-ramp	F	E	F	F	D	D
After on-ramp	F	C	C	E	C	C
Route 92						
Eastbound						
Clawiter Road						
Before off-ramp	C	C	C	F	F	F
After on-ramp	B	B	B	F	F	F
Industrial Blvd						
Before off-ramp	C	B	B	F	F	F
After on-ramp	F	F	D	F	F	F
Hesperian Blvd						
Before off-ramp	F	-	-	F	F	F
After on-ramp	F	-	F	F	-	F
I-880 southbound						
Before off-ramp	F	-	F	F	-	F
After on-ramp	-	A	A	-	C	C
Westbound						
I-880 northbound						
Before off-ramp	-	-	-		-	-
After on-ramp	-	E	E	-	B	C
I-880 southbound						
Before off-ramp	-	-	-	-	-	-
After on-ramp	C	D	D	C	B	C
Hesperian Blvd						
Before off-ramp	-	C	C	C	B	C
After on-ramp	F	E	E	C	B	C
Industrial Blvd						
Before off-ramp	D	E	D	C	B	C
After on-ramp	C	D	C	B	B	B
Clawiter Road						
Before off-ramp	C	D	C	B	B	B
After on-ramp	C	E	D	C	C	C

[a] Detailed CORSIM output results are provided in Appendix J.

[1] See Appendix I for level of service (LOS) definitions for freeways and ramp influence areas.

AM Peak

Traffic flow through the interchange during the AM peak hour for the year 2025 is estimated to be 17,900 vph under the no build condition. The commute direction traffic movement of I-880 southbound to Route 92 westbound is estimated by the CORSIM analysis to be 2,000 vph. Under all of the build alternatives the throughput during the AM peak hour is increased substantially (Table 3.14-5). For Alternative H, the total AM peak throughput for the interchange is 20,300 vph and the I-880 southbound to Route 92 westbound throughput is 3,200 vph, increases of 13 percent and 60 percent relative to the no build, respectively. For Alternatives 2C and 2D Variations, the total AM peak throughput is 21,500 vph and the I-880 southbound to Route 92 westbound throughput 3,100 vph, increases of 20 percent and 55 percent, relative to the no build, respectively. These increases in capacity result from improved ramp/connector configuration that effectively reduces weaving conflicts and improves traffic flow. The LOS impacts for specific segments within the interchange are discussed below.

I-880. The CORSIM analysis indicates only limited operational problems, i.e., weaving, queuing, occur along northbound I-880 between the Tennyson Road and Winton Avenue interchange. Replacement of the eastbound Route 92 to northbound I-880 loop ramp with the collector distributor road with a flyover ramp under Alternative H and a two-lane direct connector under Alternatives 2C/2D relieves the queuing that is experienced in the no build condition.

For northbound and southbound I-880, level of service between the Route 92 ramps improved from D to C northbound, and from E to D southbound relative to the no build. Analysis also indicates that the extensive queuing from the southbound to westbound direct connector ramp upstream onto I-880 is no longer evident as in the no build condition. This latter improvement is due mainly to the additional capacity of the on-ramp from one lane in the no build condition, to two lanes in the build alternatives (i.e., Alternatives H, 2C and 2D).

Route 92. Route 92 westbound AM peak hour LOS are generally maintained or improved. Exceptions are at Industrial Boulevard and after Clawiter Road

west of Industrial Boulevard (and the project limits) where LOS under Alternative H decreases from D to E. Service levels are decreased, but Alternative H increases capacity while imposing fewer environmental impacts than Alternatives 2C or 2D.

To alleviate most of the weaving currently experienced downstream of the Jackson Street/Santa Clara Street intersection, the existing westbound to southbound loop ramp is replaced under the build alternatives. Under Alternative H a westbound to southbound flyover ramp is proposed, and Alternatives 2C/2D provide a one-lane direct connector from the second level of the interchange. These reconfigurations provide additional capacity relative to the existing loop ramp, and eliminate the weaving caused by the two closely spaced on and off loop ramps.

Eastbound Route 92 analysis indicates queues (LOS F) at Industrial Boulevard under Alternative H. This is consistent with queues predicted for the no build alternative. This condition is improved to LOS B under Alternatives 2C/2D.

PM Peak

Traffic flow through the interchange during the PM peak hour for the year 2025 is estimated to be 17,500 vph under the no build condition. The commute direction traffic movement of Route 92 eastbound to I-880 northbound is estimated by the CORSIM analysis to be 1,300 vph. Similar to the AM peak hour, all of the build alternatives substantially increase the throughput during the PM peak hour (Table 3.14-5). For Alternative H, the total PM peak throughput for the interchange is 20,800 vph and the Route 92 eastbound to I-880 northbound throughput is 2,200 vph, increases of 19 percent and 69 percent relative to the no build, respectively. For Alternatives 2C and 2D Variations, the total PM peak throughput for the interchange is 21,100 vph and the Route 92 eastbound to I-880 northbound throughput is 2,100 vph, increases of 21 percent and 62 percent relative to the no build, respectively. These increases in capacity result from improved ramp/connector configuration that effectively reduces weaving conflicts and improves traffic flow. The LOS impacts for specific segments within the interchange are discussed below.

I-880. I-880 northbound analysis indicates that queuing that occurred on the collector distributor road under the no build, which resulted in intermittent queuing on the northbound to eastbound connector ramp, is no longer evident in the build alternatives. The flyover ramp, which replaces the westbound to northbound loop ramp, eliminates the collector-distributor road weaving and queuing problems.

Southbound I-880 LOS generally improves, and all queuing experienced in the no build condition from the Route 92 connector ramp (which blocked upstream mainline operations on I-880) is no longer evident. PM peak hour LOS decreased from C to D on several segments under Alternative H; however, southbound I-880 volumes are higher relative to the no build scenario.

Route 92. The Route 92 eastbound evaluation indicates an extensive queue from the flyover ramp upstream onto Route 92 extending back to the toll plaza. This queue, given peak spreading characteristics, would extend well past the toll plaza onto the high-rise section of the San Mateo Bridge. Level of service remains at LOS F. With Route 92 eastbound traffic effectively blocked by the flyover queue, the LOS at the Jackson Street/Santa Clara Street intersection improves from the no build scenario.

Westbound Route 92 LOS generally is maintained or improved under the build alternatives, relative to no build conditions.

Local Intersections

The level of service method used evaluates an intersection's operation based on the average stopped vehicular delay. The intersection operation was evaluated using the 1994 Highway Capacity Manual methodology of the TRAFFIX software package and correlated to a level of service. The results of the intersection LOS analysis are provided in Table 3.14-8.

Table 3.14-8. Intersection Levels of Service [a, 1]

Year 2025 Build and No Build (2025)

	No Build		Build	
Intersection	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Jackson St – Santa Clara St	F	F	F	E+
Hesperian Blvd/Route 92 EB off-ramp	B	E	B	F
Hesperian Blvd/Route 92 WB off-ramp	C+	A	D	B-
Winton Ave/Santa Clara St	F	F	E	C
Winton Ave/Hesperian Blvd	E-	D-	D-	D
Hesperian Blvd/Tennyson Rd	E	F	C	D-

[a] Detailed CORSIM output results are provided in Appendix J.

[1] See Appendix I for level of service (LOS) definitions for freeways and ramp influence areas.

Under the no build alternative, there is continued decline in LOS at intersections with the majority of intersections operating below acceptable levels. The overall level of service improves or remains constant at the six intersections during the AM and PM peak hour, with only a few exceptions when comparing build alternatives with the no build alternative. Exceptions include the Hesperian Boulevard/Route 92 off ramps, which show some deterioration in LOS compared to the no build operations. Only one, the Hesperian Boulevard/Route 92 eastbound off-ramp drops below an acceptable LOS of D.

Local Streets and Parking

Circulation in the project area remains unchanged. La Playa Drive, which serves Southland Mall, is relocated in its current configuration further west towards the mall building under Alternative 2D Variation.

The reduced congestion at the interchange would improve emergency response time in the project area.

By facilitating improved traffic operations on I-880 and Route 92, interchange improvements are expected to draw vehicles from local streets and arterials on to the freeways.

Only under Alternative 2D Variation would there be any loss of permanent parking spaces. Right of way acquisition for Alternative 2D Variation permanently reduces parking spaces at the Southland Mall by 200 spaces. These spaces are a small fraction (200 out of a total of about 7,500 spaces) of the parking provided in the parking area of the mall and would be located at the outer edge of the parking area. The remaining number of parking spaces meet the city requirement of one parking space per 16.3 square meters (175 sq. ft.) of floor area, and the remaining parking area is more than adequate to meet the needs of employees and customers. Southland Mall owners would be compensated for the parking area that is acquired.

3.14.2.3 Pedestrian and Bicycle Facilities

Upon completion of the project, there would be no permanent operational impacts on bicycle and pedestrian access and circulation under any alternative. Pedestrian and bicycle facilities and access would remain essentially unchanged. The relocation of La Playa Drive under Alternative 2D Variation would not affect the movement of bicyclists in the area. The stairway that connects the sidewalks on Winton Avenue to the Southland Mall parking lot would not be affected.

Although the Cheney/Eldridge Pedestrian Overcrossing would be relocated about 61 m (200 feet) south, the access points on both ends of the overcrossing on Cheney Lane and Eldridge Avenue would remain unchanged. There would be no impacts to the Eden Greenway. Bicyclists and pedestrians would continue to use the Cheney/Eldridge pedestrian overcrossing as they do currently.

3.14.3 Temporary Impacts

3.14.3.1 Traffic Transportation

Interchange

The current construction plan for the project anticipates keeping the number of lanes open for traffic movements in all directions during peak periods.

The Calaroga Avenue overcrossing (under Alternative H) and the Route 92 overcrossing of I-880 would be removed and reconstructed one (longitudinal) half at a time. The half of the structure that is open would handle traffic in both directions until both halves of the bridge are completed. Temporary ramps continue traffic movements at the I-880/Route 92 interchange while existing ramps are removed and new ones constructed.

Local Streets and Parking

Under each of the build alternatives, forty-one off-street parking spaces at the Bridgeporte Condominium complex would be unavailable for periods over a year for construction of combination retaining walls/sound walls and the Calaroga Avenue overcrossing. Twelve parking spaces at the Casa Romana (Church) would also be temporarily affected. After completion of construction, all parking spaces would be restored.

Since the July 24, 2002, Public Hearing, Caltrans has been exploring alternative parking areas for the condominiums and the church. No alternative parking areas appear to be available. Consequently, for the Preferred Alternative, H, Caltrans is considering a slightly narrower Route 92 eastbound shoulder and a realignment of the retaining wall in the vicinity of the condominiums so that easements and replacement of the existing sound wall would be unnecessary. Caltrans will proceed with this strategy pending further structural design studies.

3.14.3.2 Pedestrian and Bicycle Facilities

During the construction phase, vehicular, bicycle, and pedestrian circulation patterns and travel times on streets, roads, and arterials may be adversely affected by construction work and detours on the Calaroga Avenue overcrossing, the Cheney/Eldridge pedestrian overcrossing, the Route 92 bridge over I-880, and each of the interchange ramps. Although the Cheney/Eldridge Pedestrian Overcrossing would be relocated about 61 m (200 feet) south, construction of the relocated overcrossing would be completed prior to closure of the existing structure; therefore, there would be very limited interruption of access.

Construction staging plans for Alternative H would meet the City of Hayward's objective of keeping at least one lane and one sidewalk on the

Calaroga Avenue overcrossing open to maintain circulation on this structure and to meet ADA requirements.

There may be brief or temporary interruptions of pedestrian and bicycle circulation on sidewalks and bike lanes during construction.

3.14.4 Mitigation Measures

To minimize the formation of queues upstream of the Route 92 eastbound to I-880 northbound connector under a ramp-metered scenario, Caltrans proposes to monitor metering operations and traffic conditions closely, then adjust to an optimum metering rate. When queues on the Route 92 eastbound to I-880 northbound connector extend upstream to the Hesperian Boulevard interchange, the meter rates would be adjusted to decrease the queue length, which allows more congestion to build on the mixed-flow lanes of I-880. When traffic volumes increase and approach Year 2025 projections, Caltrans would restripe Route 92 eastbound to I-880 northbound connector for one HOV lane and three mixed-flow lanes at the metering lights. The additional mixed-flow lane at the metering lights increases the capability of metering operations and reduces queues extending upstream on the connector and Route 92.

The mitigation measure to be implemented for this intersection is still to be decided upon between Caltrans and the City of Hayward. One likely means of mitigating the impact of the build alternatives on the Hesperian Boulevard/Route 92 eastbound off-ramp intersection is to increase the number of lanes at the off-ramp to three (one left turn, one right turn, one optional right turn or through lane to the Route 92 on-ramp). This, along with a free right turn from Hesperian Boulevard northbound to the Route 92 eastbound on-ramp, and sufficient time for pedestrian crossing of the intersection, would improve the LOS of the intersection from F to C.

A comprehensive traffic management plan (TMP) is to be prepared prior to construction to maintain circulation on streets and arterials. The TMP would include advanced changeable message signs and broadcast media notifications, detour plans, and other contingency plans. Streets and arterials would be kept open during the construction of the Alternative H project to the extent possible. Replacement of bridges - the Calaroga Avenue overcrossing and the Route 92 mainline over I-880-would be done in a way so that traffic

in both directions may continue. If possible, lane and ramp closures would be limited to night and off-peak hours. Penalties would be imposed upon the construction contractor for delays in reopening lane closures. Pedestrian and bicycle access during construction will also be addressed in the TMP.

Mitigation for parking loss at Southland Mall would only be required under Alternative 2D Variation. Mitigation under Alternative 2D Variation would be compensation that is factored into the cost of acquisition of the parking area. No mitigation is required for loss of parking at Southland Mall under Alternative H.

Since the July 24 Public Hearing, Caltrans has been exploring alternative parking areas for the condominiums. No alternative parking appears to be available. Consequently, Caltrans is considering a narrower shoulder along Route 92 eastbound in the vicinity of the condominiums and a realignment of the retaining wall so that easements and replacement of the existing sound wall would be unnecessary. Caltrans will proceed with this strategy pending further structural design studies.

3.15 Visual/Aesthetics

The discussion below presents the impacts of the three build alternatives on visual resources in the study area. For each category of visual impacts, one or more mitigation measures are recommended. These measures are in addition to standard replacement plantings that are normally installed in a separate construction contract within two years of roadway construction completion.

The visual analysis method used in this report is based on the U.S. Department of Transportation, FHWA guidelines for assessing visual impacts of highway projects. This method evaluates the perceptions of the project as seen from the motorist's (or any other person's) view, the visual relationship between the project and its surroundings, and the project in light of enhancing the broader environment. This method prescribes that visual impacts are a function of physical change weighed against the viewer's exposure and sensitivity to that change. Three visual traits that are evaluated are intactness, vividness, and unity. Definitions of these visual characteristics are found in the Chapter 10 Glossary.

3.15.1 Affected Environment

The study area for the evaluation of visual resources generally lies between West Winton and West Tennyson Interchanges on I-880, and between Industrial Boulevard and Santa Clara Street on Route 92. It extends about 305 to 457 m (1,000 to 1,500 feet) out on both sides of the two routes.

3.15.1.1 Visual Character and Quality

Highways. The existing highway character within the project area varies with location. Three different landscape characters exist at the Winton Avenue, Route 92, and Tennyson Road interchanges with I-880. Between the interchanges, the I-880 right-of-way is low in visual quality consisting of a predominantly paved linear corridor void of vegetation and flanked by 3.7 to 4.9 m (12 to 16 foot)- high sound walls that create a strong sense of enclosure. Where sound walls do not exist, the I-880 corridor looks upon the Southland Mall and St. Rose Hospital parking lots. Permanent sound walls north of West Winton Avenue along I-880 are of a different design than the

sound walls south of West Tennyson Road. Pacific Gas and Electric Company (PG&E) high voltage transmission lines along the Eden Greenway and overhead utility lines that parallel the west side of I-880 between Route 92 and West Tennyson Road are fully open to motorists' views.

Landscaped Freeway Classification. According to the California Administrative Code, a freeway is designated as a landscaped freeway if there is continuous planting for at least 305m (1,000 feet) on both sides. This designation supports Caltrans' objective to provide safe, efficient, and attractive freeways that are compatible with the surrounding area and the environment. This classification restricts the issuance of permits for outdoor advertising displays where those displays would be viewed primarily from the designated freeway section. All sections of I-880 and Route 92 within the project area are classified by Caltrans as Landscaped Freeways. Along I-880 this classification was based on the continuous plantings that existed prior to the widening of the highway.

Surrounding Context. The terrain of the immediate project area is virtually level with most views limited to the immediate foreground area. Where available, background views from the project area are oriented to the east. These views culminate with the Hayward Hills. Warren Hall on the California State Hayward University campus is the most readily identifiable landmark in the hill landscape.

The principal land use and urban quality surrounding the project area can best be described as stable, humanly scaled residential neighborhoods, populated after the mid 1950s. The design of the built environment and the visual quality of the neighborhoods is moderately high based on the sense of unity afforded by the presence of street trees, continuity in the age of the homes and their architectural styles, and the scale of the buildings. The neighborhoods are moderately intact, with vividness provided by often highly individualized and well-maintained landscapes.

For most of the residences within the visual study area, the existing interchange is neither visible from homes nor from the local public street system. However, 3.7 to 4.9 m (12 to 16 feet)-high sound walls, metering lights and sign standards along I-880 are apparent from the adjacent neighborhood streets. The relatively large scale of these features visually

dominates the backyards of homes immediately adjacent to the freeway right-of-way affecting their character and lowering the visual quality.

Approximately eighty-five two-story single-family homes now exist within the foreground viewshed [0.4 km (1/4 mile)] of the proposed interchange.

Several public parks, schools, and commercial and institutional facilities are visually linked to the interchange area.

1. Eden Greenway is a linear park bisected by the I-880 corridor. The park is under PG&E high-voltage transmission lines. The Greenway width adjacent to I-880 is approximately 61 m (200 feet). The Greenway is a highly vivid element of the community. However, the open presence and dominating scale of the transmission lines themselves detract from the Greenway's intactness.

2. Eldridge Park/Eldridge School is a neighborhood park consisting of two play areas and open turf immediately south of the sports fields of the Eldridge School. Park and recreation spaces parallel the I-880 right-of-way for approximately 320 m (1,050 feet). The school and park are moderately vivid elements of the community. The relative openness of the turf areas, moderate use of shade trees, and the backdrop of the I-880 sound walls reduce the sense of intactness.

3. Southland Mall is a regional retail facility with a stark visual character dominated by: relatively featureless buildings; open, asphalt parking areas and the six-lane La Playa Drive with little or no landscaping surrounding the mall; a tall identity sign oriented to I-880.

4. Southgate Swim Club is a private facility generally screened from the public view. The club's open parking lot lowers the visual quality of the surrounding area, visually encroaching into views from Magnolia Street and nearby residences. The I-880 freeway sound wall is visually evident throughout the parking area. However, from within the pool area, landscaping effectively screens the sound wall. The pool setting presents a visually secluded, but unified, intact, and vivid neighborhood amenity.

5. Alameda County Public Works Field Offices/Maintenance Yard 4 is a sprawling complex of parking areas, buildings, garages, storage sheds, and

layout areas. It is visually stark and contrasts with the more heavily landscaped areas of the surrounding residences.

6. Himalayan Fur Farm (845 Turner Court) is in a dense grove of shade trees and consists of a farmhouse, barns, outbuildings, and pens. The farm has a visually intact, rustic, and rural quality.

7. St. Rose Hospital is a moderately unified complex of parking areas, a five-story high clinic and office facility, and service buildings. Top floor views afford a panorama of the Hayward area including sections of I-880, the pedestrian overcrossing, and the Eldridge School.

8. Neighborhood Commercial/Gateway Plaza is a commercial development on both sides of Route 92 along the transition into West Jackson Street. Buildings are generally oriented away from Route 92 and toward Santa Clara Street. Although the buildings of Gateway Plaza are unified and vivid, the existing ornamental landscape is eclectic in appearance. Open views exist from Route 92 to parking areas of the Gateway Plaza.

City of Hayward General Policies Plan. The City of Hayward's Landscape Beautification Plan (adopted October, 1987) implements the urban design policies and strategies of the City's General Policies Plan. In the plan, Jackson Street is designated as a major "Entry Street" to the city of Hayward. As an entry street, Jackson Street is intended to announce the arrival to Hayward. This would occur through development of appropriate gateway statements and by making Jackson Street a landscaped boulevard. West Winton Avenue and West Tennyson Road are designated as "Connector Streets" where landscape improvements are to reflect and respect the varying character of the surrounding neighborhoods and districts.

Scenic Resources. No scenic resources exist within the project area. This determination was made by the Caltrans District Landscape Architect in conformance with the requirements of the Caltrans Environmental Handbook, Section 2-3.3, and dated May 1994.

3.15.1.2 Viewer Exposure and Sensitivity

Viewer response to highway construction projects can be assessed according to a number of measures. Key factors include viewer exposure, or the

duration of view, and viewer sensitivity, which derives from visual preferences, focus of attention, and relative acuity during the exposure to the view. Distance can play a role in determining viewer sensitivity. Acuity will be greatest when observing the foreground (less than one mile [1.6 km] distant), less so in the middle ground (one to five miles [1.6 to 8 km] distant), and greatly diminished in the background (more than five miles [8 km] distant).

Project views fall into two general categories: those driving on the highway and those looking toward it. The latter category can be further broken into pedestrian, local resident, and other groups (local facility users) and their varying exposures and sensitivities.

Motorists. The I-880/Route 92 interchange is a facility serving the regional population. Of those using the highway, tourists and recreational motorists, especially passengers, are expected to have the highest degree of sensitivity to views because they tend to scrutinize views more than other viewers. Local residents may make frequent trips along portions of I-880 and Route 92 in the vicinity, and may use parts of the interchange. Their familiarity with an area can give them a high sensitivity to visual resources. Commuters, who make frequent repeat trips and may have a sense of connection with visual landmarks, are considered to have moderate sensitivity. Commercial and industrial drivers are expected to be most concerned with timely arrivals and safety, therefore, they would have low sensitivity to visual resources. Viewer sensitivity is moderate. For motorists traveling in an east-to-west direction, the change in orientation passing through the interchange serves to mark the interchange as the gateway to the San Mateo-Hayward Bridge.

Pedestrians. Consistent pedestrian activity in the study area principally exists at the pedestrian overcrossing that connects the Southgate neighborhood with the Eldridge School and Park and is most often used by school children, bicyclists and users of the Eden Greenway. The sidewalks adjacent to the Calaroga Avenue overcrossing of Route 92 are used by children going to Southgate School, Southgate Park, or the Eden Greenway as is the south sidewalk of the Winton Avenue overcrossing of I-880 that connects Birchfield Park with the Southland Mall. Because of the land uses these crossings connect (i.e., parks, neighborhoods and schools vs. industrial

areas), the concern for visual quality and subsequent viewer sensitivity is moderately high.

Local Residents. Approximately 309 single-family residential properties have direct visual access to the study area. Approximately 450 single-family residential properties have partial visual access to the study area. The neighborhoods surrounding the project are stable ones. As expressed through a Visual Resource Survey and at three public meetings, viewer sensitivity of residents is very high to any changes in neighborhood characteristics. A sense of "neighborhood" in terms of scale and visual cohesiveness is extremely important. This is expressed in terms of quality of design; quietness; greenness provided by landscaping; a sense of openness instilled by long-distance views to the Hayward Hills; views to open skies; privacy from motorists' views; and relatively low levels of ambient night lighting.

Other Groups. Viewer sensitivity of patients at Saint Rose Hospital and of the members of the Southgate Swim Club is high.

3.15.2 Permanent Impacts

3.15.2.1 Alternative 2C Variation

The Highway Motorist's View. Though showing signs of stress, the existing redwoods in the I-880/Route 92 interchange are a distinguishing feature of the interchange.

Replacement planting is required by Caltrans policy. Replacement plantings included in the design of the project should be sufficient to provide a reasonable level of visual quality for motorists passing through the study area. A positive visual effect for the motorist created by the interchange would be new, vivid (clear or strong impression on the senses) panoramas over the city of Hayward and views of the Hayward Hills from the proposed elevated Route 92 eastbound direct connector.

Given the size and location of plantable areas within the project right-of-way and the limited plantings possible, it is considered likely that the Landscaped Freeway classification would be retained only in limited portions of the project area. The Landscaped Freeway classification restricts the issuance of permits for outdoor advertising displays where those displays would be

viewed primarily from the designated freeway section. In various locations throughout the project area, gaps greater than 61 m (200 feet) in length exist where no planting could occur. In many areas, right-of-way requirements do not provide sufficient space for planting vines on retaining and sound walls as outlined in the Policy, Procedures and Guidelines Regarding Use of Plants as Elements of Noise Abatement Features (Caltrans 1992). For portions of the project area where the Landscaped Freeway classification is not retained, restrictions on outdoor advertising displays would not be enforced under state regulations governing "Outdoor Advertising Displays Adjacent to Landscaped Freeways." However, this impact does not occur because the City of Hayward Sign Ordinance and other City agreements with the advertising industry effectively prohibit outdoor advertising displays within the study area (Hom 1993).

Depending on detailed landscape designs, replacement plantings could be provided in container sizes larger than typically provided in standard highway planting application. Replacement planting within the available state right-of-way within the interchange creates the positive aesthetic effect that responds to the City's Landscape Beautification Plan.

As discussed in Section 3.5.2 under noise impact evaluation, existing sound walls could remain in certain portions of the project area where no widening of the freeway is needed. The different designs of sound walls randomly seen at the interchange result in a reduction in the unity of the interchange design.

Views to the parking lot of the Southland Mall currently detract from the unity of the interchange landscape viewed by the motorist. This condition continues with the project. No plantable area exists within the project right-of-way to screen views between I-880 and the Southland Mall parking area.

Neighborhood Views. Figure 3.15-1 presents a graphic summary of the visual consequences of Alternative 2C Variation on the residential areas surrounding the interchange.

Residents and pedestrians in the majority of the surrounding areas more than one block away from the proposed interchange right-of-way perceive only small changes in vividness, intactness and unity in the existing landscape. This perception is due largely to the predominantly flat topography, orientation of local streets, and the presence of street trees.

Removal of existing redwood trees and other vegetation within the project limits results in negative visual impacts for nearby residents. An obvious change created by either the removal of homes or by the construction of combination retaining wall/sound walls immediately behind homes also affects public views from within neighborhoods. The scale and visibility of new structures, retaining walls, earth embankments, and sound walls visually encroach, dominate, and redefine the humanly scaled fabric of selected neighborhood areas directly adjacent to the interchange. The effect is a large reduction in the visual intactness of neighborhood character, especially for those living adjacent to acquired properties or new sound wall locations. The perception of being within a neighborhood, with houses on both sides of the street, changes to an impression of being on the edge of the neighborhood.

Simulations were prepared for various viewpoints in the four quadrants to depict the appearance of the proposed interchange improvements. Simulations were prepared to represent both Alternatives 2C and 2D Variations. The visual characteristics of Alternatives 2C and 2D are similar, with the exception of the residential areas adjacent to I-880 in the northeastern and northwestern quadrants. In these quadrants, the location of the right-of-way and new sound walls differs between the 2C and 2D alternatives. Additional simulations in these areas are presented in the Visual Resources Technical Report and Report Addendum prepared for the project (2M Associates 1992, 1993; Caltrans 1997).

Simulations for Alternative 2C Variation are shown in Figures 3.15-2 through 3.15-4. Changes to views from Booker Way and Peterman Avenue (Figures 3.15-2 and 3.15-3) are common to both Alternatives 2C and 2D. These simulations represent the most apparent changes to the existing visual resources immediately adjacent to the interchange (within about one block). As a general rule, beyond this distance, changes would not be readily apparent. Under Alternative 2C Variation, homes are removed in the northeast quadrant along Willimet Way. The visual simulation for Willimet Way is shown in Figure 3.15-4.

Views to Interchange Overcrossing Structures. The Route 92 overcrossing of I-880 would be elevated approximately 10.5 m (34 feet) above the height to the current overcrossing. Depending on the location of windows, height of surrounding structures, and presence of the neighborhood street trees or other

landscaping, direct views from two-story residences to the elevated portions of the interchange probably exist much as they do today towards the existing redwoods that are in the interchange. Residents in approximately thirty-five single-family homes in all four quadrants may experience a reduction in the intactness and unity of their eastern views to the Hayward Hills. Views from the east-facing upper floors of the condominiums at 1234 Stanhope Lane would directly overlook an expanded Route 92 and the interchange structures.

Minor glimpses to the interchange structures may result in a slight to benign change in the intactness of views from Malcom, Edgemere, Merritt, and Huron lanes in the northwest quadrant of the interchange.

The central interchange overcrossing structures and elevated connectors/ramps are visible from Peterman Avenue and Willimet Way. Approximately fourteen homes along Peterman Avenue have partial views of the interchange structures. These include views to the Route 92 eastbound overcrossing and/or views to the elevated direct connector connecting Route 92 westbound to I-880 southbound. A sound wall (Supplementary Barrier 1; see Section 3.5.5 for further discussion) is located on this direct connector and screens out views of trucks and larger vehicles on this connector. Another sound wall (Supplementary Barrier 3) is located on Route 92 eastbound at the southwestern quadrant, which also screens out views from Peterman Avenue of trucks on the elevated portion of Route 92 eastbound. Approximately twelve homes along Willimet Avenue would have partial views to the elevated direct connector linking Route 92 eastbound to I-880 northbound. The scale of these structures creates an increase in vividness. The recommended sound wall for this connector (Supplementary Barrier 2) serves to screen out views of trucks on the connector from homes in the northeastern quadrant.

The redesigned and relocated Cheney/Eldridge Pedestrian Overcrossing would also be visible to motorists on I-880 as simulated in Figure 3.15-5.

Views from Eden Greenway to Sound Walls. The existing sound wall, located on the edge of the I-880 right-of-way adjacent to the Greenway, presents a stark visual contrast to the character and quality of this public space. Its simplicity and scale, though vivid, encroaches on the public open

spaces, lowering a sense of visual intactness. Relatively open access to the sound wall has, in the past, allowed graffiti to be placed on it, further affecting the visual quality of the public environment.

The recommended removal, relocation, and replacement of the existing sound barrier on the west side of I-880 would be such that no state right-of-way would be available for replacement planting to screen the recommended replacement sound wall from view or to act as a barrier to discourage graffiti.

Views to Acquired Right-of-Way Areas Where Buildings Are Removed. Along Willimet Way, approximately fifty-seven homes would be removed. A continuous sound wall would be constructed. This severely affects the foreground views of forty-nine homes along Willimet Way that have a direct view to the proposed sound walls rather than the views of residential structures, landscaped yards, street trees, and parked cars that currently exist (see Figure 3.15-4). Approximately twenty nearby homes would have a partial orientation toward the proposed sound walls.

Public views perpendicular to I-880 from Elmhurst, Larchmont, Banburry, Denslowe, Lindhurst, and Rossmore streets now terminate on residential structures, landscaped yards, street trees, and parked cars. With Alternative 2C Variation, views from these streets terminate on sound walls. An increase in vividness results from the large scale of the walls. A dramatic reduction in the intactness and unity of the existing neighborhood also occurs.

Views to Acquired Right-of-Way Areas Involving Partial Acquisitions. Partial acquisition of two single-family residential properties located along Stanhope Lane results in a reduction of yard size and visual encroachment of sound walls. As seen by residents, this change results in a reduction in the intactness of their private gardens and a feeling of being more "closed in" within their backyards. In these instances, no mitigation is feasible, and therefore none is proposed.

Views to Combination Retaining Walls/Sound Walls. Views from public streets and from individual residences to multiple walls occur in two of the interchange quadrants. These are:

- Booker Way in the southeast quadrant - backyard views of seven homes directly face a new retaining wall/sound wall combination ranging from

approximately 9.45 to 11.89 m (31 to 39 feet) above ground level. Views from an additional six homes either across the street or nearby may include portions of the wall backdrop. Because of a southeast exposure, microclimate conditions of the homes and their yards could be altered by reflected sunlight and heating of the area in the morning hours, and by blocked sunlight and cooling of the area in the late afternoon hours.

- Peterman Avenue in the southwest quadrant - retaining walls with sound walls on top of them would be constructed along Peterman Avenue. Backyard views of sixteen homes along Peterman Avenue are directly exposed to the new wall combinations. Of these, one-half of the homes have wall combinations ranging from approximately 5.8 to 6.4 m (19 to 21 feet) above ground level. The other half experiences wall combinations ranging from approximately 4.6 to 8.2 m (15 to 27 feet) above ground level. Because of the south and west orientation, solar access and microclimate conditions of the homes and their yards are altered by reflected sunlight and heating of the area, depending on the height of the combined walls behind individual homes. Views from approximately fifteen homes either across the street or nearby may include portions of the wall backdrop.

Views to the Pedestrian Overcrossing. The design of the relocated Cheney/Eldridge Pedestrian Overcrossing would be more vivid than the outdated structural design of the existing overcrossing as seen by both motorists and residents. The relocation of the existing overcrossing to approximately 61 m (200 feet) south of its present location (see Figure 3.15-6) would create potentially intrusive views into about seven residences. However, four residences gain increased privacy by the relocation of the pedestrian overcrossing.

3.15.2.2 Alternative 2D Variation

The Highway Motorist's View. As perceived from the motorist's point of view and as the interchange relates to the overall environment of the city of Hayward, Alternative 2D Variation has the same visual impacts as Alternative 2C Variation.

Neighborhood Views. Figure 3-15.7 presents a graphic summary of the visual consequences of Alternative 2D Variation on the residential areas surrounding the interchange.

Simulations developed for Booker Way and Peterman Avenue (Figures 3.15-2 and 3.15-3) are also representative of Alternative 2D Variation. Impacts to neighborhood views would be similar to those discussed above under Alternative 2C Variation with the exception of Willimet Way and Magnolia Street. Under Alternative 2D Variation, the primary impacts are shifted from residential areas along Willimet Way (Alternative 2C Variation) to Magnolia Street. Simulations of these changes are shown in Figures 3.15-8 and 3.15-9.

Views to Interchange Overcrossing Structures. The views to the proposed interchange overcrossing structures would be similar to those described for Alternative 2C Variation.

Views from Eden Greenway to Sound Walls. Views from the Eden Greenway would be similar to those described for Alternative 2C Variation.

Views to Acquired Right-of-Way Areas Where Buildings Are Removed. Along Magnolia Street (see Figure 3.15-8), fourteen homes and the Southgate Swim Club would be removed. This affects the ten homes having an eastward orientation along Magnolia Street whose foreground views currently terminate on residential structures, landscaped yards, street trees, and parked cars. These views are altered to terminate on a sound wall. Approximately seven other nearby homes have a partial orientation towards proposed sound walls. Eastward views perpendicular to I-880 from Poinciana and Resota streets that now terminate on residential structures, landscaped yards, street trees, and parked cars would be altered to terminate on a sound wall. An increase in vividness results from the large scale of the sound wall. A reduction in the intactness and unity of the existing neighborhood character also occurs.

Impacts along Willimet Way under Alternative 2C Variation would be reduced under Alternative 2D Variation as shown in Figure 3.15-9.

Views to Acquired Right-of-Way Areas Involving Partial Acquisitions. Impacts to views are similar to those described for Alternative 2C Variation.

Views to Combination Retaining Walls/Sound Walls. Views to combination retaining walls and sound walls would be similar to those described for Alternative 2C Variation.

Views to the Pedestrian Overcrossing. Impacts from relocation and reconstruction of the pedestrian overcrossing are the same as those described for Alternative 2C Variation.

3.15.2.3 Alternative H

Because of the design differences between the 2C/2D Variation alternatives and Alternative H, the visual impacts resulting from Alternative H are generally reduced relative to Alternatives 2C and 2D. This reduction in visual impact is largely because of the decrease in overcrossing height and the lack of sound walls on overcrossing structures relative to the 2C and 2D Variation designs. There are some residential acquisitions that will result in local neighborhood visual impacts similar in magnitude to those described for Alternatives 2C and 2D.

The Highway Motorist's View. As perceived from the motorist's point of view and as the interchange relates to the overall environment of the city of Hayward, Alternative H has similar visual impacts to Alternatives 2C and 2D Variations. The number of new sound walls under Alternative H would be reduced relative to Alternatives 2C and 2D Variations (see Section 3.5.5 for sound wall locations).

Neighborhood Views. Figure 3.15-10 presents a graphic summary of the visual consequences of Alternative H on the residential areas surrounding the interchange. Simulations were prepared to depict visual changes for Peterman Avenue, Willimet Way, Booker Way, and Edgemere Lane (see Figures 3.15-11 through 3.15-14). With regard to general neighborhood views, the change in visual character of the interchange would be less under Alternative H primarily because of the lower profile of the overcrossing structures. However, where local acquisition and residential structure removal occur, views from the immediate residential neighborhood would be affected similarly to Alternative 2C Variation. The removal of existing redwood trees would result in impacts similar to Alternatives 2C and 2D Variations.

Views to Interchange Overcrossing Structures. The Route 92 overcrossing of I-880 under Alternative H would be elevated about 5.2 m (17 feet) above the height of the current overcrossing. The Route 92 eastbound connector would be a similar height over I-880. Both of these structures would be partly visible to the surrounding neighborhoods. Figure 3.15-12 shows views of overcrossing structures from Willimet Way in the northeast quadrant and Figure 3.15-14 shows views from Edgemere Lane in the northwest quadrant. Sound walls surrounding the interchange and landscaped berms in the northwest and southeast quadrants (see Figure 3.15-15) block views of the structures from the street level in the surrounding neighborhoods. Upper stories of residences and other buildings probably still have views of these structures.

The Route 92 overcrossing of I-880, the Route 92 eastbound connector, and the Cheney/Eldridge Pedestrian Overcrossing would also be visible to motorists on I-880. The Route 92 overcrossing of I-880 would have an especially dominating scale and appearance for freeway motorists.

Views from Eden Greenway to Sound Walls. The sound walls currently along I-880 at the Eden Greenway would remain in place. Since no new sound walls or modification of the existing sound walls would occur, views from the Eden Greenway would be unchanged.

Views to Acquired Right-of-Way Areas Where Buildings Are Removed. Twelve residences on the 25000 and 26000 blocks of Peterman Avenue would be removed to allow for reconstruction of the Route 92 eastbound to I-880 southbound ramp. Fourteen homes across the street would have a new 4.3 m (14 feet) high sound wall instead of houses, front yards, parked cars and street trees (see Figure 3.15-11). This wall would also be visible to pedestrians, bicyclists, and motorists traveling on Peterman Avenue and Linfield Lane. The replacement of the twelve residences with a sound wall results in a change in the appearance and character of the neighborhood and a reduction in its intactness.

Views to Acquired Right-of-Way Areas Involving Partial Acquisitions. Impacts to views are similar to those described for Alternative 2C Variation.

Views to Combination Retaining Walls/Sound Walls. Alternative H recommends construction of new sound walls in the northeast quadrant of the

interchange behind houses on Willimet Way (see Figure 3.15-12), and in the southeast quadrant behind the houses on Booker Way. These new sound walls would seem larger in scale and more vivid than existing fences and trees that they replace. The new sound walls would, however, be a more effective visual screen of traffic on Route 92.

The sound wall behind the houses on Booker Way would be on top of a retaining wall. This combination retaining and sound wall would be high enough to block sunlight and cast shade in backyards of these houses during the late afternoon hours. The height of this combination retaining and sound wall would be a maximum 7.5 m (24 feet) over the existing ground level. Since the homes on Booker Way are one story in height, the upper portions of this combination retaining and sound wall would be visible to houses across the street (see Figure 3.15-13).

Along Route 92 westbound and eastbound, between Hesperian Boulevard and the I-880/Route 92 interchange, existing sound walls would be repositioned with the widening and realignment of Route 92. Although the sound walls would be about the same height as existing sound walls, residents may feel more "closed in" by the encroachment of the sound walls, up to 3.05 m (10 feet) into their back yards.

Views to the Pedestrian Overcrossing. Impacts from relocation and reconstruction of the pedestrian overcrossing are the same as those described for Alternative 2C Variation.

Views to Berms. In the northwest quadrant of the interchange, a berm would be constructed between the I-880 southbound to Route 92 westbound connector and the sound wall behind the residences on Lindenwood Way. Another berm would be constructed in the southeast quadrant between the I-880 northbound to Route 92 eastbound off-ramp and the sound walls behind the residences on Eldridge Avenue and Booker Way (see Figure 3.15-15). These berms would be visible to motorists on I-880 and Route 92 as well as residents on the other side of the sound walls. Initially, the landscaped berms could appear to viewers as small, barren hills. Over time, the plantings of trees, shrubs, and possibly groundcover, would provide a positive natural visual screen and enhance the character of the interchange, and blend into the surrounding landscape.

3.15.3 Visual Impacts Mitigation

3.15.3.1 Alternative 2C Variation

The following mitigation measures reduce the adverse visual effects associated with Alternative 2C Variation.

- Space would be provided wherever possible between the right-of-way and the proposed retaining wall structures, especially along Booker Way, to allow planting of evergreen trees to screen views to the structures.
- Along I-880 and Route 92, detailed highway design would provide viable planting areas wherever possible to grow tall shrubs in front of sound walls or to grow vines on sound walls. Planting areas may be located on the outside of sound walls, but within the interchange right-of-way, as long as sufficient holes are provided in the sound walls to train vines to grow onto the side facing motorists.
- All sound wall systems would be developed as permanent facilities and designed to provide a unifying visual sequence throughout the study area.
- Contoured, landscaped berms would be provided in the northwest and southeast interchange quadrants. One berm would be located between the right-of-way line and the I-880 southbound to Route 92 westbound connector. The other berm would be located between the right-of-way line and the I-880 northbound to Route 92 eastbound ramp. Evergreen trees such as redwoods would be planted on top of the berms to provide immediate screening from the residences to views of the elevated interchange structures. The berms would provide visual interest for the interchange and enhance the overall appearance.
- Depending on funding, replacement plantings could be provided in container sizes larger than typically provided. Otherwise, standard replacement planting application would be installed and would be designed with respect to the City of Hayward Landscape Beautification Plan. Plantings would be provided with automatic irrigation systems and a minimum three-year plant establishment period.
- The interchange structures would be engineered to be as narrow in profile as practical.
- Replacement planting would include plantings of relatively tall, fast-growing tree groupings, provided in minimum fifteen-gallon container sizes, within the interchange to screen neighborhood views to the elevated ramps. This application would help to reduce the visual impacts

associated with landscape removal during construction by reestablishing a landscape that matures sooner.

- Existing street trees and sidewalks are to be retained where possible. For neighborhood continuity, infill street trees would be planted within the local public right-of-way, space permitting, at viewer affected locations on Willimet Way, Magnolia Street, Lindenwood Way, Booker Way, Eldridge Avenue, and Peterman Avenue. Trees would be provided to the City of Hayward who would be responsible for coordinating the planting. Such planting would be subject to local approval since planting and maintenance of planting outside state right-of-way would be the responsibility of the City or others.
- Colors and textures of combination retaining walls/sound walls facing neighborhoods would be subdued, low in contrast, textured, and non-reflective to visually recede. Where feasible, retaining wall designs would provide planting strips for shrubs and vines to screen the wall. Where feasible, sound walls would be set back from the top edge of retaining walls to provide planting space for shrubs and vines to screen the sound wall. Where walls cannot be effectively screened by plantings, designs of contrasting block colors and textures in walls would be used to reduce the apparent scale of the wall. Street trees, particularly at street intersections perpendicular to the walls, would be planted within the local public right-of-way adjacent to proposed sound walls.
- Where feasible, sound walls would be located to provide planting space on the neighborhood side of the walls. Trees, shrubs and vines of a sufficient size and growth habit to buffer the walls from neighborhood views would be planted in front of sound walls on state right-of-way. The planting palette would be varied in value, texture, and height to camouflage the horizontal top of the sound wall within a 5-year period.
- Caltrans would continue to work with the City of Hayward and severely affected residents to minimize visual impacts of sound walls and prevent further deterioration of the quality of the environment.

3.15.3.2 Alternative 2D Variation

The mitigation measures identified for Alternative 2C Variation would also be applicable to Alternative 2D Variation.

3.15.3.3 Alternative H

The following mitigation measures reduce adverse visual effects associated with Alternative H.

- Fast growing evergreen trees and shrubs would be planted to screen views to the Route 92 bridge over I-880. In the northwest and southeast quadrants, these trees would be situated on top of berms between sound wall and freeway facilities.
- Colors and textures to reduce glare and visual dominance of combination retaining and sound walls on Booker way would be selected. If adequate space is available, plantings would be added to screen and soften the appearance of the wall and reduce the wall's dominance.
- Upon entering into a maintenance agreement with the City of Hayward, trees, shrubs and vines could be planted on the neighborhood side of the sound wall that replaces the residences on Peterman Avenue. This would soften the appearance of the wall and lessen the impact to the remaining residences.
- Quick to mature trees (15 gallon sized) and plantings (larger than typical size) could be installed to replace the redwood trees and plantings within the loop ramps of the I-880/Route 92 interchange, depending upon funding.
- Space permitting, proposed earth berms situated between sound walls and freeway facilities would be planted with trees, shrubs, and possibly ground cover, providing a natural visual screen and enhancing visual character. The proposed earth berms would be contour-graded in a manner to resemble naturally occurring landforms. This contour grading, along with proposed plantings, would soften the appearance of the interchange components.
- For properties adversely affected by the relocation of the Cheney/Eldridge pedestrian overcrossing, Caltrans, in consultation with the City of Hayward, would limit outward visibility along the length of the overcrossing to the properties adjacent to overcrossing ramp locations by installing visual screening on the overcrossing structure.
- For motorists on I-880 and Route 92, proposed structures and sound walls would be designed with consistent colors, patterns, and textures, wherever feasible. Such treatment would enhance the visual continuity of the

corridor. Replacement planting would be added that would increase the visual quality of the corridor for motorists.

3.16 Historical and Archaeological Resources

For all the build alternatives, there would be no impacts to any historical or archaeological resources.

3.16.1 Affected Environment

A study area or Area of Potential Effect (APE) for this project was defined and extends along I-880 from Tennyson Road to Winton Avenue and along Route 92 from Calaroga Avenue to Santa Clara Street. The APE for the evaluation of impacts to historical architectural resources includes the APE for archaeological resources and extends beyond the construction right-of-way to include the first row of structures.

Two study areas or APEs for this project were defined. Both extend along I-880 from Tennyson Road to Winton Ave and along Route 92 from Calaroga Avenue to Santa Clara Street. The APE for evaluation of effects on archaeological sites consists of all lands within the maximum proposed right-of-way (including construction areas). The APE for the evaluation of impacts to historic architecture includes the first APE and extends out beyond the construction right-of-way to include the first row of structures.

Archival research was conducted for this project at the Northwest Information Center, California Archaeological Inventory, the libraries of the University of California, Berkeley, the Caltrans library in Sacramento, and the United States Geological Survey in Menlo Park. Standard sources, such as the California Inventory of Historic Resources, California Historical Landmarks, and the listing of historic properties on the National Register of Historic Places were also consulted. In addition, as part of this project, complete archaeological and historic architecture surveys of the two APE were conducted.

Record searches and surveys revealed no archaeological or historic sites within the two APE. The Turner Ranch or the Himalayan Fur Farm located on Turner Court in the northwestern quadrant consists of a group of structures, including a wood-frame house, a barn, three sheds, a Quonset hut converted to a residence, and other structures. Some are over 50 years of age. The State

Historic Preservation Officer (SHPO), however, concurred in 1993 with FHWA's determination that this complex lacks architectural or historic significance, and is ineligible for inclusion on the National Register of Historic Places (see Appendix N). In 1998, Caltrans reevaluated archaeological and historic sites in the APE and found no new resources that have become eligible for inclusion on the National Register of Historic Places.

All other structures are less than 50 years of age. The Route 92 overcrossing of I-880 and Calaroga Overcrossing on Route 92 are listed as historically not significant in the Caltrans Comprehensive Bridge Survey.

3.16.2 Permanent, Temporary, Construction and Other Impacts

The proposed project would not likely affect known or suspected archaeological resources or any historic sites.

3.16.3 Mitigation

In the event that buried cultural deposits are discovered, construction in the vicinity of the finds will cease until the project Archaeologist, in consultation with the Caltrans Archaeologist, State Historic Preservation Officer, and the Advisory Council on Historic Preservation has determined the nature, integrity, and historical significance of the resource for the purposes of Section 106 of the National Historic Preservation Act and CEQA.

3.17 The Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

The three build alternatives result in the acquisition of land that currently has other uses, mainly residential. No agricultural lands are affected.

The long-term productivity of the study area and the broader San Francisco Bay Area would be enhanced by the proposed reconstruction of the interchange. The reconstruction of the interchange would improve movement of people, goods, and services. Within the immediate vicinity of the project, air quality would improve with more efficient operation of the interchange. Traffic safety would improve at the interchange and on local arterials and

streets that are currently used as alternate routes. The improvement in traffic operations through the interchange would slightly reduce travel time through the interchange during peak periods, and result in some improvement in energy efficiency.

This project is included in the State Toll Bridge Program and is therefore a part of the RTP for the Bay Area. RTPs are developed based on present and future traffic projections, which themselves are determined by present and future land use developments. The project is therefore consistent with the maintenance and enhancement of long-term productivity of the region, and any short-term local impacts and use of resources due to the project are outweighed by these long-term benefits.

The proposed I-880/Route 92 interchange Project provides the following benefits:

- improved traffic flow and operation between I-880 and Route 92
- improved traffic flow and operation on I-880 and Route 92 through the interchange (elimination of the interchange as a bottleneck)
- reduced queue lengths and duration throughout the project area
- reduced peak period vehicular gasoline and diesel fuel usage
- reduced peak period vehicular air pollution
- reduced vehicular merging and weaving conflicts and potentially less accidents
- reduced delays and potential increased productivity time for motorists

These benefits come at the expense of the following costs:

- relocation and disruption of twelve households under Alternative H
- partial acquisitions, permanent easements, and temporary construction easements required of other residential and commercial properties
- delays to motorists during demolition and reconstruction of the Calaroga Overcrossing and the Route 92/I-880 Separation Structure
- potential increase in conflicts between motorists during construction
- loss of landscaping and visual character of Route 92 during construction
- increased noise and vibrations during construction
- use of materials and energy to construct the project

- use of clean borrow (soil) for embankments
- reduction in capacity of hazardous waste disposal sites (if contaminated soils were to be removed and disposed at such a site)
- change in the appearance and visual character of Route 92, I-880, the I-880/Route 92 interchange, and the neighborhoods and residences adjoining I-880 and Route 92
- potential reduction in property value of residences in which a portion is acquired for the project

The construction costs are temporary, short term, and borne by everyone—Hayward residents and commuters—in the region. Other costs (e.g., relocation, reduction in property value, etc.) are borne by a limited number of people. In contrast, the benefits of the proposed project are longer lasting and accrue to people throughout the region.

3.18 Any Irreversible and Irretrievable Commitments of Resources That Would be Involved in the Proposed Action

Implementation of the proposed action involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally irretrievable. However, highway construction materials are not in short supply and their use does not have an adverse effect upon continued availability of these resources. Any construction will also require a substantial one-time expenditure of both state and federal funds, which are irretrievable.

The commitment of these resources is based on the concept that residents in the immediate area, region, and state will benefit by the improved quality of the transportation system. These benefits will consist of improved accessibility and safety, savings in time, and greater availability of quality services, which are anticipated to outweigh the commitment of these resources.

The construction of the proposed I-880/Route 92 interchange project results in irreversible and irretrievable commitment of the following resources:

- materials, labor, and energy to build the project
- capacity of disposal sites for construction waste and contaminated/hazardous materials
- land currently in residential, commercial, or public use
- views from the surrounding areas towards I-880 and Route 92
- toll bridge revenues, Alameda County Measure B (1989) monies, and other funds
- materials, labor, and energy for maintenance of the facilities

As stated in the previous section, the expenditure of all of these resources ultimately benefits the region. If the I-880/Route 92 interchange project were to be halted or delayed, all of these resources, except land currently in residential use and views from the surrounding areas, which are particular to this I-880/Route 92 interchange project, would undoubtedly be spent on other projects.

3.19 Unavoidable Adverse Impacts

The previous sections identified impacts of the build alternatives and specified mitigation measures designed to reduce or eliminate potential adverse effects. Potential unavoidable adverse impacts are listed below.

Relocation

The project displaces twelve residences under the Preferred Alternative. Adequate, affordable housing is available to relocate displaced households in Hayward, the East Bay, and elsewhere in the Bay Area. However, for those families and individuals that are displaced, separation from familiar

neighborhood surroundings, services, and people represents an unavoidable adverse impact.

Visual Resources

Landscaped Freeway status for Route 92 and I-880 is lost for some sections of the freeways within project limits.

Other unavoidable adverse visual impacts that could not be completely mitigated are those that reduce the intactness and unity of the existing neighborhood character.

With Alternative H, these impacts occur along Booker Way and Peterman Avenue where residential views are replaced with retaining wall/sound wall combinations. In these instances, microclimate changes to immediately adjacent properties would potentially occur.