3.2.5 Hazardous Waste/Materials

Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health and land use.

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

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

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

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

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

The California Health and Safety Code, Hazardous Waste Control

The Hazardous Waste Control Act (HWCA) regulates the generation, treatment, storage, and disposal of hazardous waste. Hazardous waste is any material or substance that is discarded, relinquished, disposed of, or burned, or for which there is no intended use or reuse, and the material or substance causes or significantly contributes to an increase in mortality or illness; or the material or substance poses a substantial present or potential hazard to human health or the environment. These materials or substances include spent solvents and paints (oil and latex), used oil, used oil filters, used acids and corrosives, and unwanted or expired products (pesticides, aerosol cans, cleaners, etc.). If the original material or substance is labeled Danger, Warning, Toxic, Caution, Poison, Flammable, Corrosive or Reactive, the waste is very likely to be hazardous.

The California Health and Safety Code, Underground Storage Tank Regulations

Chapter 6.7 of the Health and Safety Code outlines the requirements for USTs, identifies requirements for corrective actions, cleanup funds, liability, and the responsibilities of owners and operators of USTs.

Solano County, Environmental Health Services Division, Certified Unified Program Agency

The Solano County Department of Resource Management, Environmental Health Services Division is the Certified Unified Program Agency (CUPA) for all cities and unincorporated areas within Solano County. The CUPA is a single local agency designated by the California Environmental Protection Agency as having regulatory authority for eight environmental programs. These programs are Hazardous Materials Business Plan, Hazardous Waste, California Accidental Release Prevention (Risk Management Plan), Aboveground Storage Tanks, Underground Storage Tanks, Emergency Response, Waste Tire Program, and Illegal Disposal/Complaints. The Solano County CUPA enforces those programs throughout the County. In addition to the CUPA Program, staff responds whenever there is an accidental release of hazardous materials.

In addition, the State Water Resources Control Board has contracted with the County of Solano to provide regulatory oversight for the cleanup of leaking underground storage tanks (LUSTs) under Local Oversight Program (LOP) contract. The programs service all the cities and unincorporated areas of Solano County.

The site cleanup program oversees the voluntary cleanup of contaminated property. Sections 101480 through 101490 of the California Health and Safety Code provide that a Responsible Party (RP) for a release site may request oversight of a site investigation and any remediation necessary to mitigate the site. Oversight activities include any review required of site assessment and remediation workplans, review of required sampling operations, analysis of sampling data, and establishment of site cleanup criteria. The RP can initiate oversight by submitting a written request for oversight. Once the signed agreement is received, the Environmental Health Services Division is required to notify the California Department of Toxic Substances Control (DTSC) and the applicable Regional Water Quality Control Board (RWQCB) to determine if these agencies have regulatory involvement with the site. If no concerns are raised by the State agencies, then a staff person of the Environmental Health Services Division Hazardous Materials

Section will oversee the investigation and remediation of the site. After determining that the RP has completed the site investigation and remediation necessary to protect human health and the environment then, Environmental Health Services Division Hazardous Materials Section will prepare a no-further-action "closure" letter stating that the investigation and remediation is complete.

Asbestos Regulations

Title 8 California Code of Regulations Section 1529 regulates asbestos exposure in all construction work and defines permissible exposure limits and work practices. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of materials exceeds 1%, virtually all requirements of the standard become effective. With respect to potential worker exposure, notification, and registration requirements, the California Division of Occupational Safety and Health (Cal/OSHA) defines asbestos-containing construction material (ACCM) as construction material that contains more than 0.1% asbestos (8 CCR 341.6).

Affected Environment

The project consists of the project footprint and surrounding land in the vicinity of Fairfield and Suisun City, Solano County, California. The approximate site location is depicted on Figure 2-1. The specific site reconnaissance for this analysis are described in detail below.

Initial Site Assessment Reports

The information below is summarized from *Initial Site Assessment, I-80, I-680, SR-12 Improvement Project, Solano County* (ISA) prepared in 2008 and updated in 2009. The ISA reports were prepared in accordance with the Department's *Initial Site Assessment Guidance* in order to determine the presence of hazards and hazardous materials within the project right-of-way and temporary construction easements.

The ISA reports included the following:

- Reviews of previously prepared environmental reports, Draft Private Property Investigation and Aerially-Deposited Lead Report. These reports document potential environmental concerns within the Department's right-of-way and properties adjacent to the proposed project.
- Review of physical setting references and observations made to obtain information concerning the topographic, geologic, and hydrogeologic characteristics of the site and vicinity.
- Summary of a site reconnaissance conducted from public thoroughfares to observe conditions and activities for indications of evidence of recognized environmental conditions.
- Review of historical sources (including prior environmental reports, aerial photographs, and topographic maps) to develop a site history detailing previous uses of the site and the surrounding area to identify potential past uses that might have led to recognized environmental conditions.

- Review of publicly available federal, state, and local regulatory agency records to help identify recognized environmental conditions at or potentially affecting the site.

The information obtained for the ISA reports is relevant only for the dates of the records reviewed or as of the date of the latest site visit. Therefore, the information is valid only as of the date of the reports. Due to the lack of sufficient right-of-entry permits, site reconnaissance of private parcels and property owner interviews were not performed.

The ISA reports are not a comprehensive site characterization and should not be construed as such. The findings and conclusions presented are predicated on the site reconnaissance, a review of the historical usage of the site, and a review of the specified regulatory records as presented in the ISA. It should be noted that wetlands delineation and surveys of asbestos, lead-containing paint (non-bridge) structure, lead in drinking water, radon, methane gas, and mold were not included in the scope of services for these reports. Therefore, the ISA reports should be deemed conclusive only with respect to the information obtained.

Site Reconnaissance

Site reconnaissance of the project area was performed in April 2008 and April 2009. The purpose of the reconnaissance was to survey the existing I-80/I-680/SR 12 corridors, adjacent roadway connector and private property conditions within and adjacent to the area from public thoroughfares to attempt to identify visual indicators of potential hazardous waste facilities/impacts. The site reconnaissance excludes the segment of eastbound I-80 from SOL PM 14.0 to 15.7 and eastbound SR 12E from SOL PM L1.8 to L2.0, the eastbound I-80 Truck Inspection Facility, and portions of adjacent property south of I-80.

Aerially Deposited Lead Report

Aerially deposited lead (ADL) in soils adjacent to highways is attributed to the historic use of leaded gasoline. Areas of primary concern are soils along routes that have had high vehicle emissions from large traffic volumes or congestion during the time period when leaded gasoline was in use (generally prior to 1986). Typically, ADL is found in the top two feet of material in areas within the highway right-of-way. Soils within the Department's right-of-way that contain hazardous waste concentrations of ADL can be reused under the authority of variances issued by the DTSC. The variances allow stockpiling, transporting, and reusing soils with concentrations of lead below maximum allowable levels on the Department's right-of-way when specific conditions are met.

The ADL report for the I-80 Eastbound Cordelia Truck Scale Relocation Project (a nearby project) is summarized in the 2009 ISA update. ADL investigation of the Department's right-of-way consisting of the eastbound shoulder of I-80, from PM 10.0 to 15.7, and eastbound SR 12E from PM L1.8 to L2.0 were performed. A total of 105 soil samples were collected for lead analysis. Additionally, 20 step-out borings were advanced and 24 soil samples were collected. Soil samples were collected from the step-out borings at selected depths between the surface and 2.5 feet, and were based upon the depth intervals where reported soluble lead concentrations (using the waste extraction test [WET]) exceeded the soluble threshold limit concentration (STLC) of 5.0 milligrams per liter (mg/l) in the corresponding initial samples. Soil analytical results and the lead statistical evaluation of the initial borings indicated the following.

- Shallow soil at the western and eastern portions of the project area would not be classified as a California hazardous waste because the 90% upper confidence limit (UCL) predicted soluble WET lead concentration is less than the lead STLC of 5.0 mg/l.
- The top one foot of soil excavated from the central portion of the area investigated should be either (1) managed and disposed of as a California (but not an RCRA—i.e., Federal) hazardous waste or (2) stockpiled and re-sampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil would not be classified as hazardous waste based on lead content. Based on the results of the step-out borings, the ADL impacts at hazardous-waste levels do not appear to extend further than 12 feet from the edge of pavement (EOP).
- Analytical results of the step-out boring soil samples did not report soluble WET lead at concentrations above the STLC of 5.0 mg/l. Therefore, soil excavated from areas greater than approximately 12 feet from the EOP (approximately ten feet from the initial borings) and generated for offsite disposal should not be classified as a California hazardous waste based on lead content.

Environmental Data Resources Database Search

Environmental Data Resources (EDR) performed a search of federal, state, and local databases for the project footprint and the surrounding area (Appendix E in the 2008 ISA). The following sections provide additional information regarding properties with potential hazardous materials located within approximately 0.25 mile of the project footprint.

Maps depicting the ISA study area and potential hazardous waste facilities are presented in Figures 3.2.5-1 through 3.2.5-9. Table 3.2.5-1, located at the end of this section, identifies potential hazardous waste facilities along with their respective Map ID numbers and potential impact (low and moderate risk) on right-of-way acquisition and build alternatives selection.

According to information presented in the Department of Conservation Division of Mines and Geology map, naturally occurring asbestos is not indicated in the project footprint or in the vicinity of the project (California Department of Conservation 2000).

Emergency Response Notification System

The Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances. Two ERNS sites are within the search area for the proposed project.

- Emergency Response Notification System (ERNS) listing for Eastbound I-80 and I-680 overpass—In December 1988, approximately 100 gallons of gasoline spilled from an overturned tanker truck into Green Valley Creek.
- ERNS listing for I-680 and 80 interchange—In January 1991, an overturned fuel tanker caught fire and spilled approximately 7,200 gallons of diesel, affecting soil and surface water in Green Valley and Dan Wilson Creeks.

LUST and Spills, Leaks, Investigation, and Cleanup Listings

Review of the EDR search report indicates that 19 facilities in the vicinity of the project area are referenced on the LUST and/or Spills, Leaks, Investigation, and Cleanup (SLIC) listings. Two

sites appear to be associated with property to be potentially acquired by the Department as part of the proposed improvement project, and include the following:

- **The Valine property at 4000 Russell Road in Fairfield.** Based on subsequent soil and groundwater sample results, the Solano County Department of Resource Management granted case closure on June 11, 2008.
- **The 76 station (formerly Unocal) at 119 Red Top Road in Fairfield.** The County Department of Resource Management granted UST case closure on August 25, 1997.

Table 3.2.5-2 provides a summary of LUST and SLIC cases within the project vicinity that are currently open.

Table 3.2.5-2. LUST and SLIC Properties

Map ID No.	Name	Address	Substance	Affected Media	Status
6	PrimeSource Inc./ Sequoia Supply	250 Dittmer Road	Gasoline, MTBE	Soil and Groundwater (Drinking water aquifer)	Verification Monitoring
33	Canova Moving and Storage	1336 Woolner Avenue	Gasoline, MTBE, BTEX	Soil and Groundwater, possible utility migration	Remediation
36	Sheldon Oil Co.	526 School Street	Not Reported	Soil and Groundwater	Open LUST and SLIC case; Remediation

Source: ISA Update, Solano County, 2009.

UST/AST Listings

The EDR search report indicates that 12 facilities at and in the vicinity of the project study area contain registered USTs or ASTs. Many of these facilities are also included in the LUST listings. A review of the listings indicates that two of the registered UST facilities are located at properties proposed for full or partial Department acquisition as part of the proposed improvement project: the 76 Station at 119 Red Top Road in Fairfield (UST case closed), and Super Store #70567 Industries at 199 Red Top Road in Fairfield (no pending actions or violations).

RCRA SQG, FINDS and HAZNET Listings

There are 18 facilities at or in the vicinity of the project study area that are referenced on the RCRA Small and Large Quantity Generator (SQG and LQG) listings as generating between 100 and 1,000 kilograms and greater than 1,000 kilograms, respectively, of hazardous waste per month. There are 18 facilities listed in the Facility Index System (FINDS) from cross reference to other regulatory listings relating to chemical use, storage, and disposal, and 23 facilities at or in the vicinity of the project study area are referenced in the HAZNET listing for filing hazardous waste manifests.

The EDR Orphan Summary identifies properties that have incomplete address information and could not be specifically plotted. A total of 49 properties were listed in the Orphan Summary. Approximately four of the properties listed on the Orphan Summary are located within the project study area and have been incorporated in the prior regulatory listing summaries. None of these properties, however, are properties proposed for acquisition (copies of the EDR Orphan Summary and individual EDR Site Reports for the listed facilities are presented in Appendix B in the ISA Update).

Environmental Consequences

The ISA reports identified the following potential hazardous materials/waste conditions.

- **Effects associated with nearby agricultural uses:**
  - Soil impacts associated with pesticides, herbicides, petroleum hydrocarbons, and metals from agricultural use. Pesticides appear to be present in surface soil in the central and eastern portions of the proposed project area and the Suisun Creek Bridge area.
- **Other soil effects:**
  - Contaminated soil associated with leaking storage tanks and sanitary sewer pipelines.
  - Groundwater in the eastern portion of the proposed project area and the Suisun Creek Bridge area appears to be affected by pesticides. Potential impacts may be associated with construction of bridge pilings greater than ten feet deep.
- **Effects associated with traffic or roadway maintenance:**
  - ADL at levels exceeding hazardous waste criteria have been identified within the unpaved shoulders and median within existing I-80 right-of-way in the central and eastern portions of the project area.
  - Lead-containing paint (LCP) associated with removal of existing yellow pavement striping.
- **Potential effects associated with the removal or modification of facilities or structures:**
  - Sulfur from bridge rail posts may be encountered during demolition.
  - LCP may be encountered during demolition.
  - Treated-wood waste may be encountered during demolition.
  - Asbestos-containing pipe may be encountered during demolition.
- **Effects associated with identified potential hazardous waste facilities:**
  - Past residual petroleum hydrocarbon releases may require additional UST removal and soil and groundwater remediation.

ADL is present in the surface and near-surface soils as a result of past emissions from vehicles powered by leaded gasoline. Yellow thermoplastic and paint striping, potentially containing lead chromate, is present on roadway surfaces within the project area. Structures within the existing Department rights-of-way and those present proposed for full or partial Department acquisition may contain ACMs and LCPs. Potential LCP and ACMs also may be present in bridge construction materials within the project area.

Soil sampling and analysis to evaluate ADL in shallow soil within the existing eastbound I-80 right-of-way indicates that the top one foot of soil in the central portion of the project area would be classified as hazardous waste based on lead content.

Soil sampling and analysis to evaluate properties being considered for right-of-way acquisition was conducted. Results indicate elevated levels of arsenic, vanadium, pesticides, and dieldrin exceeding acceptable residential, commercial, and industrial ESLs.

Exposure of Humans and the Environment to Groundwater Contamination as a Result of Construction Activities

As previously discussed, Table 3.2.5-1 identifies potential hazardous waste facilities along with their respective Map ID numbers and potential impact to right-of-way acquisition and build alternatives selection. Eight facilities located within the project area are considered moderate-risk. Five of these have documented groundwater contamination and as such, are considered high-risk facilities. All eight of the medium/high risk sites are located within or adjacent to the footprints of both alternatives and therefore would not influence the selection of one alternative over another. Although some of these cases are considered closed, testing for contaminants should be conducted in order to determine the extent and nature of possible contamination.

Under the No-Build Alternative, there would be no construction and therefore, no potential to expose workers or nearby land uses to hazardous materials as a result of construction activities.

Potential for Exposure of Construction Workers or Nearby Land Uses to Previously Unknown Hazardous Materials as a Result of Construction Activities

The project area generally has a moderate risk of previously unreported hazardous materials that could be discovered during construction of any of the build alternatives. The development of a health and safety plan would address this potential hazard.

Under the No-Build Alternative, there would be no construction and therefore, no potential to expose workers or nearby land uses to hazardous materials as a result of construction activities.

Potential for Exposure of Known Hazardous Materials to Humans or the Environment as a Result of Construction Activities

The project area generally has the potential for hazardous materials in the form of heavy metals, such as chromium and lead in yellow pavement striping; ACMs; soils contaminated with pesticides, herbicides, and metals; treated-wood waste; bridge rail post sulfur; bridge pilings; and petroleum hydrocarbons that could be released during construction of any of the build alternatives unless measures are taken to avoid that release. In addition, the ADL investigation report in the ISA Update confirmed the presence of ADL within the project area.

Other potential sources of contamination include aerially applied chemicals during agricultural use of adjacent parcels that could present a respiratory irritant to construction workers. Construction may require the movement or disposal of soils or materials containing some or all of these hazardous materials. Implementation of measures relating to the handling of yellow striping, contaminated soils, sampling ground water, and to timing of construction will avoid these potential adverse effects.

Under the No-Build Alternative, no construction would occur and therefore, there would be no potential to expose any known hazardous materials during construction.

Potential for Exposure of Humans and the Environment to Hazardous Conditions from the Accidental Release of Hazardous Materials as a Result of Construction Activities

Construction would involve the use of heavy equipment, small quantities of hazardous materials (e.g., petroleum and other chemicals used to operate and maintain construction equipment), and larger quantities of potentially hazardous road construction materials (i.e., blacktopping materials) that may result in hazardous conditions in the project area. In addition, sanitary sewer pipelines may cross or exist within the planned roadway construction alignment. If pre-existing leaks are encountered, or if pipelines are ruptured during construction, construction workers or nearby land uses could be exposed to biological contamination. These hazards are applicable to any of the build alternatives. The development of a health and safety plan would avoid and minimize this potential effect.

Under the No-Build Alternative, no construction would occur and therefore, there would be no potential for an accidental release of hazardous materials as a result of construction activities.

Avoidance, Minimization, and/or Mitigation Measures

Perform Groundwater Contamination Testing

Five sites identified in Table 3.2.5-1 have documented groundwater contamination issues and as such, are considered high-risk facilities. Although some of these cases are considered closed, testing for contaminants should be conducted in order to determine the extent and nature of possible contamination.

Therefore, subsequent to the public circulation of the draft environmental document, testing will be performed on those parcels that are affected by the selected alternative, provided that a right of entry to perform the testing can be obtained.

Develop a Health and Safety Plan to Address Worker Health and Safety

The location of underground pipeline crossings will be determined by the Underground Service Alert (USA) system for excavation work at these pipeline crossings before construction. Soil testing for contamination will be conducted prior to construction work. Soils within the Department's right-of-way that contain hazardous waste concentrations of ADL can be reused under the authority of variances issues by the California DTSC. These variances include stockpiling, transporting, and reusing soils with concentrations of lead below maximum allowable levels on the Department's right-of-way when specific conditions are met. As necessary, a health and safety plan will be prepared to address worker safety when working with potentially hazardous materials, including biological contaminants, potential LCPs, soils potentially containing ADL, and other construction-related materials within the right-of-way for any soil disturbance.

Conduct Sampling, Testing, Removal, Storage, Transportation, and Disposal of Yellow Striping along Existing Roadways

The Department will ensure that before construction, the contractor will sample and test yellow pavement striping scheduled for removal to determine whether lead is present. All aspects of the proposed project associated with removal, storage, transportation, and disposal will be in strict accordance with appropriate regulations of the California Health and Safety Code. Disposal of the stripes will be at a Class 1 disposal facility. The responsibility of implementing this measure will be outlined in the contract between the Department and the contractor.

Dispose of Soils Contaminated with ADL, Arsenic, Pesticides, and Herbicides in Accordance with Appropriate Regulations

Based on the results of the 2008 ADL investigation report summarized in the 2009 ISA, soils in the central and eastern portions of the project area are classified as hazardous waste. This soil will be handled or disposed of in accordance with the California Health and Safety Code DTSC requirements. Under the DTSC Variance, this soil may be reused onsite if the excavated soil is placed under clean fill or pavement and a minimum of five feet above the maximum water table elevation. Consultation and a permit from the Solano County CUPA will be obtained before reusing any contaminated soil. The CUPA will consult with the DTSC regarding any further requirements.

Based on the elevated arsenic, lead, and pesticides concentrations reported in soil samples from the upper 2.5 feet of soil at the private property parcels, the top 2.5 feet of excavated soil can be reused within the project limits by placing the soil beneath a minimum of one foot of clean fill or beneath a pavement structure. If reuse conditions are not met, material will be transported to the Class 1 disposal site at Kettleman City.

Time Construction to Avoid Exposure of Construction Workers to Respiratory Irritants from Aerially Applied Chemicals

The Department will ensure that the contractor coordinates the timing of construction activities with individual growers on parcels within or adjacent to the project area to avoid any aerially applied chemical impacts on workers during construction.

Sampling and Testing of Groundwater

Groundwater sampling within the Suisun Creek Bridge vicinity of the project area should be performed to further evaluate potential contamination. Sampling and testing for contamination will be conducted during construction activities that require excavation deeper than four feet. Groundwater containing contaminates will be treated to reduce sediment load and metal content prior to discharge to surface water bodies or publicly owned treatment facilities.

Table 3.2.5-1. Summary of Identified Potential Hazardous Waste Facilities and Recommendations

Table 3.2.5-1
SUMMARY OF IDENTIFIED POTENTIAL HAZARDOUS WASTE FACILITIES AND RECOMMENDATIONS
I-80/I-680/SR-12 IMPROVEMENT PROJECT

Map ID No.	Facility	Address	APN	Impact to ROW and Acquisitions	Information Source(s)	Environmental Impacts/ Chemical of Concern	Regulatory Status	Potential Impact to I-80/I-680/SR-12 Improvement Project and Recommendations
1	Tower Mart	4720 Gold Hill Road		Low Impact Alt B and C ESA	EDR Report LUST	Active service station located west of the project ESA. Based on information presented in the EDR report, this facility was listed in the LUST database for petroleum hydrocarbon impacts to soil only.	The facility is listed with a "case closed" status from the SCDRM.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
2	**76 Station**	**119 Red Top Road**	**0180-01-0070**	**Moderate Impact Alt B and C ESA**	**Recon LUST SCDRM Files**	**Active service station located within the project ESA. USTs were removed in 1995. A leak in a waste oil UST was discovered and petroleum-impacted soil excavated. Confirmation soil samples did not contain detectable levels of contaminants. Low levels of BTEX reportedly remain in soil at a depth of 4.5 feet along the former product piping trenches. Groundwater not encountered in the excavation and the SCDRM indicates impacts to soil only. Replacement USTs reportedly subsequently installed at the facility.**	**This facility was granted UST case closed status from the SCDRM in August 1997.**	**This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. A partial or full parcel take may require UST removals, and additional soil and groundwater characterization and remediation. from past petroleum hydrocarbon releases. Exploratory borings should be performed for any planned construction excavations on and adjacent to this facility to evaluate worker health & safety and soil disposal options.**
3	Sunnyside Farms	199 Red Top Road	0180-01-0050	Low Impact Alt B and C ESA	Recon LUST SCDRM Files	The facility is currently a food distribution facility within the project ESA. Three USTs abandoned in place in 1989. Confirmation sample results were not included in SCDRM files. Three diesel ASTs reported at the facility. A fourth diesel UST and fuel dispensers removed in 2004 under SCDRM supervision. Contaminants not detected in confirmation soil samples. Groundwater was not encountered during closure activities.	No pending regulatory action or active violations were noted in SCDRM files for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed if partial or full parcel take is contemplated to evaluate potential site impacts related to petroleum hydrocarbon releases from past UST and current AST operations.
4	Jack-in-the-Box (Former Red Top Mini Market)	107 Red Top Road (formerly 151 Red Top Road)	0180-01-0080	Low Impact Alt B and C ESA	LUST SCDRM Files 1970 Aerial	Currently a fast-food restaurant (formerly a service station) within the project ESA. One UST failed a leak test in 1986, and three USTs removed in 1987. Petroleum impacts to soil and a limited amount of soil was excavated during the UST removal. A 1996 site characterization found TPHg and low levels of BTEX in 2 of the 30 soil samples collected at 10 ft. Soil samples at the 20 foot depth from the same borings did not contain detectable levels. Water samples collected from borings within the former UST excavation contained low levels of TPHg and BTEX. Additional impacted soil and groundwater were removed from the property for offsite disposal. Contaminants were reportedly not detected in confirmation soil samples.	This facility was granted a case closed status from the SCDRM in November 1996.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
5	United Parcel Service	5000 West Cordelia Road		Low Impact Alt C ESA	Recon UST	Active UPS parcel distribution facility within the project ESA. The UPS facility was listed in the EDR report in the UST database for operation of one UST at the facility. No case files at the SCDRM for this property and no releases indicated in the EDR report.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternative C based on proposed construction area boundaries.
6	Prime Source	250 Dittmer Road		Low Impact Alt C ESA	LUST GeoTracker	The facility is an active automobile re-seller. One UST removed in 1988. Petroleum-impacted soil was encountered in the tank pit. A replacement diesel UST was installed at the same location later that year. In 1997, a motor oil UST was abandoned in place under the supervision of SCDRM. In 2005, both USTs removed. Impacted soil and groundwater were identified and the area over-excavated. Contaminants were not detected in confirmatory soil samples, though were in groundwater. Additional borings and monitoring wells installed and soil excavated. Low levels of TPHd remain in onsite groundwater.	SCDRM is evaluating consultants request for No Further Action status for the facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternative C based on proposed construction area boundaries.
7	Arco Station	105 Lopes Road		Low Impact Alt B and C ESA	Recon UST	Active gas station with no reported releases or violations. The facility was observed in the field during the site reconnaissance and was not included in the EDR Report.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
8	Napa Valley Beverage Company	497 Edison Court		Low Impact Alt C ESA	Recon SCDRM Files LUST	Two USTs removed in 1989. Low levels of contaminants encountered in soil from the tank pit. SCDRM required installation of monitoring wells. Onsite soil remediation conducted in 1990. In August 1994, a groundwater sample from near the former UST excavation contained low levels of TPHd.	This facility was granted a case closed status from the SCDRM in August 1995.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternative C based on proposed construction area boundaries.

Source: Geocon Consultants. 2009. I-80/I-680/SR 12 Improvement Project, Fairfield and Suisun City, Solano County, California, Initial Site Assessment Update. Prepared for U.S. Department of Transportation, Federal Highways Administration, State of California, Department of Transportation. April 2009

Table 3.2.5-1
SUMMARY OF IDENTIFIED POTENTIAL HAZARDOUS WASTE FACILITIES AND RECOMMENDATIONS
I-80/I-680/SR-12 IMPROVEMENT PROJECT

Map ID No.	Facility	Address	APN	Impact to ROW and Acquisitions	Information Source(s)	Environmental Impacts/ Chemical of Concern	Regulatory Status	Potential Impact to I-80/I-680/SR-12 Improvement Project and Recommendations
9	Hudson Beverage Company	237 Lopes Road		Low Impact Alt B and C ESA	Recon SCDRM Files LUST	The facility is a commercial business. Two USTs removed 1997. Impacts soil and groundwater were encountered and over-excavation and removal of groundwater conducted. Confirmation soil and groundwater samples also showed residual petroleum impacts. In 2000, two USTs closed in place. In October 2000, sampling defined the extent of impact to a localized area near the former UST pit.	This facility was granted a case closed status from the SCDRM in March 2001.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
10	Sierra Truck and Van (Formerly Trail Wagons)	225 Lopes Road		Low Impact Alt B and C ESA	SCDRM Files LUST	The facility is a commercial business. Two USTs removed in August 1993. Confirmation soil samples contained low levels of contaminants. The tank pit was over-excavated and final confirmation soil samples contained no contamination.	This facility was granted a case closed status from the SCDRM in October 1995	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
11	Saturn of Fairfield	4850 Auto Plaza Court		Low Impact Alt B and C ESA	Recon	The property is an auto dealership with no reported releases that was not listed in the EDR report, on the GeoTracker website, or in SCDRM case files.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
12	Costco Gas Station	5101 Business Center Drive		Low Impact Alt B and C ESA	Recon EDR	The property is an active gas station with no reported releases located north of the project ESA and was listed in the EDR Report in the UST, RCRA SQG, and FINDS databases. The EDR Report identified three gasoline USTs in use at the facility. The facility was not listed in the GeoTracker database or in SCDRM case files.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
13	Green Valley Cleaners	5055 Business Center Drive		Low Impact Alt B and C ESA	Recon EDR	The property is an active dry cleaner with no reported releases located north of the project ESA. The business was listed in the EDR Report in the Drycleaners and HAZNET databases. Regulatory information for the facility was not listed on the GeoTracker website or available in SCDRM case files.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
14	Former Campbells Carpets	4731 Central Way		Low Impact Alt B and C ESA	SCDRM Files LUST	The property is a vacant portion of a commercial building. One UST removed in 1989 without SCDRM permit. In August 1997, SCDRM requested, soil and groundwater sampling to evaluate impacts. Soil and groundwater samples contained petroleum hydrocarbons and BTEX. Groundwater flow direction at that time was estimated to be to be toward the southeast. A 1998 soil gas survey indicated low risk to building occupants.	This facility was granted a case closed status from the SCDRM in September 1998.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
15	**Former Terminal Stations, Inc.**	**100 Suisun Valley Road**		**Moderate Impact Alt B and C ESA**	**SCDRM Files LUST**	**Currently vacant land, formerly occupied by a truck refueling facility located immediately west of I-80, north if the I-80/I-680 interchange. In 1984 a waste oil/diesel fuel discharge from the facility to an unnamed flood control channel was discovered adjacent and parallel to I-80. Impacted soil was excavated and surface water removed for offsite disposal. In 1987, USTs were operated at the property without a SCDRM permit A 1987 soil and groundwater investigation conducted along the perimeter of the facility included two soil boring locations within the Caltrans ROW adjacent to westbound I-80. Petroleum-impacted groundwater encountered in Caltrans ROW. In 1987, widespread onsite petroleum impacts to soil were identified. In 1988 all USTs were removed under SCDRM permit. In 1993, the groundwater flow direction was toward the south (toward the I-80/I-680 interchange).Subsequent groundwater extraction was conducted and monitoring indicated decreasing contaminant levels in groundwater.**	**Based on the decreasing contaminant concentration trends in groundwater, use of the property and lack of sensitive receptors within 1,000 feet, the SCDRM concluded that the facility met the requirements for low-risk case closure. The SCDRM granted UST case closure on May 3, 2001.**	**This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed within the Caltrans ROW adjacent to the property to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal options related to former petroleum hydrocarbon releases from UST operations and past surface water discharges at the adjacent property.**
16	Vacant land (former Arco Station)	4510 Central Way		Low Impact Alt B and C ESA	SCDRM Files LUST	Currently vacant land (formerly occupied by an Arco service station prior to 1987) located east of the project ESA. In 1993, soil and groundwater samples contained petroleum hydrocarbons. Groundwater flow direction in 1993 was toward the southeast.	The SCDRM granted UST case closure in July 2001.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
17	Chevron Station	4490 Central Way		Low Impact Alt B and C ESA	Recon SCDRM Files LUST	An active service station located east of the ESA. USTs removed in 1987. Onsite soil and groundwater impacts identified. Groundwater monitoring wells installed and sampled through 1997 showed decreasing contaminant levels. Groundwater flow direction in 1997 was toward the southeast. Subsequent onsite investigations during property transaction identified additional contamination that was remediated in 2001. Site conditions were also remediated following the UST removal and clean-up through 2003.	SCDRM granted low risk UST case closure for the prior USTs in 1997 and additional case closures in March 2001 and April 2004.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.

Source: Geocon Consultants. 2009. I-80/I-680/SR 12 Improvement Project, Fairfield and Suisun City, Solano County, California, Initial Site Assessment Update. Prepared for U.S. Department of Transportation, Federal Highways Administration, State of California, Department of Transportation. April 2009

Table 3.2.5-1
SUMMARY OF IDENTIFIED POTENTIAL HAZARDOUS WASTE FACILITIES AND RECOMMENDATIONS
I-80/I-680/SR-12 IMPROVEMENT PROJECT

Map ID No.	Facility	Address	APN	Impact to ROW and Acquisitions	Information Source(s)	Environmental Impacts/ Chemical of Concern	Regulatory Status	Potential Impact to I-80/I-680/SR-12 Improvement Project and Recommendations
18	Shell Station	4450 Central Way		Low Impact Alt B and C ESA	Recon SCDRM Files LUST	Active service station located east of the project ESA. USTs removed 1986. Onsite impacts to soil and groundwater identified. Groundwater monitoring wells were installed and monitored. Soil excavation and groundwater over-pumping conducted. Groundwater flow direction in 1996 was toward the southwest. Final groundwater sampling reported no further impacts.	SCDRM granted UST case closure in April 1996.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries
18	**76 Station**	**134 Pittman Road**		**Moderate Impact Alt B and C ESA**	**Recon SCDRM Files LUST**	**Active service station with located at the northeast corner of the Pittman Road/Suisun Valley Road entrance ramp to eastbound I-80. USTs removed in 1993 and impacted onsite soil and groundwater over-excavated and over-pumped for offsite disposal. Groundwater wells installed and monitored through 2001. Groundwater impacts indicated decreasing trends. Groundwater flow direction in 2001 was toward the west-southwest. Impacted groundwater has approached the property boundary at Pittman Road, south of the eastbound I-80 entrance ramp.**	**SCDRM granted low risk UST case closure on July 27, 2001.**	**This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed in the Caltrans ROW at the Pittman Road/I-80 area prior to construction to evaluate soil and groundwater conditions, worker health & safety, and soil disposal groundwater treatment options due to potential impacts from petroleum hydrocarbon releases at the adjacent property.**
20	Valero Station	4444 Central Place		Low Impact Alt B and C ESA	Recon UST SCDRM Files	An active service station located east of the project ESA. Gasoline and diesel UST were installed at the facility in 2001 when the station was built. No violations or unauthorized releases were noted in the SCDRM files.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
21	Arco Station	4449 Central Place		Low Impact Alt B and C ESA	Recon SCDRM Files LUST	An active service station located east of the project ESA. USTs upgraded at the facility in 1998. Petroleum impacted soil identified at that time was excavated and removed. SCDRM requested additional soil and groundwater sampling to further define impacted areas. In 1999, additional soil and groundwater samples indicated low petroleum impacts.	SCDRM granted UST case closure on June 11, 1999.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
22	Scandia Family Center	4300 Central Place		Low Impact Alt B and C ESA	Recon EDR	The facility is a miniature golf and arcade entertainment park located south of the project ESA. The EDR report listed a UST closed at the property on January 25, 2005. The facility was listed on the GeoTracker website as a registered UST facility, though not as a release site.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
23	**Former Old Fruit Bowl Mobil Station (Valine Ranch Property)**	**4000 Russell Road**		**Moderate Impact Alt B and C ESA**	**SCDRM Files LUST**	**The property is a former service station (operated from 1946 to 1972) located west of and adjacent to I-80 within the project ESA on land proposed for Caltrans acquisition. Five USTs removed in 2000 under observation by SCDRM. Onsite petroleum impacts to soil and groundwater identified. Impacted soil over-excavated for onsite remediation and groundwater over-pumped for offsite disposal. Residual petroleum impacted soil and groundwater remain onsite.**	**SCDRM granted case closure on June 11, 2008.**	**This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed if partial or full parcel take is contemplated to evaluate soil and groundwater conditions, worker health & safety, and soil disposal and groundwater treatment options due to impacts from residual petroleum hydrocarbon releases at the property.**
24	Pacific Gas & Electric substation	South of the I-80/SR-12 East interchange		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active PG&E electrical substation with fluid-cooled pad-mounted transformers. Possible polychlorinated biphenyl (PCB) compound impacts to soil at the facility.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
25	**Moore Tractor Company**	**4088 Russell Road**	**0027-510-040**	**Moderate Impact Alt B and C ESA**	Recon Prior Phase I SCDRM Files	Currently a tractor sales and service facility located southwest of the I-80/SR-12 East interchange and within the project ESA on land proposed for Caltrans acquisition. SCDRM inspections reported bulk automotive fluids stored at the property including diesel fuel (500-gallon AST), engine oil, and waste oil. A cement sump associated with a wash rack was also noted. Past SCDRM violations have included an overflowing sump, onsite automotive fluid spills, and improper drum storage.	No pending regulatory action or active violations are noted for this facility.	This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed if partial or full parcel take is contemplated to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal and groundwater treatment options related to past use of petroleum hydrocarbons and past operations at the property.
26	**Concrete Pipe Distributors**	**4974 Abernathy Road**	**0027-510-070**	**Moderate Impact Alt B and C ESA**	Recon Prior Phase I	Currently a concrete pipe distributor located southwest of the I-80/SR-12 East interchange. A prior UST was reportedly removed in approximately 1985. No SCDRM information regarding the removal. 55-gallon drums from the adjacent Moore Tractor Co. were observed stored at the facility in 1994.	No pending regulatory action or active violations are noted for this facility.	This facility presents a moderate risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries. Exploratory borings should be performed if partial or full parcel take is contemplated to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal and groundwater treatment options related to former UST operation and past conditions noted at the property.
27	Ford of Fairfield	3050 Auto Mall Court		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.

Source: Geocon Consultants. 2009. I-80/I-680/SR 12 Improvement Project, Fairfield and Suisun City, Solano County, California, Initial Site Assessment Update. Prepared for U.S. Department of Transportation, Federal Highways Administration, State of California, Department of Transportation. April 2009

Table 3.2.5-1
SUMMARY OF IDENTIFIED POTENTIAL HAZARDOUS WASTE FACILITIES AND RECOMMENDATIONS
I-80/I-680/SR-12 IMPROVEMENT PROJECT

Map ID No.	Facility	Address	APN	Impact to ROW and Acquisitions	Information Source(s)	Environmental Impacts/ Chemical of Concern	Regulatory Status	Potential Impact to I-80/I-680/SR-12 Improvement Project and Recommendations
28	Chrysler dealer	2955 Auto Mall Parkway		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
29	Dodge dealer	2901 Auto Mall Parkway		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
30	Volvo dealer	2855 Auto Mall Parkway		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
31	Hyundai dealer	2775 Auto Mall Parkway		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
32	Toyota dealer	2595 Auto Mall Parkway		Low Impact Alt B and C and Options 1 and 2 ESA	Recon	Active automobile dealership with no reported releases.	No pending regulatory action or active violations are noted for this facility.	This facility presents a low risk of impacting the I-80/I-680/SR-12 West Alternatives B and C based on proposed construction area boundaries.
33	Canova Moving and Storage	1336 Woolner Avenue		Low Impact Options 1 and 2 ESA	LUST Geotracker	Currently an active moving and storage company located northwest of the project ESA. One UST removed in 1989 and petroleum-impacted soil and groundwater identified. Groundwater wells installed and impacted groundwater monitored. Groundwater concentrations decreased during the 1990s. Additional investigations have defined onsite areas on soil and groundwater impacts. Groundwater flows to the southeast, though impacted groundwater does not extend south beyond Woolner Avenue.	On-going groundwater monitoring required by SCDRM.	This facility presents a low risk of impacting the SR-12 East Options 1 and 2 based on proposed construction area boundaries.
34	Suisun Fire District	445 Jackson Street		Low Impact Options 1 and 2 ESA	LUST SCDRM Files	An active district fire station located north of the project ESA. One UST removed in 1992. The tank pit was over-excavated and soil samples contained low petroleum impacts. Onsite groundwater wells were installed and monitored. Final sampling showed no petroleum impacts to groundwater.	SCDRM granted UST case closure on July 18, 1997.	This facility presents a low risk of impacting the SR-12 East Options 1 and 2 based on proposed construction area boundaries.
35	**Former Sheldon Oil Co.**	**426 Main Street**		**Moderate Impact Option 1 ESA**	**LUST Sanborn Maps SCDRM Files**	**A former bulk petroleum storage facility located at the north end of the Suisun Channel, northeast of a portion of the project ESA (Option 1 SR-12 East Concept). The property has been redeveloped to support a commercial office building (One Harbor Plaza), associated parking lot, and harbor waterfront walkways. The former Sheldon Oil Company was depicted in 1945 and 1954 Sanborn Maps. The facility stored bulk quantities of diesel fuel No. 2, asphalt emulsion, heating fuel Nos. 4, 5, 6, and used motor oil. Onsite soil impacted by petroleum hydrocarbons to a minimum depth of 9 ft. Onsite groundwater also impacted. Impacted areas extend to the Suisun Channel. Additional information regarding investigations and clean-up at the property were not available in SCDRM files.**	**SCDRM granted case closure to the facility on October 18, 1995.**	**This facility presents a moderate risk of impacting the SR-12 East Option 1 based on proposed construction area boundaries. Exploratory borings should be performed prior to roadway construction in areas near Main Street in Suisun City to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal and groundwater treatment options related to residual impacts related to former UST operations and other onsite chemical handling operations at the adjacent property.**
36	**Former Sheldon Oil Co.**	**526 School Street**		**Moderate Impact Option 1 ESA**	**LUST SCDRM Files**	**Currently a vacant lot (formerly used by the Sheldon Oil Co. as a truck washing/cleaning facility from the mid-1940s to 1993) located west of the Suisun Channel, at or adjacent to a portion of the project ESA (Option 1 SR-12 East Concept). Operations as the facility included the use of trichloroethylene (TCE) to clean truck tanks. Onsite TCE discharges reported and onsite soil and onsite/offsite groundwater impacted by petroleum hydrocarbons and VOCs identified. VOC-impacted groundwater has migrated offsite to the northeast. Impacted soil excavated and groundwater over-pumped for offsite disposal in 2006. Groundwater monitoring on-going.**	**On-going groundwater monitoring required by SCDRM.**	**This facility presents a moderate risk of impacting the SR-12 East Option 1 based on proposed construction area boundaries. Exploratory borings should be performed if partial or full parcel take is contemplated or if road construction is planned near the property to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal and groundwater treatment options related to former onsite chemical handling operations.**

Source: Geocon Consultants. 2009. I-80/I-680/SR 12 Improvement Project, Fairfield and Suisun City, Solano County, California, Initial Site Assessment Update. Prepared for U.S. Department of Transportation, Federal Highways Administration, State of California, Department of Transportation. April 2009

Table 3.2.5-1
SUMMARY OF IDENTIFIED POTENTIAL HAZARDOUS WASTE FACILITIES AND RECOMMENDATIONS
I-80/I-680/SR-12 IMPROVEMENT PROJECT

Map ID No.	Facility	Address	APN	Impact to ROW and Acquisitions	Information Source(s)	Environmental Impacts/ Chemical of Concern	Regulatory Status	Potential Impact to I-80/I-680/SR-12 Improvement Project and Recommendations
37	Former Texaco Station	522 Main Street		Low Impact Option 1 ESA	LUST SCDRM Files	Currently a municipal parking lot (formerly occupied by a service station) located east of the project ESA (Option 1 SR-12 East Concept). USTs removed prior to 1991. Petroleum-impacted soil and groundwater identified and impacted soil excavated for offsite disposal. Following excavation, soil and groundwater impacts had decreased.	SCDRM granted closure UST case closure on April 14, 1997.	This facility presents a low risk of impacting the SR-12 East Option 1 based on proposed construction area boundaries.
38	Union Pacific Railroad/705 West Street	705 West Street		Low Impact Option 1 ESA	LUST SCDRM Files	Currently a commercial facility located southeast of the project ESA (Option 1 SR-12 East Concept). Two USTs removed in 1998. Soil and groundwater petroleum impacts identified. Shallow groundwater at the property was designated as brackish and tidally influenced and not of domestic beneficial use. Due to these conditions, additional groundwater monitoring was not required.	SCDRM granted UST case closure on July 15, 1999.	This facility presents a low risk of impacting the SR-12 East Option 1 based on proposed construction area boundaries.
NA	**I-80/I-680/SR-12 West and East Bridge Structures**	**Various Locations**	**NA**	**Existing I-80/I-680/ SR-12 West and East ROW**	**Recon**	**Existing bridge structures to be renovated, or removed.**	**NA**	**Asbestos and lead-containing paint surveys should be conducted at the bridge structures prior to any planned renovation or demolition to evaluate worker health & safety, abatement and waste disposal options and comply with applicable regulations, including Bay Area Air Quality Management District requirements.**
NA	**I-80/I-680/SR-12 West and East**	**ROW Acquisition**	**NA**	**New ROW**	**Recon**	**Properties with current or historical agricultural land use may contain residual agricultural chemicals in shallow soil.**	**NA**	**Conduct soil investigations for pesticides, herbicides, and metals as applicable on land proposed for full or partial acquisition based on past agricultural land usage to evaluate soil reuse or disposal options.**
NA	**I-80/I-680/SR-12 West and East**	**ROW Acquisition**	**NA**	**New ROW**	**Recon**	**Existing structures within the project ESA and on parcel takes requiring demolition.**	**NA**	**Asbestos and lead-containing paint surveys should be conducted prior to any planned renovation or demolition of buildings either within the Caltrans ROW or on properties proposed for full or partial takes to evaluate worker health & safety, abatement and waste disposal options and comply with applicable regulations, including Bay Area Air Quality Management District requirements.**
NA	**I-80/I-680/SR-12 West and East**	**Union Pacific Railroad Bridge and Crossing**	**NA**	**Existing I-80/I-680/ SR-12 West and East ROW**	**Recon**	**Planned excavation and grading within existing ROW and potential railroad crossing in SR-12 East Option 1. Potential metals, herbicides, petroleum hydrocarbons, and PAHs resulting from past railroad operations.**	**NA**	**Perform soil and groundwater sampling for metals, herbicides, petroleum hydrocarbons, and PAHs as applicable based on proposed construction practices at UPRR Bridge (near I-80/SR-12 West interchange and potential UPRR track crossing in Suisun City to evaluate potential impacts to soil and groundwater, worker health & safety, and soil disposal and groundwater treatment options related to past railroad operations.**
NA	**I-80/I-680/SR-12 West and East**	**Existing Corridors**	**NA**	**Existing I-80/I-680/ SR-12 West and East ROW**	**Recon Prior Nearby ADL Study**	**Planned excavation and grading within existing ROW**	**NA**	**Perform shallow soil sampling to evaluate potential ADL in soil for worker health & safety and soil disposal options related to historical automobile exhaust emissions.**
NA	**I-80/I-680/SR-12 West and East**	**Existing Corridors**	**NA**	**Existing I-80/I-680/ SR-12 West and East ROW**	**Recon**	**Planned excavation and pavement work within existing ROW**	**NA**	**Further evaluate potential hazardous waste issues or provide construction special provisions for thermoplastic traffic paint, asbestos pipe, bridge rail post sulfur and proper abandonment of wells, septic systems, and encountered unidentified USTs.**

Source: Geocon Consultants. 2009. I-80/I-680/SR 12 Improvement Project, Fairfield and Suisun City, Solano County, California, Initial Site Assessment Update. Prepared for U.S. Department of Transportation, Federal Highways Administration, State of California, Department of Transportation. April 2009

Properties and locations listed in **BOLD** print have a moderate risk of impacting the project ESA and are recommended for further evaluation.

Notes: ESA – Environmental Study Area
UST – Underground Storage Tank
AST – Aboveground Storage Tank
UPRR– Union Pacific Rail Road
BTEX – Benzene, Toluene, Ethylbenzene, and Total Xylenes
NA – Not Applicable
EDR – Environmental Data Resources database
SFBRWQCB – San Francisco Bay Regional Water Quality Control Board
LUST – Leaking UST
PAHs – Polynuclear Aromatic Hydrocarbons
SCDRM – Solano County Department of Resource Management
ROW – Right-of-way
ADL – Aerially Deposited Lead
TPHg – Total Petroleum Hydrocarbons as Gasoline
TPHd – Total Petroleum Hydrocarbons as Diesel

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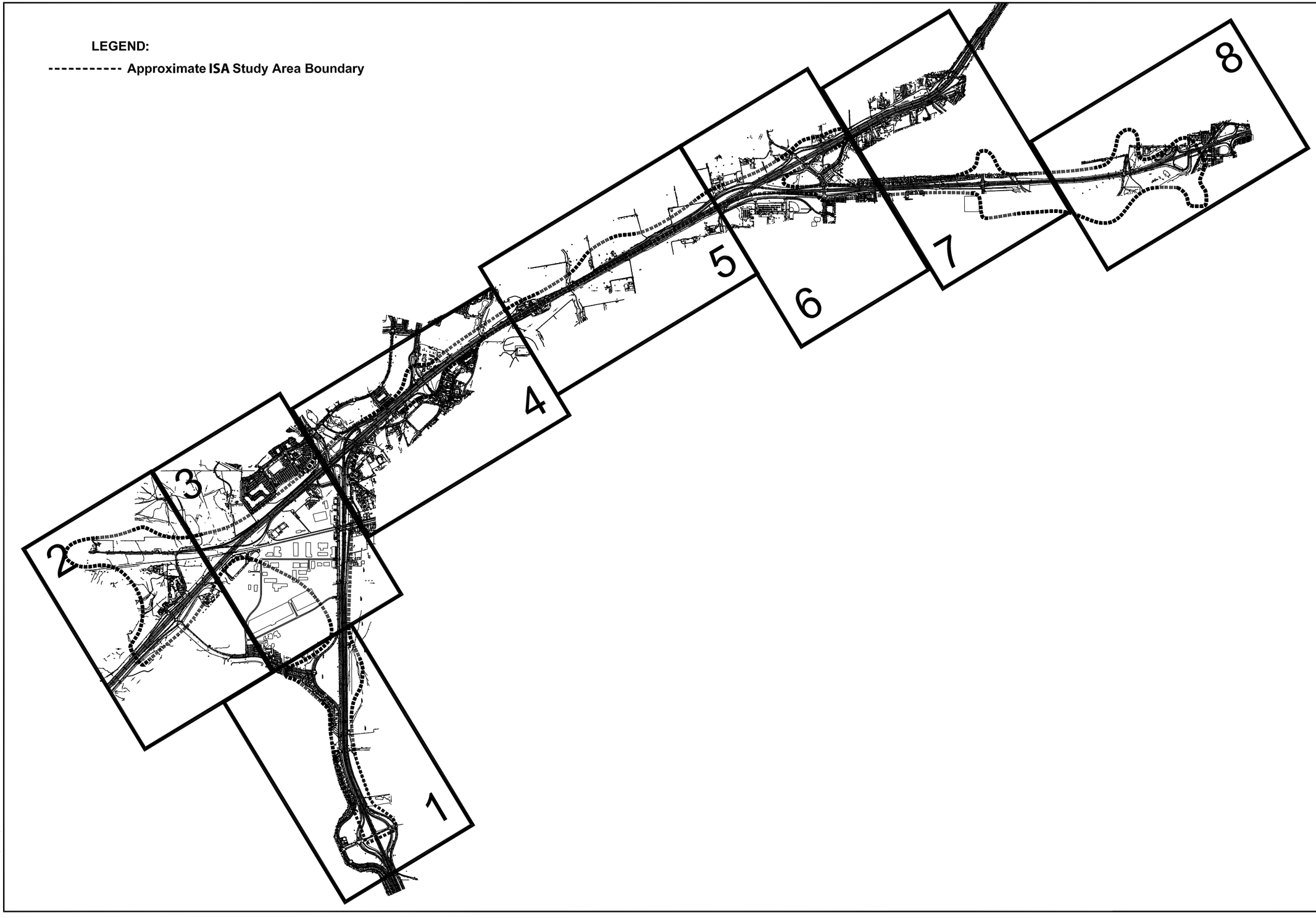
LEGEND:

---------- Approximate ISA Study Area Boundary



02166.02 Haz Mat (10-09)

Figure 3.2.5-1
Potential Hazardous Facility Locations

02166.02 Haz Mat (10-09)

Figure 3.2.5-2
Potential Hazardous Facility Locations

02166.02 Haz Mat (10-09)

Figure 3.2.5-3
Potential Hazardous Facility Locations

LEGEND:

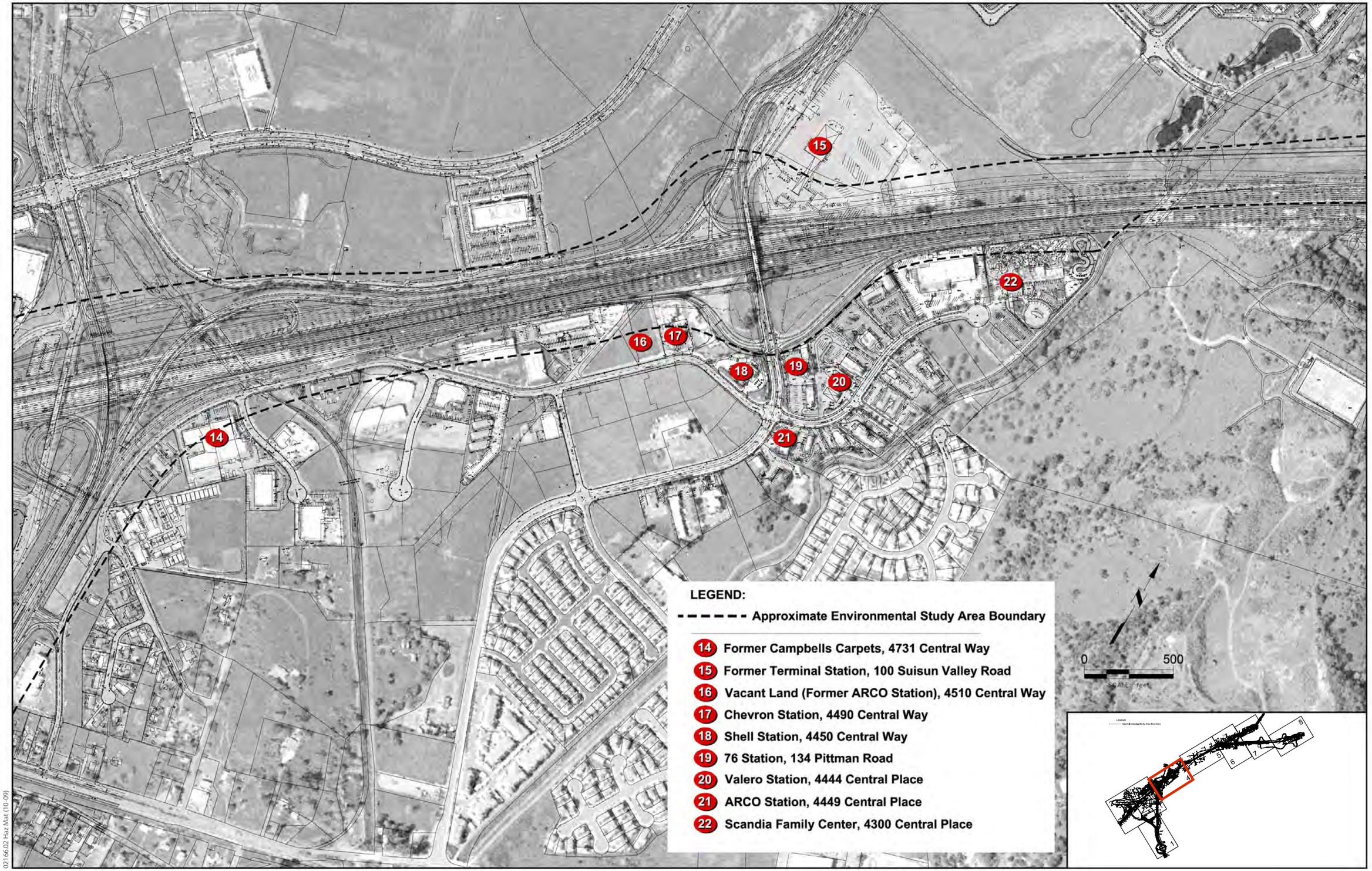
- Approximate Environmental Study Area Boundary

5. UPS, 5000 W. Cordelia Road
6. PrimeSource, 250 Dittmer Road
7. ARCO Station, 105 Lopes Road
8. Napa Valley Beverage Co., 497 Edison Court
9. Hudson Beverage Co., 237 Lopes Road
10. Sierra Truck & Van, 225 Lopes Road (Former Trail Wagons)
11. Saturn of Fairfield, 4850 Auto Plaza Court
12. Costco Gas Station, 5101 Business Center Drive
13. Green Valley Cleaners, 5055 Business Center Dr.

0 500
SCALE: feet

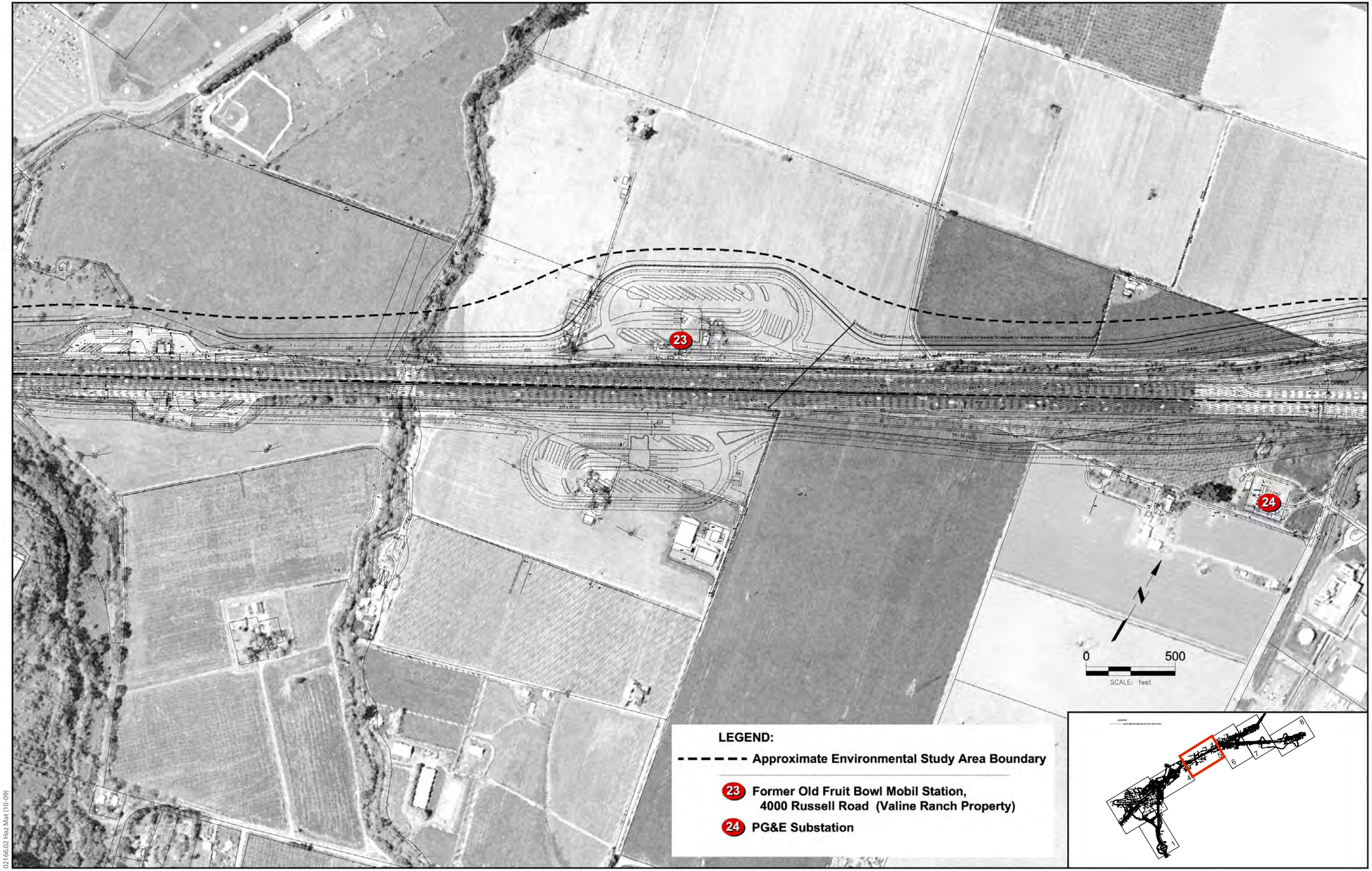
02166.02 Haz Mat (10-09)

Figure 3.2.5-4
Potential Hazardous Facility Locations



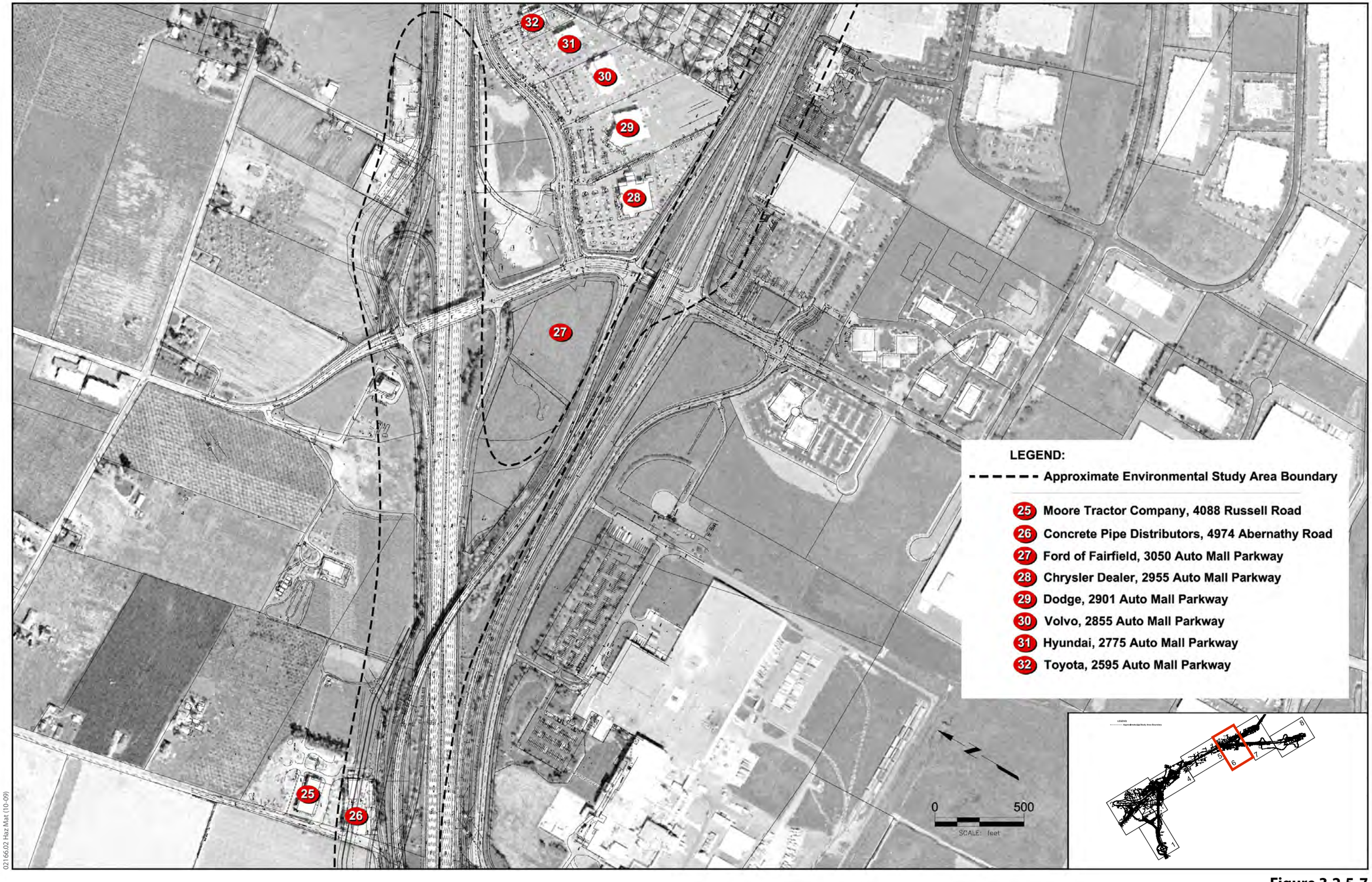
02166.02 Haz Mat (10-09)

Figure 3.2.5-5
Potential Hazardous Facility Locations



02166.02 Haz Mat (10-09)

Figure 3.2.5-6
Potential Hazardous Facility Locations



02166.02 Haz Mat (10-09)

Figure 3.2.5-7
Potential Hazardous Facility Locations

LEGEND:

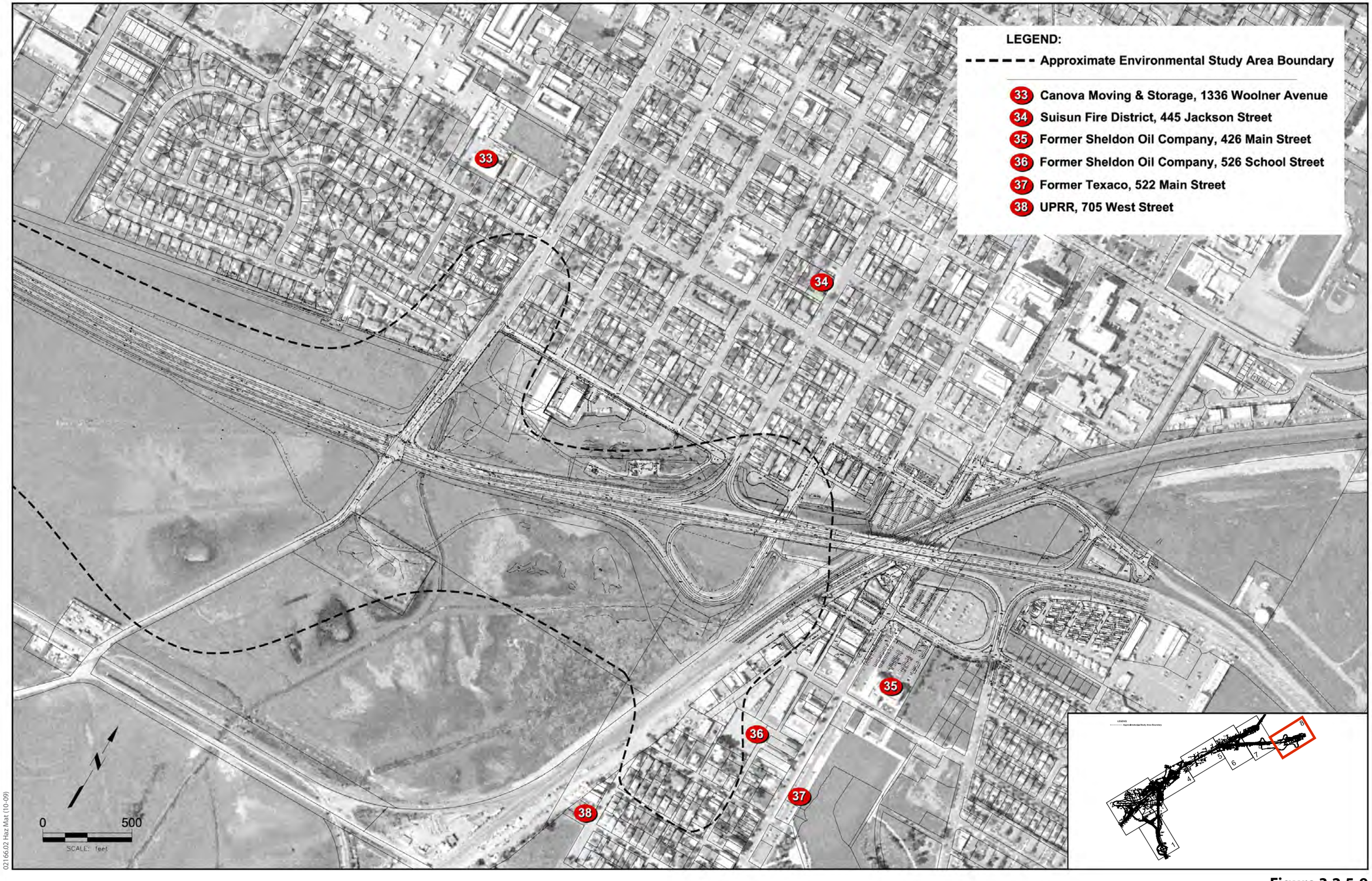
Approximate Environmental Study Area Boundary

0 500

SCALE: feet

02166.02 Haz Mat (10-09)

Figure 3.2.5-8
Potential Hazardous Facility Locations



02166.02 Haz Mat (10-09)

Figure 3.2.5-9
Potential Hazardous Facility Locations

3.2.6 Air Quality

Regulatory Setting

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

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

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide ($NO_{2)}$, ozone ($O_{3)}$, and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTPs) are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as the Metropolitan Transportation Commission (MTC) for Solano County and the appropriate federal agencies, such as the Federal Highway Administration, make the determination that the RTP is in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

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

Affected Environment

This discussion is based primarily on the *Interstate 80/Interstate 680/State Route 12 Interchange Project Air Quality Study Report* (Air Quality Study Report) and the *Traffic Operations Report for the I-80/I-680/SR 12 Interchange Project* (FTOR) prepared in 2009.

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following discussion describes the relevant characteristics of the air basin and offers an overview of conditions affecting pollutant ambient air concentrations in the basin.

The project alternatives lie within the Carquinez Strait region of the San Francisco Bay Area Air Basin (SFBAAB). The Carquinez Strait is the only sea-level gap between the San Francisco Bay and the Central Valley. Within the region, the prevailing winds are from the west, during the summer and fall months, marine air flows eastward through the Carquinez Strait due to high pressure off shore and low pressure in the Central Valley. These easterly winds usually contain more pollutants from the Sacramento and San Joaquin Valleys in the east than the cleaner marine air from the west. During summer and fall months, this condition can result in elevated pollutant levels as pollutants move through the strait into the central Bay Area from surrounding areas.

The high-pressure periods during the summer and fall months often are accompanied by low wind speeds, shallow mixing depths, higher temperatures, and little or no rainfall. During the summer, mean maximum temperatures reach about 32.2º C (90º F), while mean minimum temperatures in the winter are typically 1.6 º–4.4º C (35 º–40º F). In distant areas like Fairfield, where the region is sheltered from the moderating effects of the strait, temperature extremes are especially pronounced.

Attainment Status

The EPA has classified the portion of Solano County within the San Francisco Bay Area Air Basin as being a marginal nonattainment area for 8-hour ozone NAAQS. For CO NAAQS, the EPA has classified urban areas of the county as a moderate maintenance area (≤ 12.7 ppm) and the rest of the county as an unclassified/attainment area (U.S. Environmental Protection Agency 2008). For PM10 NAAQS the EPA has designated the county as an unclassified/attainment area. This information is presented in Table 3.2.6-1.

The 24-hour PM2.5 standard was lowered from 65 µg/m^3 to 35 µg/m^3 in 2006, and the EPA issued their final attainment status designations for the 35 µg/m^3 standard on October 8, 2009. The county is now designated as a non-attainment area for 24-hour PM2.5 NAAQS.

For ozone CAAQS, CARB has classified the county as being a serious nonattainment area, and for CO CAAQS CARB has classified the county as an attainment area (California Air Resources Board 2009). For PM10 and PM2.5 CAAQS, CARB has classified the county as a nonattainment area. Solano County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 3.2.6-1.

Table 3.2.6-1. Federal and State Ambient Air Quality Standards

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria		Attainment Status of Solano County	
			California	National	California	National	California	National	California	National
Ozone	O_3	1 hour	0.09	N/A	180	N/A	If exceeded	N/A	Serious non-attainment	N/A
		8 hours	0.070	0.075	137	147	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area	Non-attainment	Marginal non-attainment
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Moderate (≤ 12.7 ppm) maintenance
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Unclassified/ attainment
(Lake Tahoe only)		8 hours	6	N/A	7,000	N/A	If equaled or exceeded	N/A	N/A	N/A
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded on more than 1 day per year	N/A	Attainment
		1 hour	0.18	0.100	339	N/A	If exceeded	N/A	Attainment	N/A
Sulfur dioxide	SO_2	Annual arithmetic mean	NA	0.030	NA	80	NA	If exceeded	N/A	Attainment
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year	Attainment	Attainment
		1 hour	0.25	N/A	655	N/A	If exceeded	N/A	Attainment	N/A
Hydrogen sulfide	H_2S	1 hour	0.03	N/A	42	N/A	If equaled or exceeded	N/A	Unclassified	N/A
Vinyl chloride	C_2H_3Cl	24 hours	0.01	N/A	26	N/A	If equaled or exceeded	N/A	No designation	N/A
Inhalable particulate matter	PM10	Annual arithmetic mean	N/A	N/A	20	N/A	If exceeded	If exceeded at each monitor within area	Non-attainment	N/A
		24 hours	N/A	N/A	50	150	If exceeded	If exceeded on more than 1 day per year	Non-attainment	Unclassified/ attainment
	PM2.5	Annual arithmetic mean	N/A	N/A	12	15	If exceeded	If 3-year average from single or multiple community-oriented monitors is exceeded	Non-attainment	Attainment
		24 hours	N/A	N/A	N/A	35	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded	N/A	Non-attainment
Sulfate particles	SO_4	24 hours	N/A	N/A	25	N/A	If equaled or exceeded	NA	Attainment	N/A
Lead particles	Pb	Calendar quarter	N/A	N/A	N/A	1.5	NA	If exceeded no more than 1 day per year	N/A	Attainment
		30-day average	N/A	N/A	1.5	N/A	If equaled or exceeded	N/A	Attainment	N/A
		Rolling 3-month average	N/A	N/A	N/A	0.15	If equaled or exceeded	Averaged over a rolling 3-month period	N/A	Attainment

Source: California Air Resources Board 2009.
Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure; national standards shown are the primary (health effects) standards; N/A = not applicable.

Sensitive Receptors

The Bay Area Air Quality Management District (BAAQMD) generally defines a sensitive receptor as a facility or land use that houses or attracts members of the population, such as children, the elderly, and people with illnesses, who are particularly sensitive to the effects of air pollutants.

Sensitive receptors normally refer to land uses with heightened sensitivity to localized rather than regional pollutants. Examples include emissions of criteria or toxic air pollutants (PM10 and PM2.5) that have health effects and, to a lesser extent, odors or odorous compounds such as ammonia and sulfur dioxide. Sensitive receptors would not be directly affected by emissions of regional pollutants such as ozone precursors (ROG and NO_x). Various sensitive receptors are located in the vicinity of the project area (Figure 3.2.6-1) and may include: residences, schools, playgrounds, child care facilities, athletic facilities, health care facilities, convalescent centers, or rehabilitation centers. Land use compatibility issues relative to the siting of pollution-emitting sources or the siting of sensitive receptors must be considered. In the case of schools, state law requires that siting decisions consider the potential for toxic or harmful air emissions in the surrounding area.

Figure 3.2.6-1 summarizes the general locations of sensitive receptors in the project area. Figure 3.2.6-1 does not include the locations of scattered or individual sensitive receptors. Land use compatibility issues relative to the siting of pollution-emitting sources or the siting of sensitive receptors must be considered. In the case of schools, state law requires that siting decisions consider the potential for toxic or harmful air emissions in the surrounding area.

Existing Air Quality Conditions

Existing air quality conditions in the project area can be characterized in terms of the ambient air quality standards that the federal and state governments have established for various pollutants (Table 3.2.6-1) and by monitoring data collected in the region. Monitoring data concentrations are typically expressed in terms of ppm or $\mu g/m^3$. The nearest air quality monitoring station in the vicinity of the project area is located in Fairfield at Chadbourne Road; this station monitors for ozone. The closest monitoring station that monitors for carbon monoxide and particulate matter is located in the City of Vallejo at Tuolumne Street. Table 3.2.6-2 summarizes air quality monitoring data from the Fairfield and Vallejo monitoring stations during the last three years for which complete data are available (2006–2008).

Table 3.2.6-2. Ambient Air Quality Monitoring Data Measured at the Fairfield at Chadbourne Road and of Vallejo at Tuolumne Street Monitoring Stations

Pollutant Standards	Fairfield			Vallejo		
	2006	2007	2008	2006	2007	2008
1-Hour Ozone						
Maximum 1-hour concentration (ppm)	0.106	0.089	0.116	0.080	0.078	0.109
1-hour California designation value	0.10	0.10	0.10	0.08	0.08	0.08
1-hour expected peak day concentration	0.104	0.100	0.103	0.083	0.077	0.083
Number of days standard exceeded[a]						
CAAQS 1-hour (>0.09 ppm)	3	0	2	0	0	1
8-Hour Ozone						
National maximum 8-hour concentration (ppm)	0.087	0.067	0.090	0.069	0.066	0.075
National second-highest 8-hour concentration (ppm)	0.077	0.067	0.071	0.064	0.056	0.072
State maximum 8-hour concentration (ppm)	0.087	0.068	0.090	0.070	0.067	0.075
State second-highest 8-hour concentration (ppm)	0.077	0.067	0.071	0.064	0.056	0.073
8-hour national designation value	0.069	0.066	0.068	0.057	0.054	0.060
8-hour California designation value	0.087	0.077	0.077	0.065	0.061	0.067
8-hour expected peak day concentration	0.086	0.080	0.083	0.066	0.061	0.067
Number of days standard exceeded[a]						
NAAQS 8-hour (>0.075 ppm)	3	0	1	0	0	0
CAAQS 8-hour (>0.070 ppm)	8	0	2	0	0	3
Carbon Monoxide (CO)						
National[b] maximum 8-hour concentration (ppm)	–	–	–	2.94	2.70	1.91
National[b] second-highest 8-hour concentration (ppm)	–	–	–	2.73	2.60	1.96
California[c] maximum 8-hour concentration (ppm)	–	–	–	2.94	2.70	2.31
California[c] second-highest 8-hour concentration (ppm)	–	–	–	2.73	2.60	1.96
Maximum 1-hour concentration (ppm)	–	–	–	3.7	3.3	2.7
Second-highest 1-hour concentration (ppm)	–	–	–	3.5	3.3	2.5
Number of days standard exceeded[a]						
NAAQS 8-hour (≥9 ppm)	–	–	–	0	0	0
CAAQS 8-hour (≥9.0 ppm)	–	–	–	0	0	0
NAAQS 1-hour (≥35 ppm)	–	–	–	0	0	0
CAAQS 1-hour (≥20 ppm)	–	–	–	0	0	0
Particulate Matter (PM10)[d]						
National[b] maximum 24-hour concentration (μg/m^3)	–	–	–	46.6	49.1	42.1
National[b] second-highest 24-hour concentration (μg/m^3)	–	–	–	43.9	47.3	31.4
State[c] maximum 24-hour concentration (μg/m^3)	–	–	–	50.1	52.4	43.6
State[c] second-highest 24-hour concentration (μg/m^3)	–	–	–	47.2	51.1	32.4
State annual average concentration (μg/m^3)[e]	–	–	–	19.8	19.0	–
National annual average concentration (μg/m^3)	–	–	–	19.1	18.2	16.0
Number of days standard exceeded[a]						
NAAQS 24-hour (>150 μg/m^3)[f]	–	–	–	0.0	0.0	–
CAAQS 24-hour (>50 μg/m^3)[f]	–	–	–	0.0	12.6	–

Pollutant Standards	Fairfield			Vallejo		
	2006	2007	2008	2006	2007	2008
Particulate Matter (PM2.5)						
National[b] maximum 24-hour concentration (μg/m^3)	–	–	–	42.2	40.8	41.8
National[b] second-highest 24-hour concentration (μg/m^3)	–	–	–	40.5	40.0	31.0
State[c] maximum 24-hour concentration (μg/m^3)	–	–	–	44.0	41.5	51.2
State[c] second-highest 24-hour concentration (μg/m^3)	–	–	–	43.2	41.3	47.5
National annual designation value (μg/m^3)	–	–	–	10.2	9.8	–
National annual average concentration (μg/m^3)	–	–	–	9.8	9.8	–
State annual designation value (μg/m^3)	–	–	–	13	12	–
State annual average concentration (μg/m^3)[e]	–	–	–	12.4	12.0	–
Number of days standard exceeded[a]						
NAAQS 24-hour (>35 μg/m^3)	–	–	–	5.9	12.1	–

Sources: California Air Resources Board 2008; U.S. Environmental Protection Agency 2009.

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
– = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, State statistics are based on California approved samplers.

[d] Measurements usually are collected every 6 days.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

Table 3.2.6-2 indicates that the Fairfield monitoring station has exceeded the state 1-hour ozone standard on five occasions, the state 8-hour standard on ten occasions, and the national 8-hour ozone standard on four occasions during the 3-year monitoring period. During this same period, the Vallejo monitoring station has exceeded the state 1-hour ozone standard on one occasion and the state 8-hour standard on three occasions, while the national 8-hour ozone standard was not exceeded during this period. The Vallejo station has exceeded the state PM10 standard a total of 12.6 days and federal PM2.5 standard on 18 occasions during the 3-year monitoring period, while no other violations occurred at these monitoring stations during this 3-year monitoring period.

Carbon Monoxide

The project alternatives are located in a moderate (≤ 12.7 ppm) maintenance area with regards to the federal CO standard. Consequently, the evaluation of transportation conformity for CO is required. The CO transportation conformity analysis is based on the CO Protocol developed for the Department by the Institute of Transportation Studies at the University of California, Davis (Garza et al. 1997). This CO protocol details a qualitative step-by-step procedure to determine whether project-related CO concentrations have a potential to generate new air quality violations, worsen existing violations, or delay attainment of NAAQS for CO.

Particulate Matter

As previously indicated, Solano County was designated by the EPA as an unclassified/attainment area for 24-hour PM2.5 NAAQS. However, the 24-hour PM2.5 standard was lowered from 65µg/m^3 to 35 µg/m^3 in 2006, and the EPA designated the Bay Area as a nonattainment area. While the county is currently designated as a nonattainment area for 24-hour PM2.5 NAAQS, the county is designated as an attainment area for annual PM2.5 NAAQS. While conformity does not yet apply for PM2.5 (the effective date is December 14, 2010), a preliminary PM2.5 hot spot analysis in accordance with the EPA's 2006 guidance has been conducted to show that the proposed project would conform when the conformity requirements apply.

On March 10, 2006, the EPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM2.5 and PM10 nonattainment and maintenance areas. The final rule requires PM2.5 hot spot analyses to be performed for Projects of Air Quality Concern (POAQC) or any other project identified by the PM2.5 SIP as a localized air quality concern. In March 2006, the FHWA and EPA issued a guidance document titled *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* (Federal Highway Administration and U.S. Environmental Protection Agency 2006). The PM10 hot spot analysis is not required for project-level conformity because the area is in attainment or unclassified for the national PM10 standards. For the assessment of PM10 hot spots, the final rule is that a hot spot analysis is to be performed only for POAQCs. POAQCs are certain highway and transit projects that involve significant levels of diesel traffic or any other project identified in the PM2.5 or PM10 SIP as a localized air quality concern.

For projects identified as not being a POAQC, qualitative PM2.5 and PM10 (for regions without an approved conformity SIP) hot spot analyses are not required. For these types of projects, state and local project sponsors should briefly document in their project-level conformity determinations that CAA and 40 CFR 93.116 requirements were met without a hot spot analysis because such projects have been found to not be of air quality concern under 40 CFR 93.123(b)(1). Because this analysis assumes the area is classified as a nonattainment area for the federal PM2.5 standard, a determination must be made as to whether it would result in a PM2.5 hot spot.

Mobile-Source Air Toxics

The CAAA made controlling air toxic emissions a national priority, by which Congress mandated that the EPA regulate 188 air toxics. These substances are also known as hazardous air pollutants (HAPs). In the EPA's latest rule, *Control of Emissions of Hazardous Air Pollutants from Mobile Sources* (*Federal Registry, Vol. 72, No. 37, page 8430, February 2007)* it identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). The IRIS is a comprehensive database of specific substances known to cause human health effects. In addition, the EPA identified the following seven compounds as priority MSATs:

- Acrolein.
- Benzene.
- 1,3-Butadiene.

- Diesel particulate matter/diesel exhaust organic gases.
- Formaldehyde.
- Naphthalene.
- Polycyclic organic matter.

While the FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future rules.

To address emissions of MSATs, the EPA has issued a number of regulations, including the 2007 rule mentioned above, that will dramatically decrease MSATs through cleaner fuels and cleaner engines. According to an FHWA analysis, even if VMT increases by 145% as assumed, a combined reduction of 72% in the total annual emission rate for priority MSATs is projected from 1999 to 2050, as shown in the Figure 3.2.6-2.

In light of recent developments regarding MSAT's, the FHWA has issued interim guidance for the assessment of MSAT's in NEPA documents for highways projects. The *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents* uses a tiered approach to addressing MSAT emissions from highway projects in NEPA documents (Federal Highway Administration 2009a). Depending on the specific project circumstances, the FHWA has identified the following three levels of analysis:

1. No analysis for exempt projects or projects with no potential for meaningful MSAT effects.
2. Qualitative analysis for projects with low potential MSAT effects.
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Projects with Higher Potential MSAT Effects

Projects included in this category have the potential for meaningful differences among project alternatives. The FHWA expects only a limited number of projects to meet this two-pronged test. To fall into this category, projects must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location.

or

- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000[1], or greater, by the design year. In addition, to fall into this category, projects must also be proposed to be located in proximity to populated areas.

[1] Using EPA's MOBILE 6.2 emissions model, FHWA technical staff determined that this range of AADT would be roughly equivalent to the CAA definition of a major HAP source (i.e., 25 tons per year for all HAPs or 10 tons per year for any single HAP). Significant variations in conditions such as congestion or vehicle mix could warrant a different range for AADT.

Projects falling within this category should be more rigorously assessed for impacts, and the FHWA should be contacted for assistance in developing a specific approach for assessing impacts. This approach would include a quantitative analysis to forecast local-specific emission trends of the priority MSATs (benzene, acrolein, formaldehyde, 1,3-butadiene, acetaldehyde, and diesel exhaust) for each alternative, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the assistance outlined above. If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions, mitigation options should be identified and considered.

Applicable Project MSAT Category Assessment

The FTOR prepared by the project traffic engineers does not directly evaluate AADT on I-80/I-680/SR 12. However, based on the peak-hour traffic volumes on these roadways, an approximate estimate of AADT may be made using a peak-hour–to–daily conversion multiplier of 4.5 (according to Joel Rabinovitz, a transportation engineer in Walnut Creek, California, in a January 29, 2009 telephone conversation). Based on this information, it is estimated that mainline AADT on I-80 would be in excess of the FHWA's MSAT AADT threshold of 140,000 and will be located in proximity to populated areas. Consequently, based on the FHWA's 2009 MSAT guidance, the proposed project is considered a project with higher potential MSAT effects, and a quantitative analysis of MSAT emissions is required (Federal Highway Administration 2009a). Therefore, an evaluation of MSAT emissions was performed using traffic data provided by Fehr & Peers, and the CT-EMFAC model.

Unavailable Information for Project-Specific MSAT Impact Analysis

The Air Quality Study Report includes a basic analysis of the likely MSAT emission impacts of the project alternatives. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the project alternatives in this technical study. Due to these limitations, a discussion regarding incomplete or unavailable information is included in the Air Quality Study Report in accordance with CEQA regulations (40 CFR 1502.22[b]).

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. Although available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

In this document, the Department has provided a quantitative analysis of MSAT emissions relative to the various alternatives and has acknowledged that all project alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated. In accordance with CEQA regulations (40 CFR 1502.22[b])

regarding incomplete or unavailable information, a full discussion of these inadequacies is available in the Air Quality Study Report.

Environmental Consequences

The project alternatives would generate construction-related and operational emissions. The method used to evaluate construction and operational effects is described below. See the Air Quality Study Report for more detailed methodology.

Discussions with the project traffic engineers indicated that traffic volumes would not change between the build alternatives. Therefore, existing year (2004), interim year (2015) with and without project, and design-year (2035) with and without project conditions were evaluated.

Conformity of the Regional Transportation Plan with the State Implementation Plan

The evaluation of transportation conformity with regards to criteria pollutants was done by evaluating the inclusion of the proposed project in the most recent RTP as discussed above and in the Air Quality Study Report.

The first phase of either alternative of the proposed project is fully funded in the financially constrained Regional Transportation Plan *Transportation 2035 Plan for the San Francisco Bay Area: Change in Motion* (RTP) (Appendix 1, page 126). The project is also included in the MTC's financially constrained 2009 Transportation Improvement Program as TIP ID SOL070020. The TIP is being updated to be consistent with the RTP as part of the 2011 TIP process. The 2009 RTP and 2009 TIP (Revised) were found to conform with the *State Implementation Plan* (SIP) by the MTC on April 22, 2009. The FHWA and FTA found the 2009 RTP to be in conformity with the SIP on May 29, 2009. The FHWA and FTA found the 2009 TIP (Revised) to be in conformity with the SIP also on May 29, 2009.

Because the Department has not selected a preferred alternative, conformity determination cannot be made at this time. The draft conformity analysis for the preferred alternative will be conducted in the Final Environmental Impact Statement to allow for public comment. The final conformity determination will be made in the Record of Decision. Currently, only Alternative C, Phase 1 is listed in the 2035 RTP and 2009 TIP. The design concept and scope of Alternative C, Phase 1 is consistent with the project description in the most recent 2035 RTP and 2009 TIP. The design concept and scope of the proposed project are consistent with the project listings in the 2035 RTP and 2009 TIP and would not interfere with timely implementation of TCMs.

Should another alternative be chosen, STA would be required to submit a TIP amendment for the selected alternative.

Under the No-Build Alternative, there would be no changes to the current conditions and no effect.

Potential Violations of Carbon Monoxide NAAQS or CAAQS

The effects of localized CO hot spot emissions were evaluated through CO dispersion modeling using the *Transportation Project-Level Carbon Monoxide Protocol* developed for the

Department by the Institute of Transportation Studies at the University of California, Davis (Garza et al. 1997).

Existing year (2004), construction interim year (2015) with and without project, and design-future year (2035) with and without project conditions were modeled to evaluate CO concentrations relative to the NAAQS and CAAQS. As previously discussed, emissions of CO concentrations are estimated for roadway intersections within the project area, as well as mainline I-80, I-680, and SR 12 segments. These roadway intersections and segments were modeled because they represent the roadway intersections and segments in the vicinity of the project area with the highest traffic volumes and worst levels of congestion/delay. Table 3.2.6-3 and Table 3.2.6-4 summarize the results of the intersection and segment CO modeling, respectively, and indicate that CO concentrations are not anticipated to exceed the 1- or 8- hour NAAQS and CAAQS under any of the build alternatives or the No-Build Alternative.

Potential Violations of PM2.5 NAAQS or CAAQS

The effects of localized PM were evaluated using the EPA and FHWA's guidance manual, *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* (Federal Highway Administration, and U.S. Environmental Protection Agency 2006).

Solano County is currently classified as a non-attainment area with regard to the federal PM2.5 NAAQS. The build alternatives are not considered POAQCs for PM10 and PM2.5 due to <5% increase in diesel truck traffic volumes between build and no-build conditions. Confirmation of this determination will be made during interagency consultation (IAC) with the appropriate local, state, and federal agencies and the final analysis will be identified in the final environmental document.

The EPA's transportation conformity rules stipulate that transportation projects considered POAQCs, or any other project that is identified by the PM2.5 SIP as a localized air quality concern, must be analyzed for local air quality impacts (i.e., hot spot) in PM2.5 nonattainment and maintenance areas. As previously indicated, the County is designated by the EPA as a nonattainment area for the lower PM2.5 standard. While conformity does not yet apply for PM2.5, a preliminary PM2.5 hot spot analysis in accordance with the EPA's 2006 guidance should be conducted to show that the proposed project would conform when the conformity requirements apply.

As previously indicated, the FTOR prepared for the project does not directly evaluate AADT on I-80/I-680/SR 12. An approximate estimate of AADT may be made based on the peak-hour traffic volumes on these roadways (according to Joel Rabinovitz, in the conversation cited earlier), and it is estimated that mainline AADT on I-80 would be in excess of the FHWA and EPA's POAQC threshold of 125,000 AADT. In addition, based on traffic count data collected by the Department, it is anticipated that medium trucks are anticipated to account for 5% and heavy trucks are anticipated to account for 5% of all traffic on the I-80 I-680/SR 12 network (California Department of Transportation 2008).

However, because it has been concluded that diesel truck traffic volumes will not increase by more than 5% between no-build and build conditions, the build alternatives are not considered a POAQC for PM10 and PM2.5. Because the proposed project is not considered a POAQC, CAA and 40 CFR 93.116 requirements were met without a hot spot analysis because the build alternatives have been found to not be of air quality concern under 40 CFR 93.123(b)(1). Confirmation of this determination will be made during interagency consultation (IAC) with the appropriate local, state, and federal agencies and the final analysis will be identified in the final environmental document.

There would be no effect under the No-Build Alternative.

Table 3.2.6-3. Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area (Intersections)

Intersection	North-South Roadway	East-West Roadway	2004			2015									2035													
			Existing			2015 No Project			2015 Alt B Phase 1			2015 Alt C Phase 1			2035 No Project			2035 Alt B Phase 1			2035 Alt C Phase 1			2035 Full Build Alt B			2035 Full Build Alt C		
			Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr	Caline Conc	1-hr	8-hr
4	Lopes Rd	Gold Hill Rd	1.6	5.3	4.06	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36	0.4	4.1	3.22	0.4	4.1	3.22	0.4	4.1	3.22	0.2	3.9	3.08	0.4	4.1	3.22
7	I-80 EB Ramps	Red Top Rd	1.4	5.1	3.92	0.9	4.6	3.57	0.9	4.6	3.57	0.9	4.6	3.57	0.6	4.3	3.36	0.7	4.4	3.43	0.5	4.2	3.29	0.4	4.1	3.22	0.5	4.2	3.29
8	I-80 WB Ramps	Red Top Rd	0.9	4.6	3.57	0.7	4.4	3.43	0.8	4.5	3.5	0.7	4.4	3.43	0.6	4.3	3.36	0.5	4.2	3.29	0.5	4.2	3.29	0.3	4	3.15	0.5	4.2	3.29
9	Jameson Canyon Rd (SR12 West)	Red Top Rd	5	8.7	6.44	1	4.7	3.64	1	4.7	3.64	0.3	4	3.15	0.6	4.3	3.36	0.7	4.4	3.43	0.2	3.9	3.08	0.1	3.8	3.01	0.2	3.9	3.08
12	Lopes Rd	Cordelia Rd	4.2	7.9	5.88	1.2	4.9	3.78	1.2	4.9	3.78	0.5	4.2	3.29	0.6	4.3	3.36	0.8	4.5	3.5	0.4	4.1	3.22	0.5	4.2	3.29	0.4	4.1	3.22
13	Lopes Rd	Bridgeport Ave	3.5	7.2	5.39	1	4.7	3.64	1.1	4.8	3.71	0.5	4.2	3.29	0.6	4.3	3.36	0.7	4.4	3.43	0.3	4	3.15	0.5	4.2	3.29	0.3	4	3.15
14	Central Wy	Cordelia Rd	2.3	6	4.55	0.6	4.3	3.36	0.6	4.3	3.36	0.7	4.4	3.43	0.4	4.1	3.22	0.4	4.1	3.22	0.3	4	3.15	0.3	4	3.15	0.3	4	3.15
18	Green Valley Rd	Business Center Dr	2.4	6.1	4.62	1.2	4.9	3.78	1.2	4.9	3.78	1.2	4.9	3.78	0.6	4.3	3.36	0.8	4.5	3.5	0.5	4.2	3.29	0.5	4.2	3.29	0.5	4.2	3.29
21	I-80 EB Ramps	Pittman Rd	5.2	8.9	6.58	1.1	4.8	3.71	1.3	5	3.85	0.9	4.6	3.57	0.6	4.3	3.36	0.6	4.3	3.36	0.5	4.2	3.29	0.5	4.2	3.29	0.5	4.2	3.29
27	I-80 EB Ramps	Abernathy Rd	3.3	7	5.25	1	4.7	3.64	1	4.7	3.64	1	4.7	3.64	0.5	4.2	3.29	0.6	4.3	3.36	0.6	4.3	3.36	0.4	4.1	3.22	0.6	4.3	3.36
30	I-80 EB Off-Ramp	West Texas St	2.5	6.2	4.69	1.2	4.9	3.78	1.4	5.1	3.92	1.1	4.8	3.71	0.6	4.3	3.36	0.8	4.5	3.5	0.6	4.3	3.36	0.5	4.2	3.29	0.6	4.3	3.36
31	I-80 EB On-Ramp - Beck Ave	West Texas St	4.3	8	5.95	1.3	5	3.85	1.3	5	3.85	1.3	5	3.85	0.6	4.3	3.36	0.8	4.5	3.5	0.2	3.9	3.08	0.6	4.3	3.36	0.2	3.9	3.08
38	SR 12 East	Beck Ave	3.8	7.5	5.6	1.9	5.6	4.27	0.3	4	3.15	0.3	4	3.15	1	4.7	3.64	0.2	3.9	3.08	0.2	3.9	3.08	0.3	4	3.15	0.2	3.9	3.08
39	SR 12 East	Pennsylvania Ave	4	7.7	5.74	1.9	5.6	4.27	1.8	5.5	4.2	1.8	5.5	4.2	1	4.7	3.64	1.1	4.8	3.71	1	4.7	3.64	0.3	4	3.15	1	4.7	3.64
40	Pennsylvania Ave	Cordelia Rd	0.8	4.5	3.5	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36	0.8	4.5	3.5	0.4	4.1	3.22	0.3	4	3.15	0.8	4.5	3.5	0.3	4	3.15
44	I-80 EB Ramps	Travis Blvd	5.6	9.3	6.86	1.8	5.5	4.2	1.7	5.4	4.13	1.8	5.5	4.2	0.8	4.5	3.5	1	4.7	3.64	0.8	4.5	3.5	0.8	4.5	3.5	0.8	4.5	3.5
45	Gateway Shopping Center - 2nd St	Travis Blvd	4.3	8	5.95	1.3	5	3.85	1.3	5	3.85	1.3	5	3.85	0.6	4.3	3.36	0.7	4.4	3.43	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36
46	Pennsylvania Ave	Travis Blvd	2.8	6.5	4.9	1.1	4.8	3.71	1.1	4.8	3.71	1.1	4.8	3.71	0.6	4.3	3.36	0.7	4.4	3.43	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36
51	I-80 WB On-Ramp - Hilborne Rd	Waterman Blvd	5.2	8.9	6.58	1.6	5.3	4.06	1.6	5.3	4.06	1.6	5.3	4.06	0.6	4.3	3.36	0.8	4.5	3.5	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36
53	I-80 EB Ramps	Air Base Pkwy	4.8	8.5	6.3	1.8	5.5	4.2	1.8	5.5	4.2	1.8	5.5	4.2	0.8	4.5	3.5	1	4.7	3.64	0.8	4.5	3.5	0.8	4.5	3.5	0.8	4.5	3.5
54	Health Dr	Air Base Pkwy	4.5	8.2	6.09	1.3	5	3.85	1.3	5	3.85	1.3	5	3.85	0.6	4.3	3.36	0.7	4.4	3.43	0.6	4.3	3.36	0.6	4.3	3.36	0.6	4.3	3.36

Source: ICF Jones & Stokes 2009.

[a] Receptors are located 100 feet from the center of each intersection diagonal, 71 feet from the roadway centerline, and at the boundary of the mixing zone.

[b] Background concentrations of 3.7 ppm and 2.94 ppm were added to the modeling 1-hour and 8-hour results, respectively.

[c] The federal and state 1-hour standards are 35 and 20 ppm, respectively.

[d] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Table 3.2.6-4. Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area (Segments)

Segment		Existing			No Project			Alternative B Phase 1			Alternative C Phase 1			No Project			Alternative B Phase 1			Alternative C Phase 1			Full Build Alternative B			Full Build Alternative C		
		Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr	Max Receptor	1-hr	8-hr
I-680	between Gold Hill and Red Top	2.9	6.6	4.97	1.8	5.5	4.2	1.4	5.1	3.92	1.5	5.2	3.99	0.9	4.6	3.57	0.6	4.3	3.36	0.9	4.6	3.57	1.1	4.8	3.71	1	4.7	3.64
I-80	between I-680 and Green Valley Rd	5.2	8.9	6.58	2.1	5.8	4.41	1.4	5.1	3.92	2	5.7	4.34	1.3	5	3.85	0.7	4.4	3.43	1.7	5.4	4.13	0.8	4.5	3.5	1.2	4.9	3.78
SR 12 West	between Red Top Rd and I-680 SB/Green Valley Rd	4.9	8.6	6.37	2.5	6.2	4.69	2.5	6.2	4.69	2.2	5.9	4.48	1.5	5.2	3.99	1.2	4.9	3.78	1.3	5	3.85	1.2	4.9	3.78	1.2	4.9	3.78
I-80	between Pittman/Suisin Valley and Truck Scales	4.8	8.5	6.3	2	5.7	4.34	2.4	6.1	4.62	2	5.7	4.34	1.1	4.8	3.71	1.1	4.8	3.71	1.1	4.8	3.71	2	5.7	4.34	2	5.7	4.34
I-80	between Truck Scales and Abernathy/SR12 East	6	9.7	7.14	3.4	7.1	5.32	2.7	6.4	4.83	3.3	7	5.25	1.6	5.3	4.06	1.5	5.2	3.99	1.4	5.1	3.92	1.8	5.5	4.2	1.4	5.1	3.92
I-80	between Green Valley Rd and Pittman Rd	6.1	9.8	7.21	3.3	7	5.25	2.8	6.5	4.9	2.1	5.8	4.41	1.3	5	3.85	1	4.7	3.64	1	4.7	3.64	1.3	5	3.85	1.4	5.1	3.92
I-80	between Abernathy Rd and W Texas St	7.3	11	8.05	3	6.7	5.04	2.9	6.6	4.97	2.7	6.4	4.83	1.8	5.5	4.2	1.4	5.1	3.92	1.7	5.4	4.13	1.5	5.2	3.99	1.5	5.2	3.99
I-80	between Beck Ave and Travis Blvd	6.2	9.9	7.28	2.6	6.3	4.76	2.6	6.3	4.76	2.4	6.1	4.62	1.5	5.2	3.99	1.2	4.9	3.78	1.5	5.2	3.99	1.3	5	3.85	1.4	5.1	3.92
I-80	between Travis Blvd and Air Base Pkwy/Waterman Blvd	6.3	10	7.35	2.7	6.4	4.83	2.7	6.4	4.83	2.4	6.1	4.62	1.6	5.3	4.06	1.3	5	3.85	1.5	5.2	3.99	1.3	5	3.85	1.3	5	3.85
SR 12 East	between Main St and Jackson St	1.9	5.6	4.27	0.9	4.6	3.57	0.9	4.6	3.57	1	4.7	3.64	0.7	4.4	3.43	0.5	4.2	3.29	0.5	4.2	3.29	0.7	4.4	3.43	0.5	4.2	3.29
SR 12 East	between Chadbourne Rd and Beck Ave	2.1	5.8	4.41	1.4	5.1	3.92	1.2	4.9	3.78	1.7	5.4	4.13	0.8	4.5	3.5	0.6	4.3	3.36	0.7	4.4	3.43	0.9	4.6	3.57	0.8	4.5	3.5
I-680	between Red Top and Central Ave/680 interchange	2.4	6.1	4.62	1.7	5.4	4.13	1.6	5.3	4.06	1.3	5	3.85	0.7	4.4	3.43	0.8	4.5	3.5	0.6	4.3	3.36	0.8	4.5	3.5	0.7	4.4	3.43

Source: ICF Jones & Stokes 2009.

[a] Receptors are located 10, 25, 50, and 100 feet from the edge of the freeway segment on either side of the roadway segment.

[b] Background concentrations of 3.7 ppm and 2.94 ppm were added to the modeling 1-hour and 8-hour results, respectively.

[c] The federal and state 1-hour standards are 35 and 20 ppm, respectively.

[d] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Potential Generation of Significant Levels of MSAT Emissions

MSAT emissions were evaluated using the Federal Highway Administration's *Interim Guidance on Air Toxic Analysis in NEPA* (Federal Highway Administration 2006).

The area of air toxics analysis is a new and emerging field and is a continuing area of research. Currently, limited tools and techniques are available for assessing project-specific health impacts from MSATs, as there are no established criteria for determining when MSAT emissions should be considered a significant issue in the NEPA context.

To comply with Council on Environmental Quality regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information, Appendix C of the Air Quality Study Report contains discussion regarding how air toxics analysis is an emerging field and current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that would result from a transportation project in a way that would be useful to decision-makers. Also in compliance with 40 CFR 150.22(b), Appendix C of the Air Quality Study Report contains a summary of current studies regarding the health impacts of MSATs.

The FTOR prepared for the project does not directly evaluate AADT on I-80/I-680/SR 12. However, based on the peak-hour traffic volumes on these roadways, an approximate estimate of AADT may be made (according to Joel Rabinovitz, in the conversation cited earlier). Based on this information, it is estimated that mainline AADT on I-80 would be in excess of the FHWA's MSAT AADT threshold of 140,000 and will be located in proximity to populated areas. Consequently, based on the FHWA's 2006 MSAT guidance, the proposed project is considered a project with higher potential MSAT effects, and a quantitative analysis of MSAT emissions was conducted using the CT-EMFAC program and traffic data presented in Table 3.2.6-5 and Table 3.2.6-6. Table 3.2.6-7 and Figure 3.2.6-3 through Figure 3.2.6-8 present modeled MSAT emissions. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the build alternatives.

Emissions associated with implementation of the proposed project were obtained by comparing future with-project emissions to future no-project emissions for both the construction-interim year (2015) and design-future year (2035) scenarios. Table 3.2.6-7, which presents the project-level emissions for all alternatives, indicates that implementation of Alternative B or Alternative C would result in minor increases in all MSAT emissions for 2035 conditions. Alternative B, Phase 1 would result in small increases for all MSAT emission for 2015 and 2035 conditions. Alternative C, Phase 1 would result in minor increases for all MSAT emissions for 2015 conditions and minor increases in all MSATS except for acetaldehyde and formaldehyde, for 2035 conditions. The No-Build Alternative would result in lower MSAT emissions under 2015 conditions and 2035 conditions than all build alternatives except Alternative C, Phase 1.

To the extent that it is applicable or feasible for the project alternatives and through coordination with the project development team, implementation of measures to reduce MSAT and criteria pollutant emissions, as described in *Avoidance, Minimization, and/or Mitigation Measures*, would be implemented to reduce this effect for all build alternatives.

Table 3.2.6-5. Criteria Pollutant, MSAT, and CO_2 Modeling Peak Period Traffic Data Inputs

EMFAC Speed Bin Name	VMT Speed Bins Actual	Existing		2015 No Project		2015 Alt B Phase 1		2015 Alt C Phase 1		2035 No Project		2035 Alt B Phase 1		2035 Alt C Phase1		2035 Alt B Full Build		2035 Alt C Full Build	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0–4.99	3,590	0.6	6,215	0.7	2,047	0.2	3,545	0.4	21,989	2.3	12,646	1.1	3,976	0.4	3,216	0.3	2,559	0.2
10	5.0–9.99	17,038	2.6	16,242	1.7	3,562	0.4	7,539	0.8	41,087	4.3	16,067	1.4	17,791	1.7	8,904	0.7	11,641	0.9
15	10.0–14.99	11,810	1.8	14,557	1.6	3,401	0.3	9,132	0.9	48,812	5.1	15,480	1.4	16,896	1.6	8,904	0.7	15,604	1.3
20	15.0–19.99	7,904	1.2	23,837	2.6	9,252	0.9	7,337	0.8	21,129	2.2	12,036	1.1	5,964	0.6	11,460	0.9	26,090	2.1
25	20.0–24.99	23,955	3.7	30,830	3.3	14,910	1.5	16,290	1.7	21,760	2.3	18,856	1.7	18,222	1.8	29,268	2.4	39,874	3.2
30	25.0–29.99	33,274	5.1	12,635	1.4	10,365	1.1	13,777	1.4	15,723	1.7	26,951	2.4	14,660	1.4	24,901	2.0	26,252	2.1
35	30.0–34.99	50,273	7.7	28,900	3.1	28,966	2.9	36,619	3.8	40,434	4.2	65,329	5.7	36,444	3.6	37,728	3.1	41,104	3.3
40	35.0–39.99	35,486	5.5	34,740	3.7	29,240	3.0	44,901	4.7	38,276	4.0	56,737	5.0	24,450	2.4	26,778	2.2	33,182	2.7
45	40.0–44.99	28,251	4.3	40,116	4.3	41,813	4.3	50,507	5.2	35,568	3.7	45,606	4.0	53,390	5.2	28,098	2.3	56,301	4.5
50	45.0–49.99	14,061	2.2	66,066	7.1	58,947	6.0	33,837	3.5	58,120	6.1	96,091	8.4	47,359	4.6	14,827	1.2	42,022	3.4
55	50.0–54.99	35,562	5.5	58,966	6.3	99,068	10.1	104,719	10.9	72,410	7.6	88,650	7.8	142,873	13.9	210,737	17.1	240,163	19.4
60	55.0–59.99	30,615	4.7	83,806	9.0	91,023	9.3	98,014	10.2	176,533	18.5	189,314	16.6	123,109	12.0	193,360	15.6	227,071	18.3
65	60.0–64.99	103,135	15.8	192,765	20.7	194,363	19.8	209,644	21.7	111,859	11.7	171,672	15.1	193,862	18.9	188,653	15.3	153,073	12.4
70	65.0–69.99	256,001	39.3	316,914	34.1	393,885	40.1	316,180	32.8	243,730	25.6	323,270	28.3	316,593	30.8	445,133	36.0	321,283	26.0
75	70.0–74.99	0	0.0	3,691	0.4	1,886	0.2	12,296	1.3	5,176	0.5	1,716	0.2	10,966	1.1	3,622	0.3	1,816	0.1
Total		**650,956**	**100.0**	**930,280**	**100.0**	**982,728**	**100.0**	**964,339**	**100.0**	**952,605**	**100.0**	**1,140,420**	**100.0**	**1,026,555**	**100.0**	**1,235,590**	**100.0**	**1,238,035**	**100.0**

Note: Calculated from Fehr and Peers peak period traffic data (Fehr & Peers 2009).

Table 3.2.6-6. Criteria Pollutant, MSAT, and CO_2 Modeling Non-Peak Period Traffic Data Inputs

EMFAC Speed Bin Name	VMT Speed Bins Actual	Existing		2015 No Project		2015 Alt B Phase 1		2015 Alt C Phase 1		2035 No Project		2035 Alt B Phase 1		2035 Alt C Phase 1		2035 Alt B Full Build		2035 Alt C Full Build	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0–4.99	12,564	0.6	21,752	0.7	7,165	0.2	12,408	0.4	76,963	2.3	44,259	1.1	13,915	0.4	11,258	0.3	8,957	0.2
10	5.0–9.99	59,632	2.6	56,848	1.7	12,468	0.4	26,387	0.8	143,804	4.3	56,234	1.4	62,267	1.7	31,164	0.7	40,743	0.9
15	10.0–14.99	41,336	1.8	50,949	1.6	11,904	0.3	31,964	0.9	170,842	5.1	54,179	1.4	59,136	1.6	31,164	0.7	54,614	1.3
20	15.0–19.99	27,665	1.2	83,430	2.6	32,383	0.9	25,681	0.8	73,951	2.2	42,126	1.1	20,872	0.6	40,111	0.9	91,315	2.1
25	20.0–24.99	83,843	3.7	107,904	3.3	52,185	1.5	57,015	1.7	76,161	2.3	65,997	1.7	63,776	1.8	102,440	2.4	139,561	3.2
30	25.0–29.99	116,459	5.1	44,223	1.4	36,276	1.1	48,219	1.4	55,032	1.7	94,329	2.4	51,311	1.4	87,155	2.0	91,882	2.1
35	30.0–34.99	175,957	7.7	101,149	3.1	101,381	2.9	128,167	3.8	141,517	4.2	228,652	5.7	127,552	3.6	132,048	3.1	143,865	3.3
40	35.0–39.99	124,202	5.5	121,589	3.7	102,340	3.0	157,152	4.7	133,965	4.0	198,578	5.0	85,576	2.4	93,722	2.2	116,136	2.7
45	40.0–44.99	98,880	4.3	140,406	4.3	146,345	4.3	176,776	5.2	124,486	3.7	159,620	4.0	186,866	5.2	98,344	2.3	197,054	4.5
50	45.0–49.99	49,213	2.2	231,232	7.1	206,314	6.0	118,430	3.5	203,419	6.1	336,318	8.4	165,757	4.6	51,895	1.2	147,078	3.4
55	50.0–54.99	124,465	5.5	206,381	6.3	346,738	10.1	366,517	10.9	253,436	7.6	310,275	7.8	500,057	13.9	737,578	17.1	840,569	19.4
60	55.0–59.99	107,154	4.7	293,322	9.0	318,581	9.3	343,050	10.2	617,865	18.5	662,598	16.6	430,881	12.0	676,760	15.6	794,748	18.3
65	60.0–64.99	360,974	15.8	674,678	20.7	680,271	19.8	733,753	21.7	391,505	11.7	600,854	15.1	678,516	18.9	660,286	15.3	535,754	12.4
70	65.0–69.99	896,004	39.3	1,109,200	34.1	1,378,596	40.1	1,106,630	32.8	853,054	25.6	1,131,444	28.3	1,108,076	30.8	1,557,965	36.0	1,124,492	26.0
75	70.0–74.99	0	0.0	12,917	0.4	6,601	0.2	43,036	1.3	18,117	0.5	6,007	0.2	38,382	1.1	12,676	0.3	6,354	0.1
Total		**2,278,348**	**100.0**	**3,255,980**	**100.0**	**3,439,548**	**100.0**	**3,375,186**	**100.0**	**3,334,118**	**100.0**	**3,991,470**	**100.0**	**3,592,941**	**100.0**	**4,324,565**	**100.0**	**4,333,123**	**100.0**

Note: Calculated from Fehr and Peers peak period traffic data (Fehr & Peers 2009).

Table 3.2.6-7. I-80/I-680/SR 12 MSAT Emissions (pounds per day)

Scenario	Acrolein	Acetalydehyde	Benzene	1, 3-Butadiene	Diesel Particulate Matter	Formaldehyde
Existing (2004)	3.25	24.68	71.48	14.39	110.91	71.34
2015 No Project	1.39	14.29	32.95	6.25	71.95	38.05
2015 Alt B, Phase 1	1.76	17.00	40.50	7.90	90.88	45.97
2015 Alt C, Phase 1	1.71	16.96	39.93	7.69	88.76	45.59
2035 No Project	0.96	8.76	22.76	4.31	31.61	23.98
2035 Alt B, Phase 1	1.11	9.05	25.19	4.96	36.35	25.53
2035 Alt C, Phase 1	1.04	8.07	23.14	4.64	33.24	23.10
2035 Alt B	1.27	9.48	27.85	5.65	40.10	27.44
2035 Alt C	1.17	9.25	26.31	5.22	38.92	26.33
Comparison of Alternatives to Existing						
2015 Alt B, Phase 1 to Existing	-1	-8	-31	-6	-20	-25
2015 Alt C, Phase 1 to Existing	-2	-8	-32	-7	-22	-26
2035 Alt B, Phase 1 to Existing	-2	-16	-46	-9	-75	-46
2035 Alt C, Phase 1 to Existing	-2	-17	-48	-10	-78	-48
2035 Alt B to Existing	-2	-15	-44	-9	-71	-44
2035 Alt C to Existing	-2	-15	-45	-9	-72	-45
Comparison of Alternatives to No Project						
2015 Alt B, Phase 1 to 2015 No Project	0.37	2.72	7.55	1.65	18.94	7.91
2015 Alt C, Phase 1 to 2015 No Project	0.32	2.68	6.99	1.44	16.81	7.53
2035 Alt B, Phase 1 to 2035 No Project	0.15	0.29	2.43	0.65	4.74	1.55
2035 Alt C, Phase 1 to 2035 No Project	0.08	-0.69	0.38	0.33	1.63	-0.88
2035 Alt B to 2035 No Project	0.31	0.72	5.09	1.34	8.49	3.46
2035 Alt C to 2035 No Project	0.21	0.49	3.55	0.91	7.31	2.35

Source: Air Quality Study Report

Potential Generation of Significant Operation-Related Emissions of Ozone Precursors, Carbon Monoxide, and Particulate Matter

Long-term air quality impacts are those associated with motor vehicles operating on the roadway network, predominantly those operating in the project vicinity. Emission of ROG, NO_x, CO, PM10, PM2.5, and CO_2 for existing year (2004), construction interim year (2015) with and without project, and design-future year (2035) with and without project conditions were evaluated through modeling conducted using the Department's CT-EMFAC model and vehicle activity data provided in the FTOR.

Table 3.2.6-8 summarizes the modeled yearly emissions. The differences in emissions between with- and without-project conditions represent emissions generated directly as a result of implementation of the build alternatives. Vehicular emission rates are anticipated to lessen in

future years due to continuing improvements in engine technology and the retirement of older, higher-emitting vehicles.

Table 3.2.6-8. I-80/I-680/SR 12 Project-Related Emissions (pounds per day)

Scenario	ROG	NO_x	CO	PM10	PM2.5	CO_2[a]
Existing (2004)	2,720	7,671	39,631	191	176	493,410
2015 No Project	1,424	4,386	19,025	206	187	694,836
2015 Alt B, Phase 1	1,696	5,696	24,179	249	226	870,093
2015 Alt C, Phase 1	1,697	5,527	23,656	247	225	857,141
2035 No Project	995	1,625	10,379	222	207	908,948
2035 Alt B, Phase 1	1,054	1,900	12,097	228	213	1,014,343
2035 Alt C, Phase 1	948	1,742	11,094	203	189	915,991
2035 Alt B	1,125	2,109	13,426	238	221	1,093,767
2035 Alt C	1,092	2,032	12,888	238	220	1,079,032
Comparison of Alternatives to Existing						
2015 Alt B, Phase 1 to Existing	-1,024	-1,976	-15,452	58	50	376,683
2015 Alt C, Phase 1 to Existing	-1,023	-2,145	-15,975	56	49	363,731
2035 Alt B, Phase 1 to Existing	-1,665	-5,772	-27,534	37	36	520,932
2035 Alt C, Phase 1 to Existing	-1,771	-5,929	-28,537	12	12	422,581
2035 Alt B to Existing	-1,594	-5,562	-26,205	47	45	600,357
2035 Alt C to Existing	-1,628	-5,639	-26,743	46	43	585,621
Comparison of Alternatives to No Project						
2015 Alt B, Phase 1 to 2015 No Project	272	1,310	5,154	44	39	175,257
2015 Alt C, Phase 1 to 2015 No Project	273	1,141	4,631	42	38	162,305
2035 Alt B, Phase 1 to 2035 No Project	59	275	1,718	6	6	105,395
2035 Alt C, Phase 1 to 2035 No Project	-47	117	715	-19	-18	7,043
2035 Alt B to 2035 No Project	130	484	3,047	16	14	184,819
2035 Alt C to 2035 No Project	97	407	2,509	16	13	170,084

Source: Air Quality Study Report

[a] CO_2 presented in metric tons per year.

Emissions associated with implementation of the proposed project were obtained by comparing future with-project emissions to future no-project emissions for both the construction-interim year (2015) and design-future year (2035) scenarios. Because the Department has statewide jurisdiction, and the setting for projects varies so extensively across the state, the Department has not and has no intention to develop thresholds of significance for CEQA. Further, because most air district thresholds have not been established by regulation or by delegation down from a federal or state agency with regulatory authority over the Department, the Department is not required to adopt those thresholds in their documents. Nevertheless, project-level operational emissions are presented in Table 3.2.6-8. In 2035, ROG, NO_x, CO, PM10, and PM2.5 emissions would increase for Alternative B, Alternative C, and Alternative B, Phase 1 when compared to the No-Build Alternative. Alternative C, Phase 1 would result in increases in ROG, NO_x, CO, PM10, and PM2.5 emissions for 2015 conditions, and increases in NO_x and CO emissions for 2035 conditions. ROG, PM10, and PM2.5 emissions would decrease for 2035 conditions. As previously indicated, there are no established criteria for determining when MSAT emissions should be considered a significant issue given that the EPA has not established regulatory concentration targets for the six relevant MSAT pollutants appropriate for use in the project development process and the emerging state of the science and of project-level analysis techniques. To the extent that it is applicable or feasible for the proposed project and through

coordination with the project development team, implementation of measures to reduce MSAT and criteria pollutant emissions, as described in *Avoidance, Minimization, and/or Mitigation Measures*, would be implemented to reduce this effect for all build alternatives.

Potential Temporary Increase in Ozone Precursors (ROG and NO_x), CO, and PM10 Emissions during Grading and Construction Activities

Construction activity is a source of dust and exhaust emissions that can have substantial temporary impacts on local air quality (i.e., exceeding state air quality standards for ozone, CO, PM10, and PM2.5). Such emissions would result from earthmoving and use of heavy equipment, as well as land clearing, ground excavation, cut-and-fill operations, and roadway construction. Emissions can vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing weather. A major portion of dust emissions for the build alternatives would likely be caused by construction traffic on temporary areas.

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities. Emissions from construction equipment also are anticipated and would include CO, nitrogen oxides (NO_x), volatile organic compounds (VOCs), directly emitted particulate matter (PM10 and PM 2.5), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO_x and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM10, PM2.5, and small amounts of CO, SO_2, NO_x, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM10 emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM10 emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

The EPA estimates that construction activities for large development projects add 1.09 tonne (1.2 tons) of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, the emissions can be reduced by up to 50%. The Department's Standard Specifications (Section 14) pertaining to dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

In addition to dust-related PM10 emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, VOCs and some soot particulate (PM10 and PM2.5) in exhaust emissions. If construction activities were to increase traffic

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

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

Implementation of all build alternatives would result in the construction of widened roads, overcrossings, and embankments, as well as intersection improvements. Temporary construction emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade construction, and paving activities and construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather.

The SMAQMD's Road Construction Emissions Model (Version 6.3.1) was used to estimate construction-related ozone precursors ROG and NO_x, CO, PM10, PM2.5, and CO_2 emissions from construction activities. The model estimates emissions for load hauling (on-road heavy-duty vehicle trips), worker commute trips, construction site fugitive dust (PM10 and PM2.5), and off-road construction vehicles. This analysis is based on anticipated construction equipment calculated by the Road Construction Emissions Model, which estimates construction equipment based on project size, duration of construction activities, and level of daily construction activities. While exhaust emissions are estimated for each activity, fugitive dust estimates are currently limited to major dust-generating activities, which include grubbing/land clearing and grading/excavation. In addition, dust estimates do not account for control measures required by BAAQMD.

Construction of the fundable first phase is expected to begin in 2012. It was assumed that construction activities would occur for eight hours per day. There are no projected dates for later phases of construction. The total project length was assumed to be 13 miles, and total area of disturbed ground is 192.5 acres for Alternative B and 220.2 acres for Alternative C. To represent a worst-case scenario, the total area of disturbed ground associated with Alternative C was evaluated, with an assumed maximum of 55.1 acres disturbed per day (based on a default assumption that the maximum amount of acreage disturbed in any given day would be 0.25 of the overall assumed project acreage). It was also assumed that no soil would be imported or exported. Construction activities were divided into separate phases and analyzed separately. Construction emission estimates represent the maximum emissions for each phase of construction. Total emissions per day represents the potential maximum daily emissions, while the total emissions provides an estimate of total maximum emissions associated with construction of the proposed project. The results of modeling for construction activities for the worst case alternative, Alternative C, are summarized in Table 3.2.6-9.

Table 3.2.6-9. Worst-Case Construction Emission Estimates (pounds per day)

Construction Phase	ROG	NO_x	CO	PM10	PM2.5	CO_2[a]
Grubbing/land clearing	64.7	547.3	287.9	574.7	135.9	7,019.0
Grading/excavation	56.5	440.6	271.4	573.5	134.8	6,659.8
Drainage/utilities/sub-grade	32.7	215.1	135.0	563.3	125.8	3,153.4
Paving	33.4	180.4	136.8	15.1	13.8	2,320.5
Total	**187.3**	**1,383.3**	**831.1**	**1,726.5**	**410.3**	**19,152.7**

Source: Air Quality Study Report
Note: Emissions calculations based on Road Construction Emissions Model (Version 6.3.1).
[a] CO_2 presented in metric tons per year.

Construction activities are subject to requirements found in the Standard Specifications for Construction of Local Streets and Roads (California Department of Transportation 2006). Standard Specification Section 14 stipulates that construction activities must comply with all rules, regulations, ordinances, and statutes of the local air pollution control district; addresses dust control requirements; and addresses dust palliatives.

Implementation of the Department's standard specification and measures to control dust and exhaust emissions during construction would help to minimize air quality impacts from construction activities.

There would be no effect under the No-Build Alternative because there would be no construction.

Naturally Occurring Asbestos

According to the California Department of Conservation's 2000 publication, *A General Location Guide for Ultramafic Rock in California*, there are no geologic features normally associated with NOA (i.e., serpentine rock or ultramafic rock near fault zones) in or near the project area (California Department of Conservation 2000). As such, there is no potential for impacts related to NOA emissions during construction activities. However, construction activities that involve the demolition of any building or structure containing asbestos would be subject to EPAs National Emissions Standards for Hazardous Air Pollutants (NESHAP) and CARB's Airborne Toxic Control Measures (ATCMs).

Climate Change

Climate change is analyzed in Chapter 4. Neither the EPA nor the FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on the FHWA's climate change Web site (Federal Highway Administration 2009b), climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because more requirements have been set forth in California legislation and executive orders regarding climate change, the issue is addressed in the CEQA chapter of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by the FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours travelled.

Avoidance, Minimization, and/or Mitigation Measures

Amend the Transportation Improvement Program to Include Additional Alternatives

STA will submit a TIP amendment for the selected alternative if Alternative C, Phase 1 is not selected as the Preferred Alternative.

Implement Measures to Reduce MSAT and Criteria Pollutant Emissions

The project applicant shall implement measures to reduce MSAT emissions where feasible. The U.S. Department of Transportation Federal Highway Administration presents mitigation strategies to reduce emissions of MSATs (Federal Highway Administration 2006). Operational and long-term MSAT emissions are much more difficult to control than short-term construction MSAT emissions because variables such as daily traffic and vehicle fleet mix are elusive and beyond the Department's control. To the extent that it is applicable or feasible for the proposed project and through coordination with the project development team, the Department will consider the following MSAT emission reduction measures:

- Implement operational strategies that focus on speed limit enforcement and traffic management.
- Implement active Intelligent Transportation System programs, such as traffic management centers or incident management systems.
- Implement anti-idling strategies, such as truck-stop electrification.
- Establish buffer zones between new and expanded highway alignments and areas of vulnerable populations.
- Modify local zoning and develop guidelines that are more protective to separate emissions from sensitive receptors.

Most of the construction impacts on air quality are short term in duration and, therefore, will not result in adverse or long-term conditions. The Department's Standard Specifications pertaining to dust control and dust palliative requirement is a required part of all construction contracts and should effectively reduce and control emission impacts during construction. The provisions of the Department's Standard Specifications, Section 14 "Environmental Stewardship" "requires the contractor to comply with rules, ordinances, regulations, and statutes.

Implementation of the following measures would minimize air quality impacts from construction activities.

Implement California Department of Transportation Standard Specification Section 14

To control the generation of construction-related PM10 emissions, the project proponent will follow Standard Specification Section 14, "Environmental Stewardship," which addresses the contractor's responsibility on many items of concern, such as: air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; and convenience of the public; and damage or injury to any person or property as a result of any construction operation. Section 14-9.01 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances. Section 14-9.02 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 14.9-01.

- Water or dust palliative will be applied to the site and equipment as frequently as necessary to control fugitive dust emissions.
- Soil binder will be spread on any unpaved roads used for construction purposes, and all project construction parking areas.
- Trucks will be washed off as they leave the right-of-way as necessary to control fugitive dust emissions.
- Construction equipment and vehicles will be properly tuned and maintained. Low-sulfur fuel shall be used in all construction equipment as provided in 17 CCR 93114.
- A dust control plan will be developed to address sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts on existing communities.
- Equipment and materials storage sites will be located as far away as practical from residential and park uses. Construction areas will be kept clean and orderly.
- To the extent feasible, ESAs will be established for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited.
- Track-out reduction measures such as gravel pads at project access points, will be used to minimize dust and mud deposits on roads affected by construction traffic.
- Transported loads of soils and wet materials will be coved prior to transport, or adequate freeboard (space from the top of the material to the top of the truck) will be provided to reduce PM10 and deposition of particulate during transportation.
- Dust and mud deposited on paved, public roads due to construction activity and traffic will be removed to decrease particulate matter.
- To the extent feasible, construction traffic will be routed and scheduled to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Vegetation will be planted or mulched as soon as practical after grading to reduce windblown particulate in the area.

Implement Additional Control Measures for Construction Emissions of Fugitive Dust

Additional measures to control dust shall be borrowed from the BAAQMD (see Table 3.2.6-10) and implemented to the extent practicable when the measures have not already been incorporated and do not conflict with requirements of the Department's Standard Specifications, Special Provisions, NPDES permit, and the Biological Opinions, Clean Water Act Section 404 permit, Clean Water Act Section 401 Certification, and other permits issued for the project.

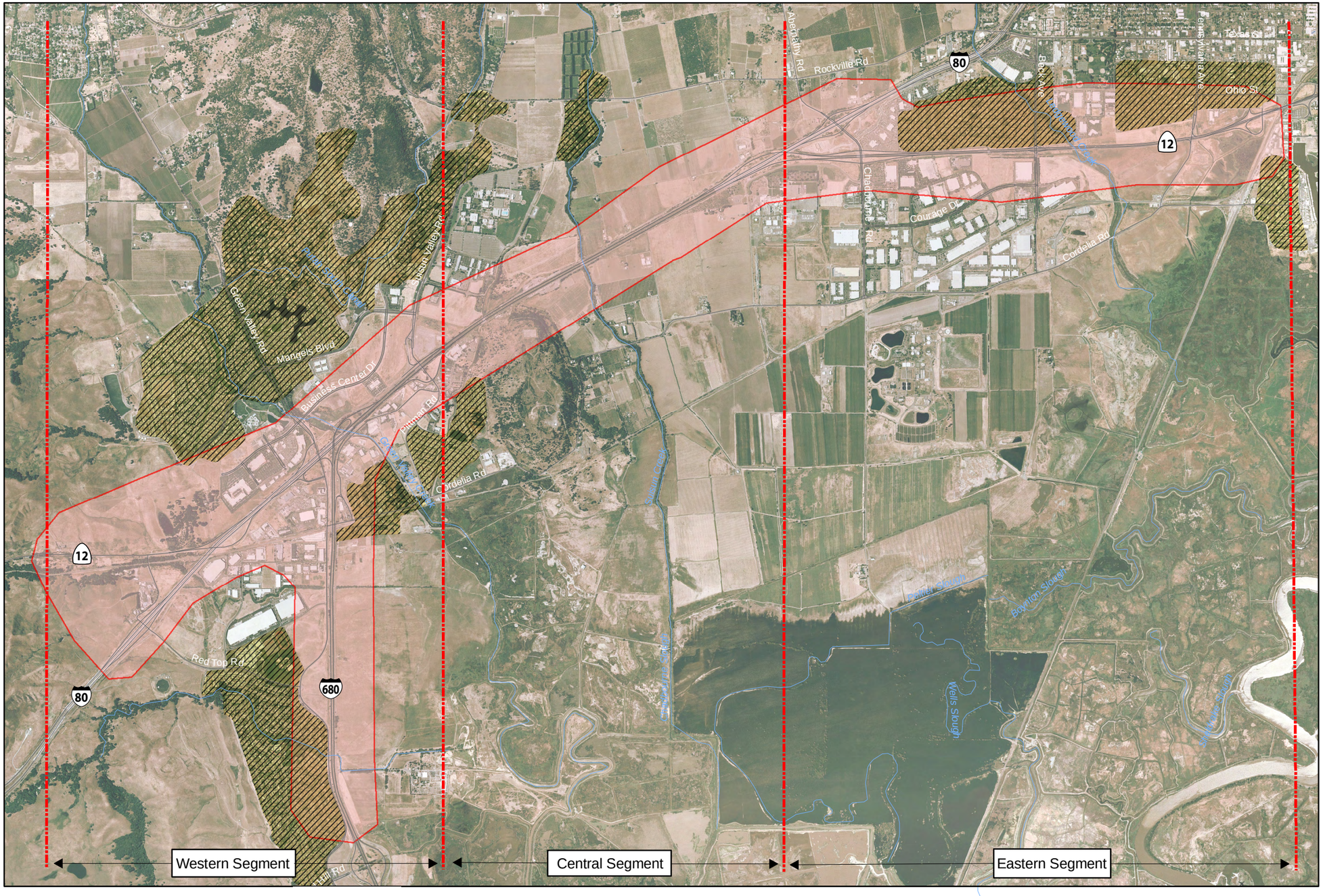
Table 3.2.6-10. Feasible Control Measures for Construction Emissions of PM10

Basic Control Measures (The following controls should be implemented at all construction sites.)
• Water all active construction areas at least twice daily.
• Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 0.6 meters (2 feet) of freeboard.
• Pave; apply water three times daily; or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
• Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
• Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
Enhanced Control Measures (The following additional measures should be implemented at construction sites greater than four acres in area.)
• Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (i.e., previously graded areas inactive for 10 days or more).
• Enclose, cover, water twice daily, or apply (nontoxic) soil binders to exposed stockpiles (e.g., dirt and sand).
• Limit traffic speeds on unpaved roads to 24.1 kilometers per hour (15 miles per hour).
• Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
• Replant vegetation in disturbed areas as quickly as possible.
Optional Control Measures (The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or for any other reason may warrant additional emissions reductions, but the project applicant is not required to implement them.)
• Install wheel washers for all exiting trucks or wash off the tires or tracks of all trucks and equipment leaving the site.
• Install windbreaks or plant trees or vegetative wind breaks at windward sides of construction areas.
• Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 miles per hour.
• Limit the area subject to excavation, grading, and other construction activity at any one time.

Source: Bay Area Air Quality Management District 1999.

Implement Measures to Reduce Exhaust Emissions from Off-Road Diesel-Powered Equipment

The construction contractor will be required to implement measures to reduce construction-related exhaust emissions. Such measures could include, but are not limited to maintaining properly tuned engines; minimizing the idling time of diesel powered construction equipment to two minutes; using alternative powered construction equipment (i.e., compressed natural gas, biodiesel, electric); using add-on mitigation devices such as diesel oxidation catalysts or particulate filters; using equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines; phasing project construction; and limiting the operating hours of heavy-duty equipment.



Legend

I680/I80/SR12 Interchange

- Proposed Project Area
- Segment Lines
- General Location of Sensitive Receptors in Vicinity of Project Area *

* Does not include locations of scattered sensitive receptors in the project area.

1 inch equals 3,000 feet

Meters: 0 — 750 — 1,500

Feet: 0 — 3,100 — 6,200

Source: Nolte 2007, ESRI 2005, CirclePoint 2007, NAIP 2006.

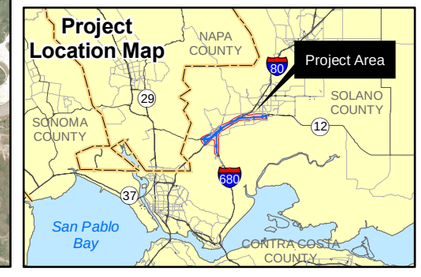
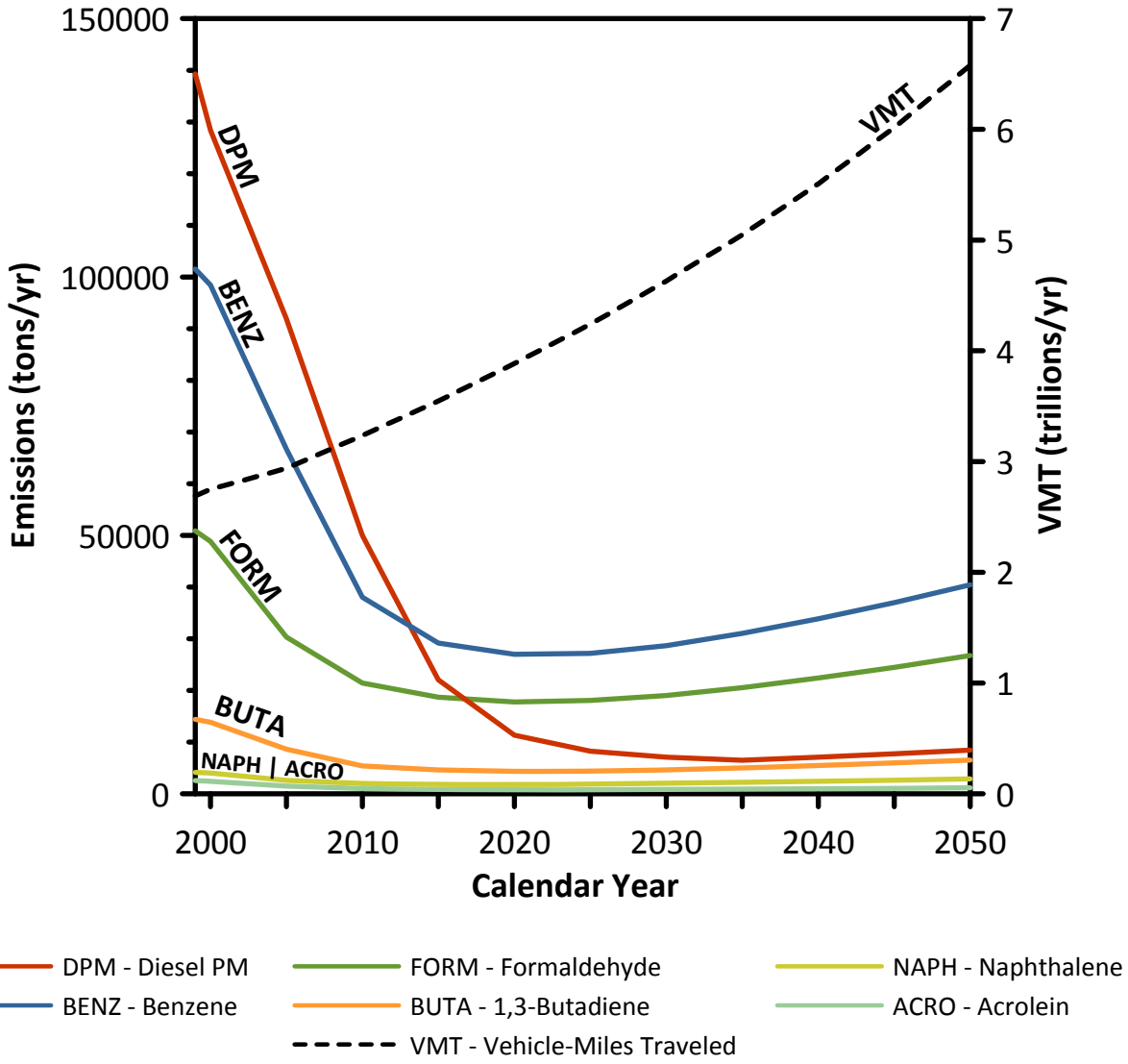


Figure 3.2.6-1
Project Area Map and General Locations of Sensitive Receptors



Note: (1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: FHWA 2009

Graphics/Projects/02166.02/EIS (11-09) SS

Figure 3.2.6-2
National MSAT Emission Trends 1999-2050
For Vehicle Operating on Roadways Using EPA's Mobile6.2 Model

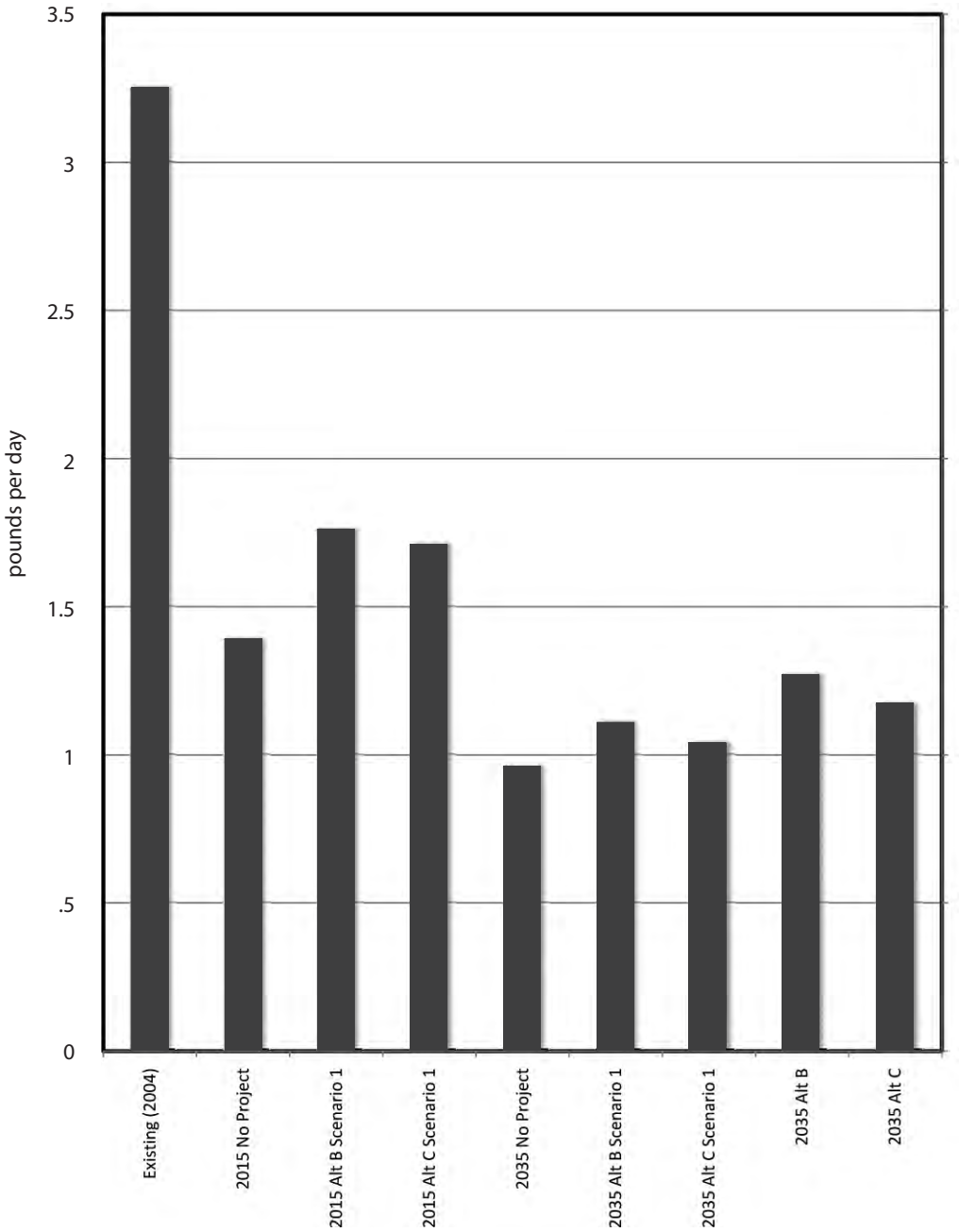


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Figure 3.2.6-3
Summary of Project Level Acrolein Emissions (pounds per day)

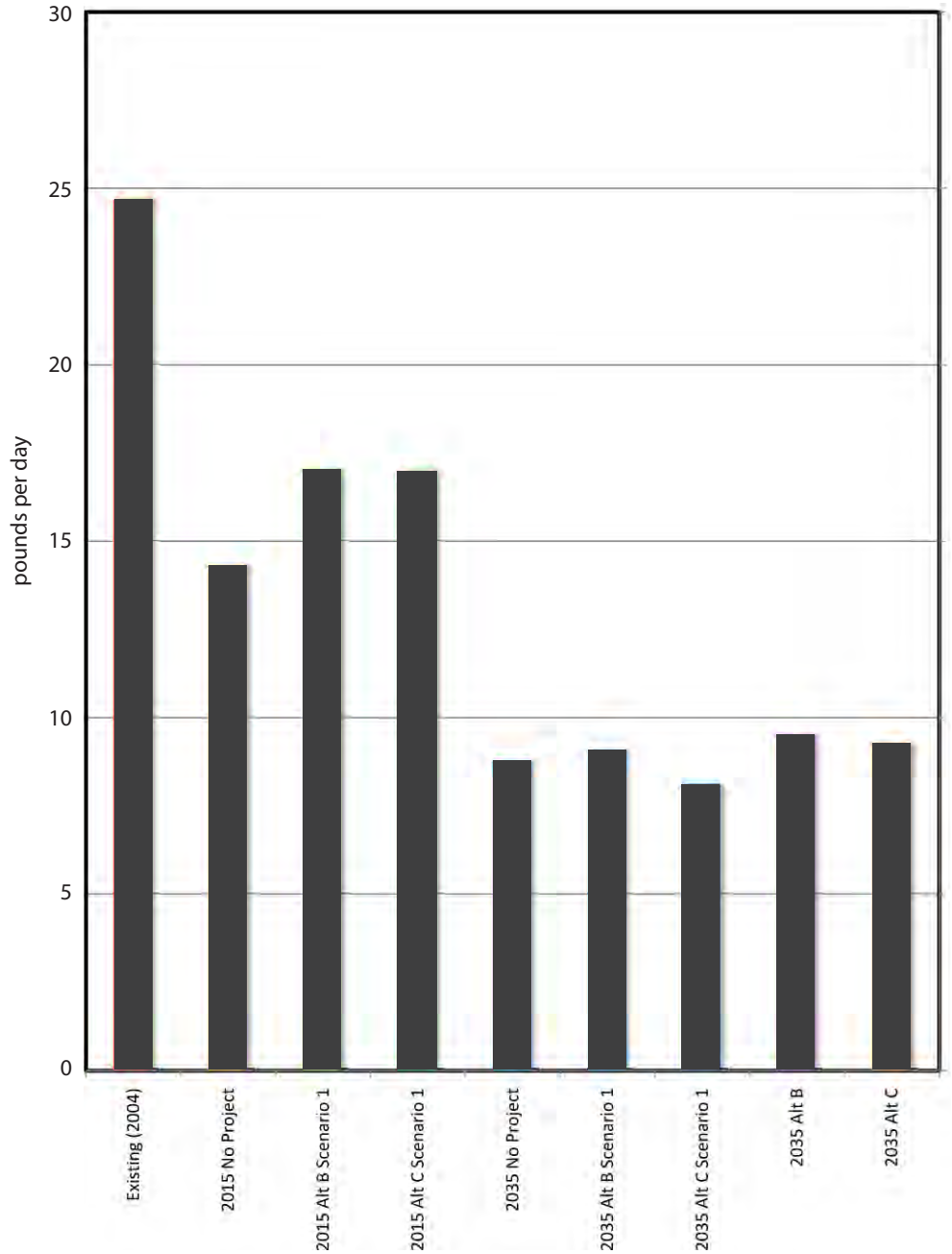

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Figure 3.2.6-4
Summary of Project Level Acetaldehyde Emissions (pounds per day)

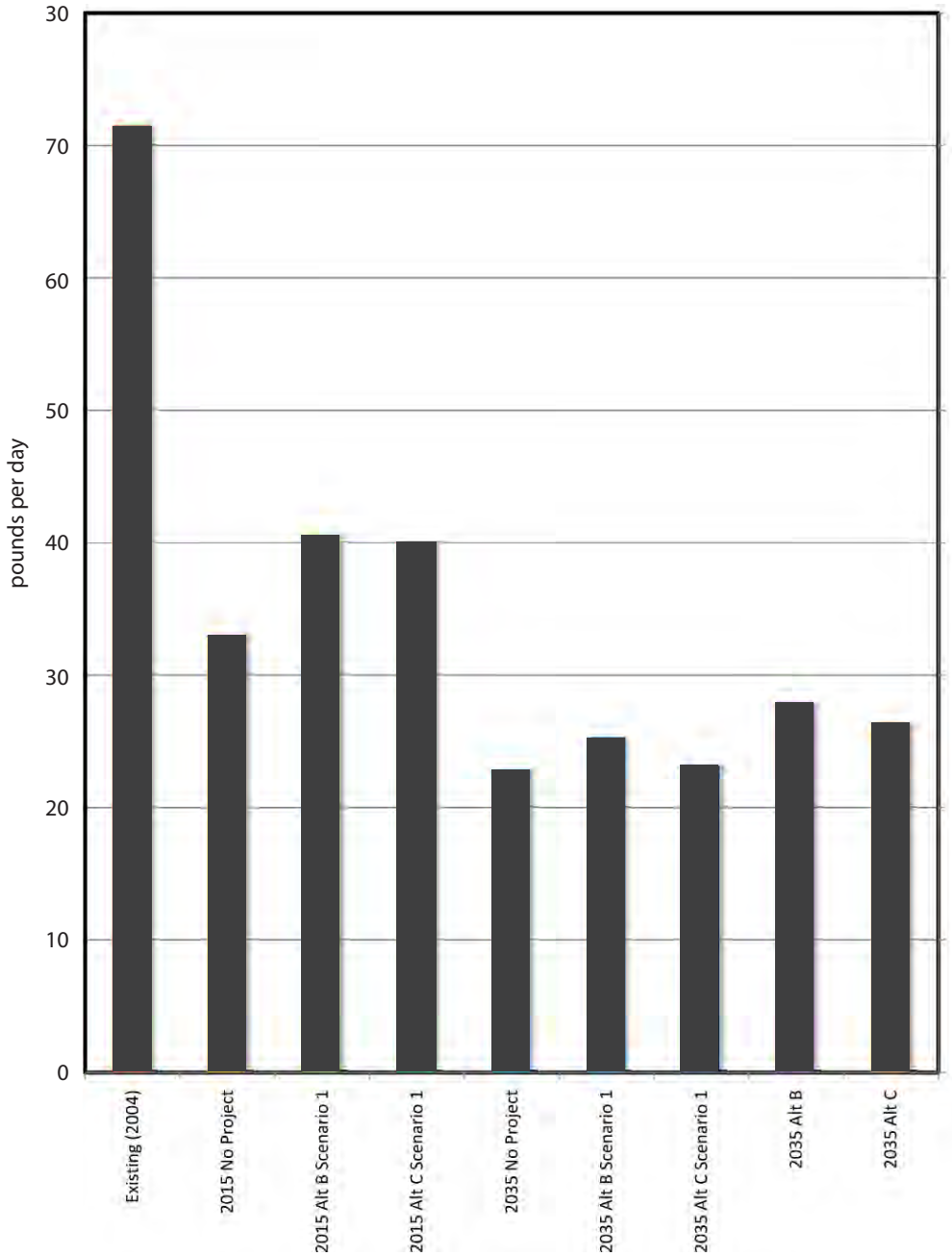

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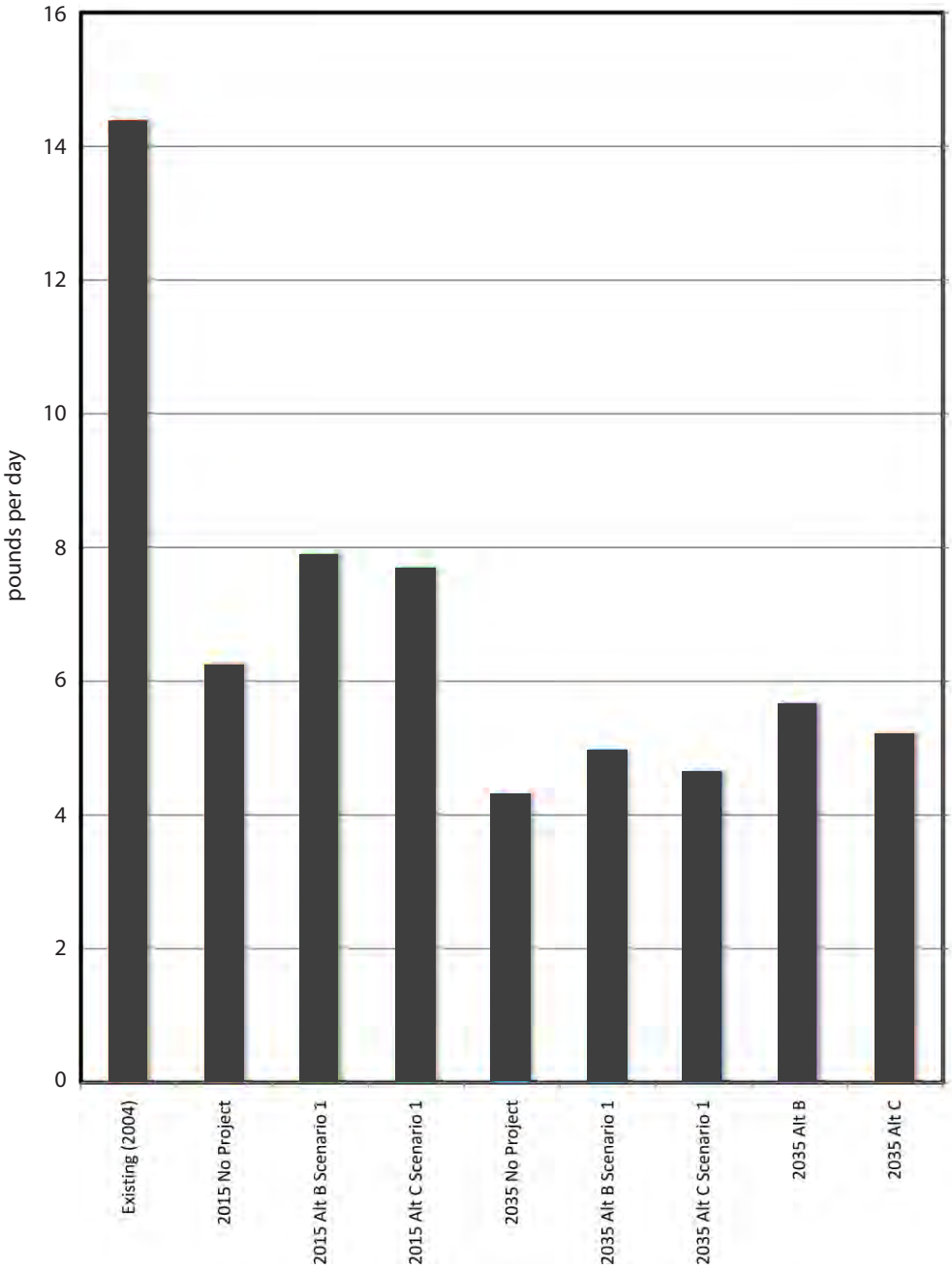
Figure 3.2.6-5
Summary of Project Level Benzene Emissions (pounds per day)



Graphics ... 02166.02 EIS (6-09) tm

Figure 3.2.6-6
Summary of Project Level 1,3-Butadiene Emissions (pounds per day)

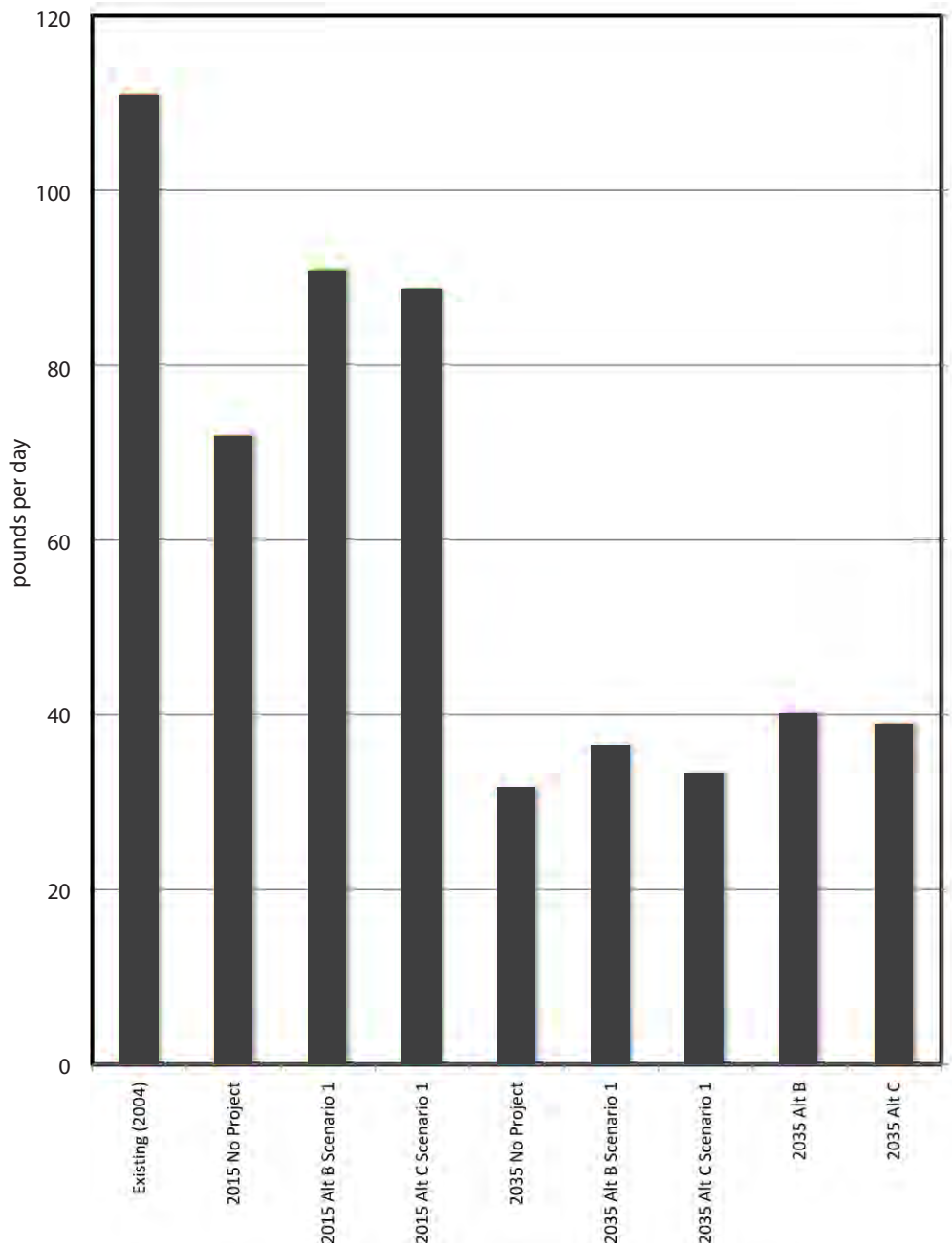


Figure 3.2.6-7
Summary of Project Level Diesel Particulate Matter Emissions (pounds per day)

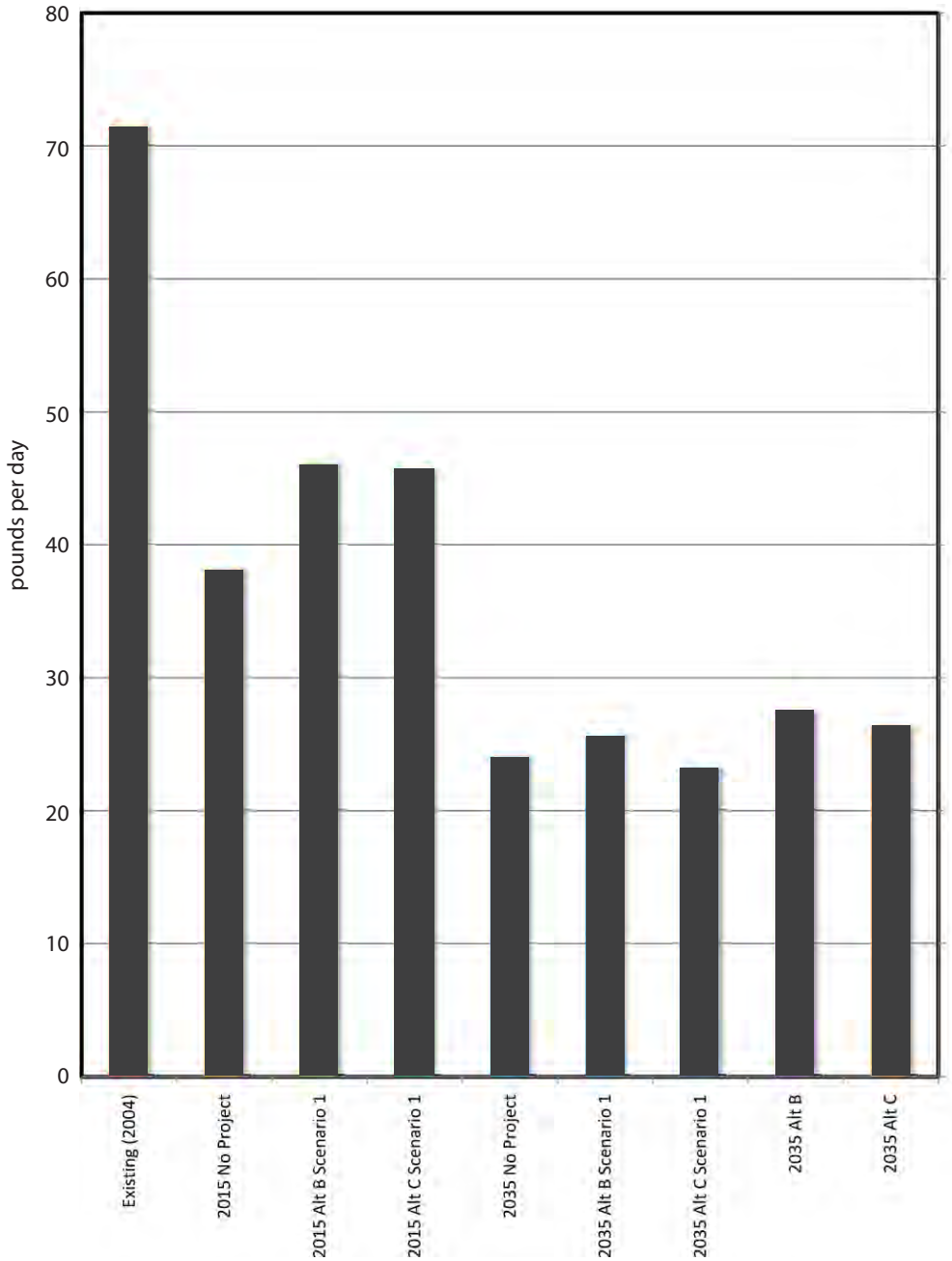


Figure 3.2.6-8
Summary of Project Level Formaldehyde Emissions (pounds per day)

3.2.7 Noise

Regulatory Setting

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

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that measures must be incorporated into the project unless such measures are not feasible. The rest of this section will focus on the NEPA-23 CFR 772 noise analysis; please see Chapter 4, "California Environmental Quality Act Evaluation," for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA (and the Department, as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). Table 3.2.7-1 lists the noise abatement criteria for use in the 23 CFR 772 analysis.

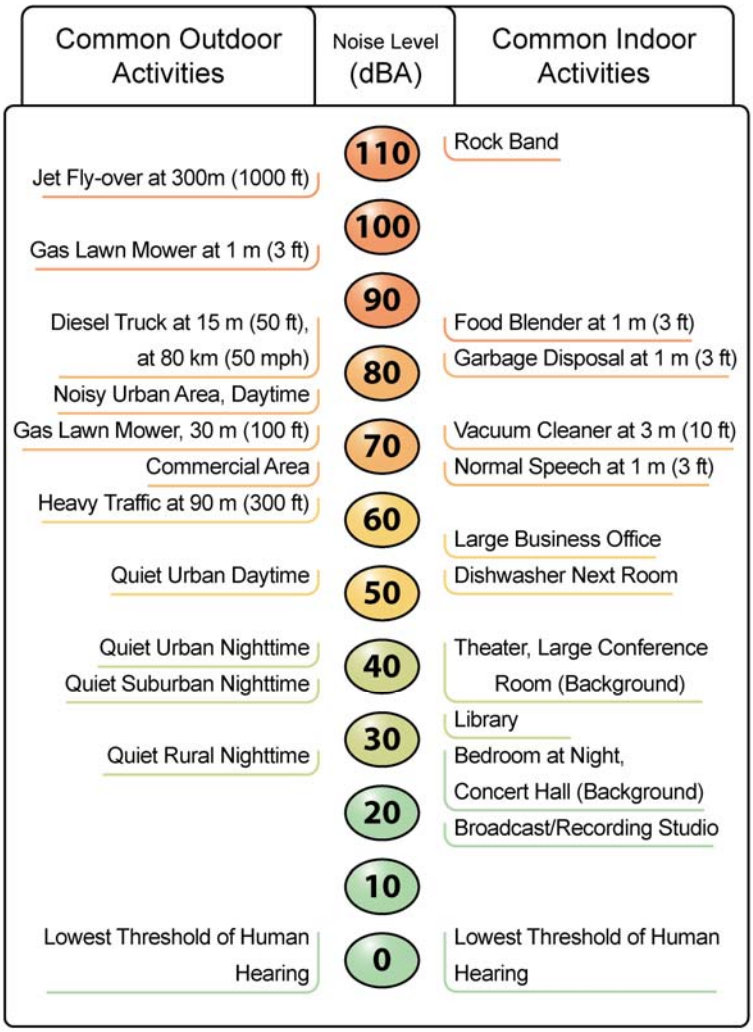
Table 3.2.7-1. Activity Categories and Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA, $L_{eq}(h)$	Description of Activities
A	57 exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 exterior	Developed lands, properties, or activities not included in Categories A or B above
D	Not applicable	Undeveloped lands.
E	52 interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Note: dBA $L_{eq}(h)$ = one-hour A-weighted equivalent sound level.

Table 3.2.7-2 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

Table 3.2.7-2. Typical A-Weighted Noise Levels



In accordance with the Department's *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (California Department of Transportation 2006), a noise impact occurs when the future noise level with the project results in a substantial increase in the noise level (defined as an increase of 12 dB or more) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as a noise level within 1 dB of the NAC.

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

The Department's *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. The feasibility of noise abatement is basically an engineering concern. A minimum 5 dB reduction in the future noise level must be achieved for an abatement measure to be considered feasible from an acoustical perspective. Other considerations affecting feasibility of noise abatement include topography, access requirements, other noise sources and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978 and the cost per benefited residence.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3-dB increase in sound level. However, subjective perception of a doubling of loudness may be different than what is measured. In noisy environments, changes in noise of 1 to 2 dB are generally not detectable. However, it is widely accepted that the normal human ear begins to perceive a sound level increase of 3 dB in typical noisy environments. A 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. A 3-dB increase is considered a perceptible increase in noise level.

Affected Environment

The *Noise Study Technical Report for the Interstate 80/Interstate 680/State Route 12 Interchange Project* (Noise Study) was prepared in 2010. The technical report discusses potential noise impacts and related noise abatement measures associated with the construction and operation of mainline and interchange improvements on I-80, I-680, and SR 12 and the construction and operation of a truck scale facility on I-80 in Solano County. The report was prepared to comply with 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise," and the Department's noise analysis policies as described in the Traffic Noise Analysis Protocol.

The project area consists of a mix of residential, commercial, and industrial land uses (Activity Categories B and C). For the purposes of this analysis, land uses in the project area are grouped into a series of lettered regions as described below. Figures 3.2.7-1 through 3.2.7-16 in Volume 2 of this document identify the locations of these lettered regions. Figures 3.2.7-1 through 3.2.7-8 show the project area under Alternative B (and the fundable first phase). Figures 3.2.7-9 through 3.2.7-16 show the project area under Alternative C (and the fundable first phase).

Area A: Area A is located on the west side of I-680, north of Gold Hill Road, and is a dense single-family residential neighborhood (Activity Category B) adjacent to Lopes Road, extending north to Silver Creek Road. A sound barrier with a nominal height of six feet is located between I-680 and residences in Area A (refer to Volume 2, Figures 3.2.7-4 and 3.2.7-12).

Area A1: Area A1 is located on the west side of I-680, adjacent to Lopes Road and south of Gold Hill Road. This is a neighborhood densely populated with single-family residences (Activity Category B). A sound barrier with a nominal height of six feet is located between I-680 and residences in Area A1 (refer to Volume 2, Figures 3.2.7-4 and 3.2.7-12).

Area B: Area B is located on the west side of I-680, between Silver Creek Road and Rolling Hills Park. This area consists of residential townhouse units (Activity Category B) surrounded by a sound barrier with a nominal height of six feet (refer to Volume 2, Figures 3.2.7-4 and 3.2.7-12). This area also includes a walking trail that leads into Rolling Hills Park (Activity Category B).

Area C: Area C is located on the west side of I-680, north of Rolling Hills Park, extending along Lopes Road north to Red Top Road. This is a neighborhood densely populated with single-family residences (Activity Category B). Sound barriers with a nominal height of six feet are located between I-80 and residential receivers in this area (refer to Volume 2, Figures 3.2.7-4 and 3.2.7-12).

Area D: Area D is located on the west side of I-680, north of Cordelia Road. This area consists of two single-family residences on small lots adjacent to Lopes Road (Activity Category B), in the northwest quadrant of the Cordelia Road/Lopes Road intersection; and commercial land uses (Activity Category C) that do not include areas of frequent human use. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-3 and 3.2.7-11).

Area E: Area E is located on the east side of I-680 on both sides of Cordelia Road. This area consists of scattered single-family homes (Activity Category B), and commercial buildings (Activity Category C) that do not include areas of frequent human use. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-3 and 3.2.7-11).

Area F: Area F is located north of Business Center Drive, which will connect to the North Connector in the future under both Alternatives B and C. A single-family residential subdivision (Activity Category B) is located in this area. The area consists mostly of retail and commercial buildings (Activity Category C) that do not include areas of frequent human use. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-1 and 3.2.7-9).

Area G: Area G is located on the south side of SR 12E east of I-80. This area consists of the baseball diamond and park area adjacent to Busch Drive and west of Chadbourne Road (Activity Category B). The area consists mostly of retail and commercial buildings (Activity Category C) that do not include areas of frequent human use. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-7 and 3.2.7-15).

Area H: Area H is located on the north side of SR 12E east of I-80. This area is a single-family residential neighborhood (Activity Category B) that extends from east of Abernathy Road to

Beck Avenue. Two sound barriers in this area extend along SR 12; one extends along Marquette Way and has a nominal height of eight feet, and the other extends along Burgundy Way and has a nominal height of ten feet (refer to Volume 2, Figures 3.2.7-7 and 3.2.7-15).

Area I: Area I is located on the north side of SR 12E and consists of single-family residences (Activity Category B) along Diamond Way and Diamond Court. A sound barrier with a nominal height of eight feet is located between SR 12 and the residential area (refer to Volume 2, Figures 3.2.7-7 and 3.2.7-15).

Area J: Area J is located on the north side of SR 12E and consists of single-family residences (Activity Category B) along Ontario Street and Ontario Court. A sound barrier with a nominal height of eight feet is located between SR 12 and the residential area (refer to Volume 2, Figures 3.2.7-8 and 3.2.7-16).

Area K: Area K is located on the north side of SR 12E and consists of single-family residences (Activity Category B) and the Fairfield Vista apartment buildings along James Street and west of Pennsylvania Avenue. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-8 and 3.2.7-16).

Area L: Area L is located on the north side of SR 12E and consists of single-family residences and apartments (Activity Category B) along Illinois Street and Ohio Street. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-8 and 3.2.7-16).

Area M: Area M is located on the south side of SR 12E and consists of single-family residences and apartments (Activity Category B) and commercial buildings with no areas of outdoor frequent human use (Activity Category C) along Sacramento Street and Solano Street. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-8 and 3.2.7-16).

Area N: Area N is located along Chadbourne Road on the north side of I-80 and consists of scattered single-family residences (Activity Category B) and commercial buildings with no areas of outdoor frequent human use (Activity Category C). There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-7 and 3.2.7-15).

Area O: Area O is located on the south side of I-80 and consists of scattered single-family residences (Activity Category B) and commercial buildings with no areas of outdoor frequent human use (Activity Category C) near Hale Ranch Road. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-6 and 3.2.7-14).

Area P: Area P is located on the south side of I-80 and consists of scattered single-family residences (Activity Category B) and commercial buildings with no areas of outdoor frequent human use (Activity Category C) near Cordelia Road. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-6 and 3.2.7-14).

Area Q: Area Q is located in an area on the north side of I-80 bound by Dan Wilson Creek and Suisun Creek. This area is planned for mixed commercial and residential development (Activity Categories B and C) under the Fairfield Corporate Commons project (City of Fairfield 2005). Locations of residential use within the development are based on the configuration studied in the

Fairfield Corporate Commons Draft EIR. There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-5, 3.2.7-6, 3.2.7-13, and 3.2.7-14).

Area R: Area R is located in the southeastern quadrant of the I-80/Pittman Road interchange. This area consists of hotels with outdoor swimming pools (Activity Category B), a family outdoor recreation area, and commercial use (Activity Category C). There are no existing sound barriers in this area (refer to Volume 2, Figures 3.2.7-5 and 3.2.7-13).

Environmental Consequences

Noise Monitoring

The existing noise environment in the project area was characterized by short- and long-term noise monitoring. Short-term noise monitoring was conducted on Tuesday, October 9, and Wednesday, October 10, 2007. Short-term noise monitoring was conducted over 15-minute intervals at or near Activity Category B land uses within the project area. The short-term measurement positions are identified in Figures 3.2.7-1 through 3.2.7-16 in Volume 2. Table 3.2.7-3 summarizes the results of the short-term noise monitoring conducted in the project area.

Table 3.2.7-3. Summary of Short-Term Noise Monitoring

Measurement Location	Description	Area	Start Time	Duration (min.)	Existing Wall Height	Measured L_{eq}
ST-1	Ramsey Road, End of Smith Lane	E	4:20 p.m.	15	N/A	70.9
ST-2	First-row residence on Bridgeport Avenue	E	4:20 p.m.	15	N/A	62.8
ST-3	Second-row residence on Bridgeport Avenue	E	4:20 p.m.	15	N/A	63.1
ST-4	First-row residence on Silverado Drive	C	3:29 p.m.	15	6 feet	58.9
ST-5	Rolling Hills Park	B	3:29 p.m.	15	N/A	59.1
ST-6A	Trail, Rolling Hills Park	B	11:57 a.m.	15	N/A	63.9
ST-6B	Trail, Rolling Hills Park	B	3:29 p.m.	15	N/A	64.8
ST-7	First-row residence on Ridgecrest Court	A	11:57 a.m.	15	6 feet	56.2
ST-8	Second-row residence on Ridgecrest Court	A	11:57 a.m.	15	6 feet	47.2
ST-9	First-row residence on Northwood Drive	A	1:02 p.m.	15	6 feet	50.7
ST-10	Second-row residence on Northwood Drive	A	1:02 p.m.	15	6 feet	48.0
ST-11	Trail, Northwood Drive	A	1:02 p.m.	15	6 feet	68.3
ST-12	Fairfield Vista Apartments, Pennsylvania Avenue	K	12:32 p.m.	15	N/A	52.5
ST-13	First-row residence, James Street	K	12:32 p.m.	15	N/A	48.2
ST-14	First-row residence, James Street	K	12:32 p.m.	15	N/A	48.9
ST-15	First-row residence, Ontario Court	J	3:56 p.m.	15	8 feet	59.5
ST-16	First-row residence, Burgundy Way	H	2:52 p.m.	15	8 feet	54.2
ST-17	First-row residence, Burgundy Way	H	2:52 p.m.	15	8 feet	54.6
ST-18	First-row residence, Marquette Way	H	3:56 p.m.	15	8 feet	59.6
ST-19	First-row residence, Marquette Way	H	3:56 p.m.	15	8 feet	59.0
I-80-ST-1	Cordelia Road	I-80	1:00 p.m.	15	N/A	60.4
I-80-ST-6	Hamilton Avenue	I-80	3:00 p.m.	15	N/A	54.2
I-80-ST-13	Lozano Lane	I-80	11:00 a.m.	15	N/A	71.1

Note: N/A = not applicable.

Short-term monitoring was conducted at 23 positions within the project area. The maximum level measured was 71.1 dBA L_{eq}. The median level was 47.2 dBA L_{eq}.

Long-term monitoring position LT-1 was conducted at one position, next to Suisun Creek on the south side of I-80, approximately 200 feet from the edge of pavement (shown in Figures 3.2.7-5 and 3.2.7-13). The long-term sound level data was collected over five consecutive 24-hour periods, beginning on Thursday, January 19, 2006, and ending on Wednesday, January 25, 2006. The average loudest-hour sound level measured was 68.4 dBA L_{eq}1h, during the 7 a.m. hour.

Traffic Noise Modeling

A noise impact analysis was conducted for the proposed project. Three-dimensional modeling objects were developed using CAD drawings, aerials, and topographic contours provided by the STA. These objects were digitized into the FHWA Traffic Noise Model Version 2.5 (TNM 2.5). Loudest-hour traffic volumes, classification percentages, and speeds used to model traffic noise under existing and design-year (2035) conditions were provided in the FTOR for the proposed project. Table 3.2.7-4 summarizes the traffic noise modeling results under existing and design-year conditions.

Exposure of Noise Sensitive Land Uses to Increased Traffic Noise

Modeling results in Table 3.2.7-4 indicate that predicted traffic noise levels for the design-year with-project conditions would approach or exceed the NAC of 67 dBA, L_{eq}(h), for Activity Category B land uses within the project area.

Noise impacts resulting from a substantial increase over existing noise levels (12 dB) are not predicted to occur under the proposed project. As such, the increase in noise levels as a result of project operations would not be considered a significant adverse effect. However, because noise levels in the project area would approach or exceed the NAC thresholds, noise abatement must be considered.

Modeling results also indicate that predicted traffic noise levels for the design-year with-project conditions approach or exceed the NAC of 72 dBA, L_{eq}(h), for Activity Category C land uses within the project area. However, none of these Category C areas have exterior frequent human use that would benefit from lowered noise levels. Accordingly, no noise abatement is considered for any Category C uses in the project area.

Under Alternative B, Phase 1, noise impacts are predicted to occur in areas D, E (just south of the I-80/680 interchange), and R (just east of Suisun Valley Road). The affected units include 13 residences, an outdoor swimming pool (at the Days Inn) and an outdoor recreation area (Scandia Family Center). Under Alternative B, 28 residences along SR 12 and I-80 would be affected in addition to the noise impacts under Alternative B, Phase 1, resulting in a total of 49 affected units (Table 3.2.7-5).

Under Alternative C, Phase 1, one residence adjacent to I-680 would be exposed to high noise levels, resulting in a total of one unit affected (refer to Table 3.2.7-6). Under Alternative C, residences along I-80 and SR 12 are included in the project area, resulting in a total of 37 affected units, as shown in Table 3.2.7-6. The units affected include 29 residences, an outdoor swimming pool (at the Days Inn) and an outdoor recreation area (Scandia Family Center).

As indicated in Table 3.2.7-4, design year with-project traffic noise levels are predicted to be more than 3 dB greater than design year no-project traffic noise levels. This increase is more than the threshold of a perceptible change (3 dB).

Under Alternative B, noise levels would increase at Venus Drive (Area F), Busch Drive (Area G), Marquette Way (Area H) and Burgundy Way (Area H). Noise levels would exceed the NAC at the Marquette Way. Under Alternative B, Phase 1, noise levels would increase at Burgundy Way (Area H) only, and would not approach or exceed the NAC. Under Alternative C, noise levels would increase at James Street (Area K), Sacramento Street (Area M), and Marquette Way (Area H), but would only approach or exceed the NAC at Marquette Way. No exposure of sensitive land uses to traffic noise is expected to occur under Alternative C, Phase 1. Under the No-Build Alternative, noise levels associated with traffic would increase in the future as traffic congestion associated with growth increases (Table 2.3.7-4).

None of the receptors within the project boundaries would be exposed to a substantial increase over existing noise levels under any of the project alternatives. Therefore, no adverse effects related to increased traffic noise are expected.

Table 3.2.7-4. Traffic Noise Impact Evaluation, I-80, I-680 and SR 12

Position	Location	Area	Existing Traffic Noise Level, dBA, $L_{eq}(h)$	Design-Year No-Project Traffic Noise Level, dBA, $L_{eq}(h)$	Design-Year With Project, Alternative B Phase 1			Design-Year With Project, Alternative B Buildout			Design-Year With Project, Alternative C Phase 1			Design-Year With Project, Alternative C Buildout			Traffic Noise Impact[a]
					Noise Level, dBA, $L_{eq}(h)$	Increase re Existing, dB	Increase re No-Project, dB	Noise Level, dBA, $L_{eq}(h)$	Increase re Existing, dB	Increase re No-Project, dB	Noise Level, dBA, $L_{eq}(h)$	Increase re Existing, dB	Increase re No-Project, dB	Noise Level, dBA, $L_{eq}(h)$	Increase re Existing, dB	Increase re No-Project, dB	
A06	Birkdale Circle	A	61	63	64	+ 3	+ 1	64	+ 3	+ 1	64	+ 3	+ 1	64	+ 3	+ 1	–
A11	Stoneridge Circle	A	62	64	65	+ 3	+ 1	65	+ 3	+ 1	65	+ 3	+ 1	65	+ 3	+ 1	–
A13	Stoneridge Circle	A	62	64	65	+ 3	+ 1	65	+ 3	+ 1	65	+ 3	+ 1	65	+ 3	+ 1	–
B01	Smith Lane	B	61	63	64	+ 3	+ 1	64	+ 3	+ 1	64	+ 3	+ 1	64	+ 3	+ 1	–
B04	Rolling Hills Park	B	67	68	69	+ 2	+ 1	69	+ 2	+ 1	69	+ 2	+ 1	69	+ 2	+ 1	A/E All alts
C01	Silverado Drive	C	61	63	63	+ 2	0	64	+ 3	+ 1	63	+ 2	0	64	+ 3	+ 1	–
C04	Silverado Drive	C	60	62	63	+ 3	+ 1	63	+ 3	+ 1	63	+ 3	+ 1	63	+ 3	+ 1	–
C05	Silverado Drive	C	60	62	62	+ 2	0	63	+ 3	+ 1	62	+ 2	0	63	+ 3	+ 1	–
D01	Lopes Road	D	70	71	70	0	- 1	71	+ 1	0	n/a	n/a	n/a	n/a	n/a	n/a	A/E, Alt. B(ph1) B
E01	Bridgeport Avenue	E	68	70	70	+ 2	0	70	+ 2	0	n/a	n/a	n/a	n/a	n/a	n/a	A/E, Alt. B(ph1) B
E05	Cordelia Road	E	67	69	68	+ 1	- 1	69	+ 2	0	n/a	n/a	n/a	n/a	n/a	n/a	A/E, Alt. B(ph1) B
E10	Ritchie Road	E	63	63	63	0	0	63	0	0	n/a	n/a	n/a	n/a	n/a	n/a	–
E11	Ramsey Road	E	66	68	69	+ 3	+ 1	69	+ 3	+ 1	n/a	n/a	n/a	n/a	n/a	n/a	A/E, Alt. B(ph1) B
E12	Ramsey Road	E	73	75	74	+ 1	- 1	74	+ 1	- 1	74	+ 1	- 1	74	+ 1	- 1	A/E All alts
F01	Venus Drive	F	53	55	57	+ 4	+ 2	59	+ 6	+ 4	56	+ 3	+ 1	57	+ 4	+ 2	–
G01	Busch Drive Baseball Diamond	G	60	62	n/a	n/a	n/a	65	+ 5	+ 3	n/a	n/a	n/a	64	+ 4	+ 2	–
H01	Marquette Way	H	64	66	n/a	n/a	n/a	68	+ 4	+ 2	n/a	n/a	n/a	68	+ 4	+ 2	A/E, Alt. B C
H06	Marquette Way	H	64	66	n/a	n/a	n/a	69	+ 5	+ 3	n/a	n/a	n/a	69	+ 5	+ 3	A/E, Alt. B C
H09	Marquette Way	H	62	64	n/a	n/a	n/a	68	+ 6	+ 4	n/a	n/a	n/a	68	+ 6	+ 4	A/E, Alt. B C
H11	Marquette Way	H	61	63	n/a	n/a	n/a	66	+ 5	+ 3	n/a	n/a	n/a	66	+ 5	+ 3	A/E, Alt. B C
H12	Marquette Way	H	59	61	n/a	n/a	n/a	62	+ 3	+ 1	n/a	n/a	n/a	62	+ 3	+ 1	–
H21	Burgundy Way	H	59	61	64	+ 5	+ 3	64	+ 5	+ 3	n/a	n/a	n/a	63	+ 4	+ 2	–
I01	Diamond Way	I	59	61	59	0	- 2	59	0	- 2	n/a	n/a	n/a	60	+ 1	- 1	–
I11	Diamond Way	I	59	61	62	+ 3	+ 1	62	+ 3	+ 1	n/a	n/a	n/a	62	+ 3	+ 1	–
J01	Ontario Street	J	59	61	61	+ 2	0	61	+ 2	0	n/a	n/a	n/a	63	+ 4	+ 2	–
K01	James Street	K	58	61	n/a	n/a	n/a	58	0	- 3	n/a	n/a	n/a	62	+ 4	+ 1	–
K04	James Street	K	62	62	n/a	n/a	n/a	64	+ 2	+ 2	n/a	n/a	n/a	65	+ 3	+ 3	–
L04	Illinois Street	L	59	61	n/a	n/a	n/a	62	+ 3	+ 1	n/a	n/a	n/a	63	+ 4	+ 2	–
L06	Ohio Street	L	61	63	n/a	n/a	n/a	65	+ 4	+ 2	n/a	n/a	n/a	64	+ 3	+ 1	–
M01	Sacramento Street	M	51	53	n/a	n/a	n/a	54	+ 3	+ 1	n/a	n/a	n/a	59	+ 8	+ 6	–
N01	Chadbourne Road	N	63	64	n/a	n/a	n/a	65	+ 2	+ 1	n/a	n/a	n/a	65	+ 2	+ 1	–
O01	Hale Ranch Road	O	70	72	n/a	n/a	n/a	73	+ 3	+ 1	n/a	n/a	n/a	73	+ 3	+ 1	A/E All alts
P01	Cordelia Road	P	65	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	–[b]
Q01	Fairfield Commons (future)	Q	54	55	n/a	n/a	n/a	56	+ 2	+ 1	n/a	n/a	n/a	56	+ 2	+ 1	–
Q03	Fairfield Commons (future)	Q	55	56	n/a	n/a	n/a	57	+ 2	+ 1	n/a	n/a	n/a	57	+ 2	+ 1	–
Q04	end of Russell Road	Q	71	72	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	n/a[b]	–[b]
R01	Days Inn Pool (R1)	R	74	75	76	+ 2	+ 1	76	+ 2	+ 1	n/a	n/a	n/a	76	+ 2	+ 1	A/E All alts
R02	Scandia Rec Center (R2)	R	78	79	80	+ 2	+ 1	80	+ 2	+ 1	n/a	n/a	n/a	80	+ 2	+ 1	A/E All alts

[a] A/E indicates that traffic noise levels approach or exceed the NAC for the corresponding Activity Categories in the area.
[b] This property is taken under future project alternatives

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Table 3.2.7-5. Counts of Affected Residences, Alternative B, and Alternative B, Phase 1

Area	Primary Source of Traffic Noise	Alternative B, Phase 1		Alternative B	
		Approach or Exceed NAC	Substantial Increase over Existing Noise Levels	Approach or Exceed NAC	Substantial Increase over Existing Noise Levels
A	I-680	0	0	0	0
B	I-680	0	0	0	0
C	I-680	0	0	0	0
D	I-680	2	0	2	0
E	I-680	11	0	11	0
F	North Connector	0	0	0	0
G	SR 12	N/A	N/A	0	0
H	SR 12	0	0	25	0
I	SR 12	0	0	0	0
J	SR 12	0	0	0	0
K	SR 12	N/A	N/A	0	0
L	SR 12	N/A	N/A	0	0
M	SR 12	N/A	N/A	0	0
N	I-80	N/A	N/A	0	0
O	I-80	N/A	N/A	3	0
P	I-80	N/A	N/A	0	0
Q	I-80	0	0	0	0
R	I-80	8[a]	0	8[a]	0
Total Units Affected		**21**	**0**	**49**	**0**

Note: N/A = not applicable.

[a] Impact count for non-residential outdoor use is based on one unit per 100 linear feet of highway frontage.

Table 3.2.7-6. Counts of Affected Residences, Alternative C and Alternative C, Phase 1

Area	Primary Source of Traffic Noise	Alternative C, Phase 1		Alternative C	
		Approach or Exceed NAC	Substantial Increase over Existing Noise Levels	Approach or Exceed NAC	Substantial Increase over Existing Noise Levels
A	I-680	0	0	0	0
B	I-680	0	0	0	0
C	I-680	0	0	0	0
D	I-680	N/A	N/A	N/A	N/A
E	I-680	1	0	1	0
F	North Connector	0	0	0	0
G	SR 12	N/A	N/A	0	0
H	SR 12	N/A	N/A	25	0
I	SR 12	N/A	N/A	0	0
J	SR 12	N/A	N/A	0	0
K	SR 12	N/A	N/A	0	0
L	SR 12	N/A	N/A	0	0
M	SR 12	N/A	N/A	0	0
N	I-80	N/A	N/A	0	0
O	I-80	N/A	N/A	3	0
P	I-80	N/A	N/A	0	0
Q	I-80	N/A	N/A	0	0
R	I-80	N/A	N/A	8[a]	0
Total Units Affected		**1**	**0**	**37**	**0**

Note: N/A = not applicable.

[a] Impact count for nonresidential outdoor use is based on one unit per 100 linear foot of highway frontage.

Exposure of Noise-Sensitive Land Uses to Construction Noise

Construction noise is regulated by the Department's Standard Specifications Section 14-8, "Sound Control Requirements," which states that noise levels generated during construction will comply with applicable local, state, and federal regulations and that all equipment will be fitted with adequate mufflers according to the manufacturers' specifications.

Table 3.2.7-7 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 3.2.7-7. Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete pump	82

Source: Federal Transit Administration 2006.

No adverse noise effects from construction are anticipated, because construction would be conducted in accordance with the Department's Standard Specifications Section 14-8 and applicable local noise standards. Construction noise would be short-term, intermittent, and masked by local traffic noise. Under the No-Build Alternative, no new noise effects associated with project construction would occur.

Avoidance, Minimization, and/or Mitigation

Noise Abatement Evaluation under 23 CFR 772

None of the receptors within the project boundaries would be exposed to a substantial increase (greater than 12 dB) in future predicted noise levels under any of the project alternatives. Consequently, no adverse effects under NEPA were identified. However, several receptors within the project area would experience high noise levels that approach or exceed the NAC thresholds. Under the requirements of 23 CFR 772 noise abatement in the form of noise barriers was considered for the following areas that are predicted to experience high noise levels:

- Area E (All Project Alternatives).
- Area H (Project Alternatives B and C).
- Area O (Project Alternatives B and C).
- Area R (Project Alternatives B and C, Alternative B, Phase 1).

Potential noise abatement measures include the following:

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

Because of the configuration and location of the proposed project, noise barriers are the only form of noise abatement evaluated in this report. Each noise barrier has been evaluated for feasibility based on achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. The Department's 2009 base cost-per-residence allowance is $31,000. Additional allowance dollars are added to the base allowance based on absolute noise levels, the increase in noise levels resulting from the proposed project, achievable noise reduction, and the date of building construction in the area. Worksheets in Appendix B of the Noise Study summarize the reasonable cost allowance calculations, based on the procedure outlined in the Protocol.

For any noise barrier to be considered reasonable from a cost perspective the estimated cost of the noise barrier should be equal to or less than the total cost allowance calculated for the barrier. The cost calculations of the noise barrier should include all items appropriate and necessary for construction of the barrier, such as traffic control, drainage modification, and retaining walls. The design of noise barriers presented in this report is preliminary only and has been conducted at a level appropriate for environmental review but not for final design of the proposed project.

Preliminary information on the physical location, length, and height of noise barriers is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement will be made upon completion of the project design.

Area D (Alternatives B and Alternative B, Phase 1)

The traffic noise modeling results in Table 3.2.7-4 indicate that traffic noise levels at residences in Area D will be in the range of 70–71 dBA-L_{eq}[h]. Traffic noise impacts are predicted to occur at two residences in this area under Alternative B. Receivers in Area D lie outside of the project area under Alternative C, so they are not considered for noise abatement under Alternative C.

Noise Barrier D was designed for the edge of southbound I-680, and was analyzed for feasibility to benefit receivers in Area D. Detailed modeling analysis of Barrier D indicates that a barrier with a height of up to 16 feet would provide a maximum noise reduction of less than 5 dB at noise-sensitive receiver locations. Barrier D is therefore not considered to be feasible.

A noise barrier along the western edge of Lopes Road would not be feasible because the affected residences require access to Lopes Road, and an acoustically effective barrier would block driveway access. Therefore, noise barriers are not considered a feasible noise abatement option for Area D.

Area E

Table 3.2.7-4 indicates that traffic noise levels at residences in Area E will be in the range of 63–74 dBA-L_{eq}[h]. Traffic noise impacts are predicted to occur at 11 residences in this area.

Noise Barrier E-1 was designed for the northbound edge of I-680, and was analyzed for feasibility to benefit receivers adjacent to Cordelia Road and Bridgeport Avenue. Traffic noise from local roadways such as Cordelia Road contributes significantly to sound levels, decreasing the potential for a noise barrier along I-680 to benefit receivers adjacent to Cordelia Road. Detailed modeling analysis of Barrier E-1 indicates that a barrier with a height of 16 feet would provide a maximum noise reduction of less than 5 dB at noise-sensitive first-row receiver locations. Barrier E-1 is therefore not considered to be feasible.

Construction of noise barriers along local roads such as Cordelia Road would not be feasible because the affected residences require access to the local roads, and an acoustically effective barrier would block those access points.

Noise Barrier E-2 was designed to benefit a single ranch property south of Bridgeport Avenue, and was evaluated for wall heights in the range of 6–16 feet. Barrier E-2 would extend approximately 1,160 linear feet within Caltrans right-of-way between I-680 northbound and Ramsey Road. Detailed modeling analysis of Barrier E-2 indicates that construction of this barrier at a height of ten to 16 feet would provide noise reduction of 5 dB or more at noise-sensitive receiver locations. Barrier E-2 is therefore considered feasible from an acoustical perspective. Barrier E-2 would meet the Department's line-of-sight requirement at a barrier height of 12 feet. Table 3.2.7-8 summarizes the calculated reasonable allowances for Noise Barrier E-2. Reasonable allowance calculation sheets are provided in Appendix B of the Noise Study. Barrier E-2 is shown in Figure 3.2.7-17.

Table 3.2.7-8. Summary of Reasonableness Determination Data—Barrier E-2, Ramsey Road

Barrier I.D.: E-2, Ramsey Road						
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}[h]	69					
Design-year noise level minus existing noise level, dB	3					
Design Year with Barrier	**Height: 6 feet**	**Height: 8 feet**	**Height: 10 feet**	**Height: 12 feet**	**Height: 14 feet**	**Height: 16 feet**
Barrier noise reduction, dB	3	4	5	6	6	7
Number of benefited residences	0	0	1	1	1	1
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$45,000	$45,000	$45,000	$47,000	$47,000	$47,000
Total reasonable allowance	N/A	N/A	$45,000	$47,000	$47,000	$47,000

Note: N/A = not applicable.

Noise Barrier E-3 was analyzed for feasibility to benefit a single ranch property east of Red Top Road. Barrier E-3 would extend approximately 750 linear feet within Caltrans right-of-way between I-680 northbound and Ramsey Road. Barrier E-3 was evaluated for wall heights in the range of 6–16 feet, and would meet the Caltrans line-of-sight requirement at a barrier height of 12 feet. Detailed modeling analysis of Barrier E-3 indicates that a barrier with a height of up to 16 feet would provide noise reduction of 5 dB or more at noise-sensitive receiver locations. Barrier E-3 is therefore considered feasible from an acoustical perspective. Table 3.2.7-9 summarizes the calculated reasonable allowances for Barrier E-3. Reasonable allowance calculation sheets are provided in Appendix B of the Noise Study. Barrier E-3 is shown in Figure 3.2.7-17.

Table 3.2.7-9. Summary of Reasonableness Determination Data—Barrier E-3, Ramsey Road

Barrier I.D.: E-3, Ramsey Road						
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}[h]	74					
Design-year noise level minus existing noise level, dB	1					
Design Year with Barrier	**Height: 6 feet**	**Height: 8 feet**	**Height: 10 feet**	**Height: 12 feet**	**Height: 14 feet**	**Height: 16 feet**
Barrier noise reduction, dB	5	5	6	7	7	7
Number of benefited residences	1	1	1	1	1	1
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$45,000	$45,000	$47,000	$47,000	$47,000	$47,000
Total reasonable allowance	$45,000	$45,000	$47,000	$47,000	$47,000	$47,000

Note: N/A = not applicable.

Area H (Project Alternatives B and C)

The traffic noise modeling results in Table 3.2.7-4 indicate traffic noise levels residences in Area H will be in the range of 62–69 dBA-L_{eq}[h]. Traffic noise impacts are predicted to occur at 25 residences in this area. There are two existing noise barriers within Area H. The first noise barrier (Barrier H-1) has a nominal height of eight feet and extends along the SR 12E right-of-way parallel to Columbus Drive to the Chadbourne Road exit ramp. All 25 affected receivers are first-row residences located behind Barrier H-1.The second barrier (Barrier H-2) has a nominal height of ten feet and extends along the SR 12E right-of-way from Beck Avenue to the end of Burgundy Way.

Barrier H-1 would extend approximately 2,250 linear feet within SR 12 right-of-way and perpendicular to SR 12 along the existing noise barrier footings on both sides of the neighborhood enclosing Marquette Way (see Figure 3.2.7-18). Detailed modeling analysis of Barrier H-1 indicates that increasing the height of the existing barrier to at least 14 feet would provide a noise reduction of 5 dB or more at first-row residences. Increasing the height of existing Barrier H-1 is therefore considered feasible from an acoustical perspective.

Increasing the height of Barrier H-1 to 14 feet would meet the Department's line-of-sight requirement. Table 3.2.7-10 summarizes the calculated reasonable allowances for wall heights from ten to 16 feet. Reasonable allowance calculation sheets are provided in Appendix B of the Noise Study. Barrier H-1 is shown in Figure 3.2.7-18 in Volume 2.

Segments of Noise Barrier H-1 lie outside of Caltrans right-of-way, so would need to meet additional requirements before approval for construction. First, all affected property owners would need to approve construction of the segments of the Barrier H-1 which lie outside Caltrans right-of-way. Second, each affected property owner must enter into a contract agreement with Caltrans to specify responsibilities related to construction and maintenance of noise barriers.

Table 3.2.7-10. Summary of Reasonableness Determination Data—Barrier H-1, Marquette Way

Barrier I.D.: H-1, Marquette Way						
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}[h]	69					
Design-year noise level minus existing noise level, dB	6					
Design Year with Barrier	**Height: 6 feet**	**Height: 8 feet**	**Height: 10 feet**	**Height: 12 feet**	**Height: 14 feet**	**Height: 16 feet**
Barrier noise reduction, dB	0	0	2	4	6	7
Number of benefited residences	0	0	0	0	25	25
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$45,000	$45,000	$45,000	$45,000	$47,000	$47,000
Total reasonable allowance	N/A	N/A	N/A	N/A	$1,175,000	$1,175,000

Note: N/A = not applicable.

Detailed modeling analysis of Noise Barrier H-2 indicates that increasing the height of the barrier to 16 feet would result in a maximum noise reduction of less than 5 dB at noise-sensitive first-row receiver locations. No receivers would benefit from increasing the height of Barrier H-2. Increasing the height of Barrier H-2 is therefore not considered to be feasible.

Area O (Project Alternatives B and C)

The traffic noise modeling results in Table 3.2.7-4 indicate that traffic noise levels at single-family residences will be up to 73 dBA-L_{eq}[h]. Traffic noise impacts are predicted to occur at three residences in this area. No noise barriers are currently located in this area. Barrier O (also Barrier SB4 in the I-80 Eastbound Cordelia Truck Scales Relocation Project) consists of two barriers that would provide shielding for traffic noise from both I-80 and the SR 12E flyover transition ramp. Barrier O would have a total length of approximately 4,800 linear feet within Caltrans right-of-way adjacent to I-80 eastbound to SR 12 transition ramps. Barrier O was evaluated for wall heights in the range of 6–16 feet, and would meet the Caltrans line-of-sight requirement at a barrier height of 12 feet. Detailed modeling analysis of Barrier O indicates that a barrier with a height of up to 16 feet would provide noise reduction of 5 dB or more at noise-sensitive receiver locations. Barrier O is therefore considered feasible from an acoustical perspective.

Table 3.2.7-11 summarizes the calculated reasonable allowances for the two barriers at equal heights. Reasonable allowance calculation sheets are provided in Appendix B of the Noise Study. Barrier O is shown in Figure 3.2.7-19 in Volume 2.

Table 3.2.7-11. Summary of Reasonableness Determination Data—Barrier O, Hale Ranch Road

Barrier I.D.: O (SB4), Hale Ranch Road						
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}[h]	73					
Design-year noise level minus existing noise level, dB	4					
Design Year with Barrier	**Height: 6 feet**	**Height: 8 feet**	**Height: 10 feet**	**Height: 12 feet**	**Height: 14 feet**	**Height: 16 feet**
Barrier noise reduction, dB	3	4	7	8	9	9
Number of benefited residences	0	0	1	3	3	3
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$47,000	$47,000	$49,000	$49,000	$51,000	$51,000
Total reasonable allowance	N/A	N/A	$49,000	$147,000	$153,000	$153,000

Note: N/A = not applicable.

Area Q—Fairfield Corporate Commons

The Fairfield Corporate Commons project is currently under construction. The project is a mixed-use development that includes office buildings, single- and multi-family residential units, and a hotel. The Fairfield Corporate Commons Draft EIR included a noise study, which assessed noise impacts predicted to result from construction activities and operations from the long-term buildout of the project. The noise analysis was done to determine the project's conformity to local land use compatibility standards. The study determined that potentially significant impacts would occur at exterior areas of frequent human use associated with the planned residential use.

Based on the preliminary configuration of land use studied in the report, mitigation in the form of noise barriers was required to reduce impacts at exterior locations. However, David Feinstein of the City of Fairfield Planning Department confirmed in a September 25, 2009, telephone conversation with ICF Jones & Stokes personnel that residential outdoor use areas would be located behind continuous building structures, which would function as shielding elements from traffic noise on the North Connector and I-80.

The traffic noise modeling results in Table 3.2.7-4 indicate traffic noise levels at planned residential use areas associated with the future Fairfield Corporate Commons project would be up to 57 dBA-L_{eq}[h]. No traffic noise impacts are predicted to occur within the Fairfield Corporate Commons project.

In addition, an existing residence in Area Q is expected to be removed due to construction of a truck scales facility on westbound I-80 as part of the project. Therefore, no noise abatement was considered for Area Q.

Area R (Project Alternatives B and C, Alternative B, Phase 1)

The traffic noise modeling results in Table 3.2.7-4 indicate that traffic noise levels at Scandia Family Center and the outdoor pool area of the Days Inn will be up to 80 dBA-L_{eq}[h]. Traffic noise impacts are therefore predicted to occur in this area. No noise barriers are currently located in this area. The two-barrier system identified as Barrier R in Figure 3.2.7-20 in Volume 2 (Barrier NR for the I-80 HOV Lanes Project) was evaluated for wall heights in the range of 6–16

feet, and would meet the Caltrans line-of-sight requirement at a barrier height of 12 feet. The Barrier R two-barrier system would have a total length of approximately 1,400 linear feet within eastbound I-80 right-of-way. Detailed modeling analysis of Barrier R indicates that a barrier with a height of up to 16 feet would provide noise reduction of 5 dB or more at noise-sensitive receiver locations. Barrier R is therefore considered feasible from an acoustical perspective.

Table 3.2.7-12 summarizes the calculated reasonable allowances for this wall. Reasonable allowance calculation sheets are provided in Appendix B of the Noise Study.

Table 3.2.7-12. Summary of Reasonableness Determination Data—Barrier R, Pittman Road

Barrier I.D.: R (NR), Pittman Road						
Predicted Sound Level without Barrier						
Design-year noise level, dBA-L_{eq}[h]	80					
Design-year noise level minus existing noise level, dB	2					
Design Year with Barrier	**Height: 6 feet**	**Height: 8 feet**	**Height: 10 feet**	**Height: 12 feet**	**Height: 14 feet**	**Height: 16 feet**
Barrier noise reduction, dB	5	6	7	9	10	10
Number of benefited residences	7	7	8	8	8	8
New highway or more than 50% of residences predate 1978	Yes	Yes	Yes	Yes	Yes	Yes
Reasonable allowance per benefited residence	$49,000	$51,000	$51,000	$53,000	$53,000	$53,000
Total reasonable allowance	$343,000	$357,000	$408,000	$424,000	$424,000	$424,000

Note: N/A = not applicable.

Under with-project design-year conditions, receiver R02 (Volume 2, Figure 3.2.7-20) is predicted to be exposed to a noise level of 80 dBA L_{eq}. This location is therefore predicted to be exposed to a severe traffic noise impact as defined in the Protocol. Noise abatement that is not reasonable and feasible as defined in the Protocol may be considered for severe traffic noise impacts on a case-by-case basis. This type of abatement is called extraordinary abatement. Barrier R would provide at least 5 dB of noise reduction and would reduce noise to less than 74 dBA L_{eq} at this location at a height of eight feet (as shown in Appendix C of the Noise Study). In the event that this barrier is not determined to be reasonable and feasible, it may be considered for extraordinary abatement.

Noise Abatement Decision Report

A Noise Abatement Decision Report (NADR) was prepared to include noise abatement construction cost estimates that have been prepared by the project engineer based on site-specific conditions. These cost estimates are then compared to the total reasonableness allowances as shown in Table 3.2.7-13.

Table 3.2.7-13. Summary of Reasonableness Allowances and Cost Estimates for Evaluated Noise Barrier Designs

Height (ft)	Receivers Benefited	Barrier Length (linear feet)	Barrier Area (square feet)	Department Cost Allowance per Residence ($)	Department Reasonableness Allowance ($)	Estimated Construction Cost ($)	Cost-Reasonable?
Barrier H-1							
14	25	2,250	31,500	$47,000	$1,175,000	$1,560,000	No
16	25	2,250	36,000	$47,000	$1,175,000	$1,700,000	No
Barrier E-2							
10	1	1,160	11,600	$45,000	$45,000	$440,000	No
12	1	1,160	13,920	$47,000	$47,000	$500,000	No
14	1	1,160	16,240	$47,000	$47,000	$560,000	No
16	1	1,160	18,560	$47,000	$47,000	$600,000	No
Barrier E-3							
6	1	750	4,500	$45,000	$45,000	$200,000	No
8	1	750	6,000	$45,000	$45,000	$260,000	No
10	1	750	7,500	$47,000	$47,000	$280,000	No
12	1	750	9,000	$47,000	$47,000	$330,000	No
14	1	750	10,500	$47,000	$47,000	$370,000	No
16	1	750	12,000	$47,000	$47,000	$390,000	No
Barrier O							
10	1	4,800	48,000	$49,000	$49,000	$2,530,000	No
12	3	4,800	57,600	$49,000	$147,000	$2,800,000	No
14	3	4,800	67,200	$51,000	$153,000	$3,030,000	No
16	3	4,800	76,800	$51,000	$153,000	$3,250,000	No
Barrier R							
6	7	1,400	8,400	$49,000	$343,000	$500,000	No
8	7	1,400	11,200	$51,000	$357,000	$570,000	No
10	8	1,400	14,000	$51,000	$408,000	$650,000	No
12	8	1,400	16,800	$53,000	$424,000	$730,000	No
14	8	1,400	19,600	$53,000	$424,000	$790,000	No
16	8	1,400	22,400	$53,00	$424,000	$850,000	No

As shown in Table 3.2.7-13, the estimated construction costs exceed the reasonableness allowance in all cases. Accordingly, the barrier designs studied in this analysis are not considered reasonable from a cost perspective. The determination of final reasonableness will made upon completion of the public input process.

Minimize Construction Noise

The Department's Standard Specification Section 14-8.02 will be implemented to minimize noise effects from construction. In addition, the following measures may be implemented to further minimize noise effects from construction:

- Use of equipment with sound-control devices that are no less effective than those provided on the original equipment.
- Prohibition of the use of any equipment with an unmuffled exhaust.

- Changing the location of stationary construction equipment to maximize the distance to noise sensitive uses.
- Turning off idling equipment.
- Rescheduling construction activity to non-sensitive hours of the day.
- Notifying adjacent residents in advance of construction work.
- Installing acoustic barriers around stationary construction noise sources.

3.2.8 Energy

Regulatory Setting

The State CEQA Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts on the environment, including energy impacts.

California's Energy Action Plan (updated in 2008) describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy resources are adequate, affordable, technologically advanced, and environmentally sound. In accordance with this plan, the first-priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer energy usage during peak periods to address system reliability and support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation (i.e., the use of relatively small power plants near or at centers of high demand). To the extent that these actions are unable to satisfy the increasing energy demand and transmission capacity needs, clean and efficient fossil-fuel–fired generation is supported.

Affected Environment

This discussion is based primarily on the *Interstate 80/Interstate 680/State Route 12 Energy Technical Report* (Energy Report) prepared in 2010. The affected environment includes the physical boundaries of the roadway construction site as well as the total vehicle flow passing through the completed roadway. Traffic flow passing through the project area at build-out is intrinsically connected to traffic patterns throughout the region, underpinned by socioeconomic and regulatory factors throughout the state and nation. Thus the affected environment can best be thought of as the regional energy budget. For reasons discussed in detail below, a comprehensive analysis of the regional energy budget is beyond the scope of this report. This analysis therefore is restricted to direct energy consumption and indirect energy consumption as defined below.

Direct Energy Use

Direct energy use is the energy used in the actual propulsion of a vehicle using the facility. It can be measured in terms of the thermal value of the fuel (usually measured in British thermal units [BTUs]), the cost of the fuel, or the quantity of electricity used in the engine or motor.

Indirect Energy Use

Indirect energy is defined as all the remaining energy used to run a transportation system, including construction energy, maintenance energy, and any substantial impacts on energy expenditures related to project-induced land use changes and mode shifts, and any substantial changes in energy associated with vehicle operation, manufacturing or maintenance due to increased automobile use.

Environmental Consequences

Determination of Adverse Effects

There are no thresholds of significance for energy consumption. Instead, the Department and the Federal Highway Administration (FHWA) require a discussion of the potential energy effects of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

A qualitative comparison of the project alternatives was employed in this analysis. Direct energy consumption was relatively assessed across the project alternatives through a comparison of peak vehicle miles traveled (VMT) (a.m. and p.m.), total VMT, and delay hours. To assess indirect energy consumption, the construction parameters of the project alternatives were compared. The qualitative analysis was determined to be the simplest way of comparing the project alternatives. This approach limits the need for assumptions and avoids significant limitations in standard, but outdated methodologies.

Historically, transportation energy studies quantified direct and indirect energy expenditures. Quantitative analyses of direct energy consumption were a summation of the peak and non-peak energy for vehicle movement for the analysis period, which was typically the period from the completion of project construction to 20 years following the completion of project construction. In assessing the direct energy impact, assumptions are made when considering various factors, including vehicle fleet mix, annual VMT, fuel economy, and variation of fuel consumption rates over time and by vehicle type. Additional assumptions were made, including:

- New-model fleet fuel efficiency would always be improving.
- Vehicle fuel usage in rural settings would differ from vehicle fuel usage in urban settings.
- Multiple occupant vehicles could use high occupancy vehicle lanes.
- Pavement would be maintained in fair to reasonable condition.

Quantification analyses of indirect energy were the summation of energy required to construct, operate, and maintain the transportation network, as well as to manufacture and maintain on-road vehicles and transit vehicles. This approach relied on factors (construction equipment operation energy factors and maintenance energy factors) that have remained unchanged for 30 years. The methodology to estimate construction energy expenditures using project construction cost requires adjusting future construction costs to the 1977 highway construction price index, which is almost always overlooked.

Today we can no longer make these same assumptions. The on-the-road vehicle fleet mix can vary in type and age with the economy. The on-the-road vehicle fleet fuel usage rates will depend on the on-the-road vehicle fleet mix and can be propelled by gasoline or diesel fuels as well as by other means, including gasoline-electric hybrids, plug-in electricity, fuel cells, and compressed natural gas. New-model vehicle fleet fuel usage rates are known, but we do not know how the rates may change as vehicles age. There may be new or improved technologies during the analysis period that constitute significant leaps in vehicle fuel conservation rates and efficiency. With fuel injection technology, the commonly used assumptions about cold starts are outdated and are not deemed appropriate for this analysis. Vehicle fleet fuel efficiency doesn't

always increase over time; vehicle fleet fuel efficiency actually decreased in the 1990s with the proliferation of sport utility vehicles. There may be no differences in vehicle fuel usage between rural and urban settings with urban expansion. Express (toll) lanes may replace high-occupancy vehicle lanes in the near future. Pavement condition may become worse over time if funding for maintenance improvements remains scarce. Construction equipment and techniques have improved in the last 30 years, so construction equipment operation energy factors require updating.

The project alternatives in and of themselves cannot influence the vehicle fleet, future fuel economy, or development patterns that steer regional driving patterns. All project alternatives would be equally affected by these uncertain future scenarios. However, at the writing of this document, both the regulatory environment and the market are responding to climate change concerns, and a transformation of American driving patterns and technologies seems likely within a generation. The practice of assuming present-day fuel economy and fleet conditions is commonly implemented as a worst-case scenario for energy analyses, but at this time the likelihood of large-scale changes in this sector would render that assumption grossly incorrect. This analysis has therefore relied on a comparison of the raw traffic numbers and has not converted them to BTUs.

In addition, numerous contributors to the energy balance within a project area require complicated and rigorous economic analysis. The decision of where people buy homes, how far they regularly commute, the choice of personal vehicle and the fuel price at which consumers begin to alter their transportation patterns are just a few examples of large-scale patterns that ultimately affect the number of vehicles in the project area. Traditional energy analyses for roadway projects have ignored these components, and consequently attributed increases in VMT uniquely to the implementation of the project—a gross oversimplification of the regional energy budget.

With so many unknowns and a multitude of future energy scenarios, a quantitative analysis has a high risk of being inaccurate and meaningless. Consequently, a qualitative analysis would provide more useful information upon which to judge a proposed project and its alternatives. The qualitative approach employed is described in detail in the “Methods” section.

Methods

The energy analysis addresses both direct and indirect energy. The direct energy analysis includes the potential for increased energy consumed by fossil-fuel–powered vehicles using the interchange. A discussion of motor vehicle traffic (VMT and average travel speeds) through the interchange is a component of the direct energy analysis because VMT and speeds can infer direct energy consumption. These VMT values were not converted to BTUs, avoiding the need to make assumptions about the future vehicle fleet or fuel economy. This approach essentially assumes that all future developments in fuel carbon content, fuel economy, fuel technology, and regulation affect the projected VMT equally across alternatives, and that the build alternatives would have no effect on these variables.

The indirect energy analysis addresses the energy associated with construction and maintenance of the interchange and other roadway infrastructures. This approach compares the amounts of various construction materials required for each alternative. Construction-related energy

consumption and energy consumption embodied in materials production is assumed to be directly proportional to roadway elevation, length, area and volume needed. By comparing the raw materials employed, the need to use speculative or outdated factors relating energy consumption to cost are avoided. The cost of acquiring individual materials may vary dramatically in response to global demand and availability. A lump cost estimate masks the effects of these fluctuations and is only very indirectly related to the true energy consumed.

Direct Energy Consumption

This analysis compares the estimated VMT, delay, and average network speed on the I-80/I-680/SR 12 interchange system-wide measure of effectiveness network (i.e., the portion of the network included in the traffic study) that would result under implementation of the project alternatives. The analysis parallels the *Air Quality Study Report* of the EIR by presenting direct energy (fuel consumption through VMT) calculations associated with estimated vehicle speeds from the traffic study.

A comparison of traffic metrics in the project area in 2015 and 2035 are shown in Tables 3.2.8-1 and 3.2.8-2. It is assumed that societal, economic, or regulatory changes affecting fuel economy are equally reflected in the VMTs for each project alternative. Thus assumed fuel economy is not required to convert VMT to energy consumption in order to compare alternatives.

Table 3.2.8-1. Traffic Flow during Operations in Year 2015 and Ranking of Alternatives (score in parenthesis)

Vehicles		No-Build	Alternative B Phase 1	Alternative C Phase 1
Project distance (miles)		–	6.23	10.17
VMT/hour	a.m. p.m.	449,870(*0*) 480,410(*0*)	451,325*(1)* 531,935*(1)*	448,800(*0*) 516,055(*0*)
Vehicle hours of delay/hour	a.m. p.m.	1,075(*0*) 5,100*(1)*	840(*0*) 2,150(*0*)	1,105*(1)* 3,110 (*0*)
Average network speed (miles per hour)	a.m. p.m.	51.2*(1)* 36.2*(1)*	52.6*(1)* 47.6(*0*)	51.0*(1)* 43.3(*0*)
Daily VMT		4,186,260(*0*)	4,424,670*(1)*	4,341,848(*0*)
Off-peak VMT		3,255,980(*0*)	3,441,410 *(1)*	3,376,993(*0*)
Total score		***3***	***5***	***2***

Source: Final Traffic Operations Report.

Table 3.2.8-2. Traffic Flow during Operations in Year 2035 and Ranking of Alternatives (score in parentheses)

Peak Hour Vehicles		No-Build	Alternative B	Alternative C	Alt B, Ph 1	Alt C, Ph 1
Project distance (miles)	–	–	21.17	22.95	6.23	10.17
VMT/hour	a.m. p.m.	539,445 *(0)* 413,160*(0)*	575,300*(0)* 660,290*(0)*	577,480 *(1)* 660,555 *(1)*	564,605 *(1)* 575,815 *(1)*	546,625*(0)* 480,410*(0)*
Vehicle hours of delay/hour	a.m. p.m.	3,695 *(1)* 19,065 *(1)*	1,335 *(0)* 5,420*(0)*	1,260*(0)* 5,995 *(0)*	1,845*(0)* 10,155*(0)*	3,020 *(1)* 16,095 *(1)*
Average network speed (miles per hour)	a.m. p.m.	41.8 *(1)* 15.9 *(1)*	52.4*(0)* 40.1*(0)*	52.7*(0)* 38.5*(0)*	48.9*(0)* 28.9*(0)*	44.2*(0)* 19.8*(0)*
Daily VMT	–	4,286,723*(0)*	5,560,155*(0)*	5,571,158 *(1)*	5,131,890 *(1)*	4,621,658*(0)*
Off-peak VMT	–	3,334,118*(0)*	4,324,565*(0)*	4,333,123 *(1)*	3,991,470 *(1)*	3,594,623*(0)*
Total points	**–**	***4***	***0***	***4***	***4***	***2***

Source: Final Traffic Operations Report

Tables 3.2.8-1 and 3.2.8-2 utilize a point system to compare No-Build Alternative with the various full-build alternatives (Alternative B and Alternative C) based on the various traffic flow metrics. One point was assigned to the alternative with the larger value for a particular traffic metric, presumably resulting in higher energy consumption relative to the other alternatives. The build and no-build alternatives are compared to estimate which would result in greater energy consumption, and a point is given if the alternative would potentially increase energy relative to the other alternatives. The higher the total points for each alternative, the greater the assumed direct energy consumption.

When comparing the fundable first phases of the alternatives to the no-build conditions, Alternative B, Phase 1 would result in increase in peak hourly, daily, and off-peak VMT while decreasing hours of delay when compared to both Alternative C, Phase 1, and the No-Build Alternative. The fundable first phases of both alternatives would increase VMT, reduce hours of delay, and increase average network speeds over 2035 no-build conditions. In general, energy consumption is minimized under traffic conditions that minimize delay hours, maintain speeds between 45 and 55 mph, and limit the need for vehicles to exit the freeway onto surface streets in order to avoid heavy traffic conditions. The relative scoring system shown in Table 3.2.8-1 indicates that at 2015, Alternative C, Phase 1 is the better performing build alternative for the specific metrics listed. However, neither fundable first phase would result in wasteful or excessive use of direct energy.

When comparing the two full build alternatives to no-build conditions, Alternative C would increase peak hourly VMT, daily VMT, and off-peak VMT compared to both Alternative B and the No-Build Alternative. Average network speed would improve for both build alternatives, but the resulting difference in fuel economy between the two is considered negligible. Alternative C would result in a greater increase in VMT relative to the No-Build Alternative and would decrease a.m. hours of delay and a.m. network speed. Alternative B would improve p.m. hours of delay and network speed. Total VMT is directly proportional to fuel consumed while average network speed is inversely proportional, through a certain range. The relative scoring system shown in Table 3.2.8-2 indicates that at 2035, Alternative B is the better performing full-build alternative for the specific metrics listed. However, neither full-build alternative would result wasteful or excessive use of direct energy.

This analysis does not take into account vehicles leaving the freeway in response to traffic conditions and the fuel consumption associated with surface-street driving patterns. Neglecting this activity likely introduces greatest error into the No-Build scenario because hours of delay are highest for this Alternative. A rigorous analysis accounting for these factors would allow more clear differentiation of Alternatives B and C, although it is expected that direct energy consumption is similar. Based on the data presented in Tables 3.2.8-1 and 3.2.8-2, Alternatives B and C should be considered comparable in 2035 for direct energy consumption, with Alternative B as a slightly better alternative.

Indirect Energy Consumption

This analysis compares the quantities of material for structures construction and numbers of structure types for the No-Build Alternative, Alternative B, and Alternative C. An additional metric used is lane-miles of roadway requiring maintenance after construction is complete. The total amount of energy required is inferred from these metrics and no assumptions regarding cost were made. Because many of the alternatives included in the proposed project are at conceptual planning stages and detailed construction information, such as the number of equipment, materials, and labor hours are not available, no detailed quantitative assessment of construction and maintenance impacts is possible. Were this information available, materials-specific energy factors and equipment-specific fuel economy could be employed to calculate construction-related energy consumption.

The qualitative comparison analysis presented here assumes that larger amounts of materials equates with more energy use due to increased labor hours, increased hauling of materials, and increased embodied energy consumption in materials manufacture. Construction- and maintenance-related metrics are presented for comparison in Table 3.2.8-3. An identical scoring system to that used for the direct energy evaluation was applied here.

Table 3.2.8-3 indicates that construction of Alternative B will require a larger volume of excavated roadway and a larger area of asphalt concrete (AC). Additionally, Alternative B requires more material associated with edge drains, median islands, sidewalk, curbs and gutters as compared to Alternative C. Conversely, construction of Alternative C will require a larger area be covered with Portland cement concrete (PCC) pavement and more barriers and guardrails. The total square footage of structures as defined by the client is larger in Alternative C. The total lane miles of roadway requiring maintenance would be higher for Alternative C. Without a more rigorous assessment of the energy associated with each of the unique construction activities listed in Table 3.2.8-3, it is impossible to quantify the total energy consumed for the aggregate of construction tasks. Some construction activities may be inherently more energy intensive than others, and thus apparent energy benefits in one metric could be negated in another. In general, Alternative B has larger values in more construction categories than Alternative C.

The estimated number of lane-miles for Alternative B, Alternative C, Alternative B Phase 1, and Alternative C, Phase 1 (Table 3.2.8-3) served as an estimate for maintenance energy usage. Based on the information from the *Draft Interchange Pavement and Interchange Configuration Data* (Nolte Associates 2009), the total estimated PCC and AC lane-miles for Alternative B and Alternative C are estimated to be approximately 86 to 90 lane-miles for PCC pavements and 20 to 25 lane-miles for AC pavements. According to Table C-14 in Appendix C of the Caltrans

1983 report, the estimated amount of energy factor required to maintain the roadway is approximately 16.3 and 17.8 billion BTUs per lane-mile for PCC and AC pavements, respectively.

According to the project description, Alternative C will have considerably more PCC and AC pavement to maintain than Alternative B and No-Build scenarios. For the fundable first phases of the project alternatives, Alternative C, Phase 1 will require more maintenance energy than Alternative B, Phase 1.

Based on the data presented in Table 3.2.8-3, Alternative B and C would result in comparable levels of indirect energy consumption. For the fundable first phases of the project alternatives, Alternative B, Phase 1 would result in slightly less indirect energy consumption. However, neither project alternative nor their fundable first phases are anticipated to result in wasteful or excessive indirect energy expenditures.

Table 3.2.8-3. Materials Consumption for Construction and Maintenance and Ranking of Alternatives (score in parentheses)

Indirect Energy	No-Build	Alternative B	Alternative C	Alt B, Phase 1	Alt C, Phase 1
Roadway excavation (cubic yard [cy])	–	2,800,000 *(1)*	2,523,000 *(0)*	750,000*(0)*	2,187,000*(1)*
Imported borrow (cy)	–	1,120,000 *(0)*	2,129,000 *(1)*	75,000*(0)*	607,400*(1)*
Portland cement concrete (PCC) pavement roadway (cy)	–	220,000*(1)*	126,852*(0)*	64,000*(0)*	137,611*(1)*
Asphalt concrete (AC) Pavement (cy)	–	280,000*(0)*	302,333*(1)*	60,000*(1)*	19,393*(0)*
Bridge structures PCC (cy)	–	106,000*(0)*	115,050*(1)*	54,000*(0)*	80,470*(1)*
Bridge structures rebar (pounds)	–	22,000,000*(0)*	23,895,000*(1)*	11,000,000*(0)*	16,713,000*(1)*
Lighting (units)	–	305*(1)*	206*(0)*	130*(1)*	108*(0)*
Traffic signals (units)	–	22*(1)*	16*(0)*	8*(1)*	7*(0)*
Overhead sign structures (units)	–	20*(0)*	20*(0)*	10*(0)*	10*(0)*
Ramp meters (units)	–	19*(1)*	17*(0)*	5*(0)*	6*(1)*
Striping (feet)	–	1,788,000*(1)*	1,566,000	710,000*(1)*	693,800*(0)*
Retaining walls (square feet)	–	475,000*(1)*	407,700*(0)*	388,300*(1)*	325,100*(0)*
Noise barriers (square feet)	–	25,000*(0)*	25,000*(0)*	33,000*(1)*	0*(0)*
Barriers and guardrails (feet)	–	108,000*(0)*	110,400*(1)*	32,300*(0)*	34,800*(1)*
Sidewalk, curb, and gutter(square feet)	–	243,500*(1)*	117,800*(0)*	120,700*(0)*	143,880*(1)*
Temporary MSE walls (square feet)	–	50,000*(0)*	50,000*(0)*	38,000*(1)*	0*(0)*
Total for all structures (square feet)		806,704*(0)*	1,050,281*(1)*	398,195*(0)*	619,000*(1)*
PCC lane-miles	75.83*(0)*	86.34*(0)*	89.75 *(1)*	29.34*(0)*	48.13*(1)*
AC lane-miles	17.76*(0)*	20.57*(0)*	25.36*((1)*	0.98*(0)*	9.03*(1)*
Total Points	***0***	***8***	***8***	***6***	***11***

Source: John Thomson, personal communication, 2009.

Note: Construction cost estimate sheets are located in Appendix A of the *Interstate 80/Interstate 680/State Route 12 Energy Technical Report.*

Environmental Consequences

Increased Consumption of Direct Energy

Direct energy consumption for each alternative would result from motor vehicle travel through the project area. This analysis compares traffic data summarized in the FTOR for the proposed project and inferred future energy consumption from the relationship between traffic conditions and fuel consumption.

Both build alternatives would result in increased VMT, reduced hours of delay, and increased motor vehicle speed over no-project conditions. Increased VMT would result from increased motor vehicle trips traveling a greater distance over the project area. Increased vehicle speeds would increase travel flow and reduce congestion, which may result in reduced fuel consumption. The optimal fuel efficiency varies by vehicle, but generally the lowest fuel economy is in the 0–25 mph range, and the optimal range is 45–55 mph, with a steady decline in efficiency occurring as speeds exceed 55 mph. Under 2035 Alternative B and C full-build conditions, a.m. peak hour vehicle speeds increase to the optimal range for fuel efficiency (52.4 mph for Alternative B; 48.9 mph for Alternative B, Phase 1; 52.7 mph for Alternative C; 44.2 mph for Alternative C, Phase 1), a condition that would increase fuel efficiency when compared to no-project a.m. average speeds (41.8 mph). Improved traffic flow would reduce the vehicle hours of delay for all build scenarios (except 2015 Alternative C, Phase 1), a condition that might reduce fuel use as lower traffic speeds (0–25 mph) result in poor fuel economy. It is unknown to what extent drivers bypass the existing interchange and use alternate and potentially longer-distance traffic routes because of existing traffic conditions. The inability to capture these VMTs in the analysis likely has the greatest affect on the No-Build Alternative where delay hours are highest.

Implementation of either build alternative would relieve traffic congestion by reducing vehicle hours of delay and increasing network speeds, while increasing total VMT through the project area. However, none of the build alternatives are expected to result in an inefficient, wasteful, or unnecessary consumption of energy.

Increase Consumption of Indirect Energy

Indirect energy consumption would result from project construction and maintenance. Construction of the proposed project would result in the consumption of energy to prepare the project site, manufacture and deliver construction materials to the project site, and construct the roadway interchange and associated structures. This increased fossil fuel consumption from project construction is not expected to have an appreciable impact on energy resources.

Based on the qualitative comparison, Alternative C would result in more AC pavement, more bridge structures (both PCC and rebar), slightly more barriers and guardrails, and would have a longer project distance. Based on the qualitative comparison, Alternative B would require more PCC pavement, more lighting, more traffic signals, more ramp meters, more striping, and more sidewalks, curbs, and gutters. For the fundable first phase scenarios, Alternative C, Phase 1 will require more PCC bridge structures, rebar structures, AC pavements, and roadway base aggregate materials than Alternative B, Phase 1. The construction of any of the proposed build

alternatives would be a necessary component of the project and a one-time expenditure of energy. This one-time expenditure of energy would provide for energy benefits in the long run because reduced congestion and improved traffic flow through the interchange might result in reduced direct energy consumption. Based on the qualitative analysis, Alternative C was determined to be the most preferable alternative.

Implementation of the proposed project would result in an increase in indirect energy consumption relative to the No-Build Alternative due to project construction and maintenance. However, the associated construction and maintenance of the build alternatives are not expected to result in an inefficient, wasteful, or unnecessary consumption of energy.

Avoidance, Minimization, and/or Mitigation Measures

For the proposed project alternatives, an adverse impact on energy consumption would occur if a project alternative results in wasteful, inefficient, or unnecessary consumption of energy. The increase in energy consumption associated with any of the build alternatives is not expected to result in an inefficient, wasteful, or unnecessary consumption of energy. Mitigation of any impacts on energy is largely beyond the authority of STA, MTC, and the Department, and unimplementable on a project-specific basis. Because the build alternatives would not result in wasteful or excessive use of energy, avoidance, minimization, and mitigation measures would not be necessary.