2.19.3 Environmental Consequences

Conformity with the State Implementation Plan (SIP)

Federal and state air quality laws require identification of areas not meeting the ambient air quality standards. These areas must develop regional air quality plans to eventually attain the standards. Under federal law, the plans are referred to as State Implementation Plans (SIP). In California, the SIP is composed of regional air quality plans from throughout the state. A project level conformity analysis shows that the project will conform with the SIP, including the localized impact analysis for CO and PM10 required by 40 CFR 93.116 and 93.123. This project is not a Project of Air Quality Concern (POAQC) regarding PM_{10} and $PM_{2.5}$ as defined in 40 CFR 93.123(b)(1) and meets the requirements of the Clean Air Act and 40 CFR 93.116, therefore, an explicit PM_{10} or $PM_{2.5}$ hot-spot analysis are not required.

Regional Air Quality Conformity

The proposed project is in the MTP 2035, which was found to conform by SACOG on March 20, 2008, and FHWA and Federal Transit Administration (FTA) adopted the air quality conformity finding on March 24, 2009. The project is also included in SACOG's financially constrained 2009–2012 Metropolitan Transportation Improvement Program (MTIP) as SACOG # CAL18410, page 92. SACOG's MTIP was adopted by SAGOG on November 17, 2008, and found to conform by FHWA and FTA on August 21, 2009. The design concept and scope of the proposed project is consistent with the project description in the 2035 MTP, the 2009–2012 MTIP, and the assumptions in SACOG's regional emissions analysis.

Table 18 Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area for Existing Conditions

Segment	Receptor[1]		
		1-hour CO[2]	8-hour CO[3]
Richards Boulevard to Garden Hwy	1	7.1	5.2
	2	7.1	5.2
	3	6.5	4.8
	4	6.5	4.8
Garden Hwy to W El Camino Ave	5	8.2	5.8
	6	8.2	5.8
	7	7.3	5.3
	8	7.3	5.3
I-80 to Arena Boulevard	9	7.9	5.6
	10	7.9	5.6
	11	7.1	5.2
	12	7.1	5.2
Del Paso Rd to SR 99	13	6.8	5.0
	14	6.8	5.0
	15	6.3	4.7
	16	6.3	4.7

Notes:
[1] Receptors 1, 2,5, 6, 9, 10, 13, and 14 are located are located 50 feet from the center of northbound I-5. Receptors 3, 4, 7, 8, 11, 12, 15, and 16 are located are located 75 feet from the center of northbound I-5.
[2] The federal and state 1-hour standards are 35 and 20 ppm, respectively.
[3] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Table 19 Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area for 2020 Conditions

Segment	Receptor[1]	2020 No Project[2]		2020 Mixed Flow[2]		2020 Alternative 1A[2]		2020 Alternative 1B[2]		2020 Alternative 1C[2]	
		1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]
Richards Boulevard to Garden Hwy	1	5.9	4.4	5.9	4.4	5.9	4.4	5.9	4.4	5.9	4.4
	2	5.9	4.4	5.9	4.4	5.9	4.4	5.9	4.4	5.9	4.4
	3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
	4	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
Garden Hwy to W El Camino Ave	5	5.9	4.4	5.1	4.0	5.9	4.4	5.9	4.4	5.9	4.4
	6	5.9	4.4	5.1	4.0	5.9	4.4	5.9	4.4	5.9	4.4
	7	5.7	4.3	5.0	3.9	5.6	4.3	5.6	4.3	5.6	4.3
	8	5.7	4.3	5.1	4.0	5.6	4.3	5.6	4.3	5.6	4.3
I-80 to Arena Boulevard	9	5.9	4.4	5.8	4.4	5.9	4.4	5.9	4.4	5.9	4.4
	10	5.9	4.4	5.8	4.4	5.9	4.4	5.9	4.4	5.9	4.4
	11	5.6	4.3	5.6	4.3	5.7	4.3	5.7	4.3	5.7	4.3
	12	5.6	4.3	5.6	4.3	5.7	4.3	5.7	4.3	5.7	4.3
Del Paso Rd to SR 99	13	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2	5.6	4.3
	14	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2	5.6	4.3
	15	5.3	4.1	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1
	16	5.3	4.1	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1

[1] Receptors 1, 2,5, 6, 9, 10, 13, and 14 are located are located 50 feet from the center of northbound I-5. Receptors 3, 4, 7, 8, 11, 12, 15, and 16 are located are located 75 feet from the center of northbound I-5.
[2] Background concentrations of 5.0 ppm and 3.9 ppm were added to the modeling 1-hour and 8-hour results, respectively.
[3] The federal and state 1-hour standards are 35 and 20 ppm, respectively.
[4] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Table 20 Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area for 2030 Conditions

Segment	Receptor[1]	2030 No Project[2]		2030 Mixed Flow[2]		2030 Alternative A[2]		2030 Alternative 1B[2]		2030 Alternative 1C[2]	
		1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]
Richards Boulevard to Garden Hwy	1	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
	2	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
	3	5.4	4.1	5.4	4.1	5.4	4.1	5.5	4.2	5.4	4.1
	4	5.4	4.1	5.4	4.1	5.4	4.1	5.5	4.2	5.4	4.1
Garden Hwy to W El Camino Ave	5	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
	6	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3	5.6	4.3
	7	5.4	4.1	5.4	4.1	5.4	4.1	5.5	4.2	5.4	4.1
	8	5.4	4.1	5.4	4.1	5.4	4.1	5.5	4.2	5.4	4.1
I-80 to Arena Boulevard	9	5.5	4.2	5.7	4.3	5.7	4.3	5.7	4.3	5.7	4.3
	10	5.5	4.2	5.7	4.3	5.7	4.3	5.7	4.3	5.7	4.3
	11	5.4	4.1	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2
	12	5.4	4.1	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2
Del Paso Rd to SR 99	13	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1
	14	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1
	15	5.3	4.1	5.3	4.1	5.3	4.1	5.3	4.1	5.3	4.1
	16	5.3	4.1	5.3	4.1	5.3	4.1	5.3	4.1	5.3	4.1

Segment	Receptor[1]	2030 No Project[2]		2030 Mixed Flow[2]		2030 Alternative A[2]		2030 Alternative 1B[2]		2030 Alternative 1C[2]	
		1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]

[1] Receptors 1, 2,5, 6, 9, 10, 13, and 14 are located are located 50 feet from the center of northbound I-5. Receptors 3, 4, 7, 8, 11, 12, 15, and 16 are located are located 75 feet from the center of northbound I-5.
[2] Background concentrations of 5.0 ppm and 3.9 ppm were added to the modeling 1-hour and 8-hour results, respectively.
[3] The federal and state 1-hour standards are 35 and 20 ppm, respectively.
[4] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Table 21 Modeled Carbon Monoxide Levels Measured at Receptors in the Vicinity of the Project Area for 2040 Conditions

Segment	Receptor[1]	2040 No Project[2]		2040 Mixed Flow[2]		2040 Alternative A[2]		2040 Alternative 1B[2]		2040 Alternative 1C[2]	
		1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]	1-hour CO[3]	8-hour CO[4]
Richards Boulevard to Garden Hwy	1	5.5	4.2	5.5	4.2	5.5	4.2	10.2	7.0	10.1	7.0
	2	5.5	4.2	5.5	4.2	5.5	4.2	10.2	7.0	10.1	7.0
	3	5.3	4.1	5.4	4.1	5.4	4.1	8.8	6.2	8.7	6.1
	4	5.3	4.1	5.4	4.1	5.4	4.1	8.8	6.2	8.7	6.1
Garden Hwy to W El Camino Ave	5	5.5	4.2	5.5	4.2	5.5	4.2	5.6	4.3	5.4	4.1
	6	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2	5.4	4.1
	7	5.3	4.1	5.3	4.1	5.4	4.1	5.5	4.2	5.4	4.1
	8	5.3	4.1	5.3	4.1	5.4	4.1	5.3	4.1	5.4	4.1
I-80 to Arena Boulevard	9	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2	9.8	6.8
	10	5.5	4.2	5.5	4.2	5.5	4.2	5.5	4.2	9.8	6.8
	11	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1	8.5	6.0
	12	5.4	4.1	5.4	4.1	5.4	4.1	5.4	4.1	8.5	6.0
Del Paso Rd to SR 99	13	5.4	4.1	5.4	4.1	5.4	4.1	8.5	6.0	8.5	6.0
	14	5.4	4.1	5.4	4.1	5.4	4.1	8.5	6.0	8.5	6.0
	15	5.3	4.1	5.3	4.1	5.3	4.1	7.5	5.4	7.5	5.4
	16	5.3	4.1	5.3	4.1	5.3	4.1	7.5	5.4	7.5	5.4

[1] Receptors 1, 2,5, 6, 9, 10, 13, and 14 are located are located 50 feet from the center of northbound I-5. Receptors 3, 4, 7, 8, 11, 12, 15, and 16 are located are located 75 feet from the center of northbound I-5.
[2] Background concentrations of 5.0 ppm and 3.9 ppm were added to the modeling 1-hour and 8-hour results, respectively.
[3] The federal and state 1-hour standards are 35 and 20 ppm, respectively.
[4] The federal and state 8-hour standards are 9 and 9.0 ppm, respectively.

Carbon Monoxide NAAQS and CAAQS

CO concentrations are not anticipated to exceed the 1- or 8- hour NAAQS and CAAQS (NAAQS and CAAQS are shown in Table 16). Existing year (2006) (Table 18), construction year (2020) (Table 19) with and without project, interim year (2030) (Table 20) with and without project, and design-year (2040) (Table 21) with and without project conditions were modeled to evaluate CO concentrations relative to the NAAQS and CAAQS. Emissions of CO concentrations are estimated for the northbound segments of I-5 between Richards Boulevard and Garden Highway, Garden Highway and West El Camino Avenue, I-80 and Arena Boulevard, and Del Paso Road and SR 99. These roadway segments were modeled because they were identified in the traffic analysis prepared by Fehr & Peers as the greatest affected segments in the vicinity of the proposed project.

Particulate Matter

The EPA's transportation conformity rules stipulate that transportation projects considered a Project of Air Quality Concern (POAQC), or any other project that is identified by the $PM_{2.5}$ SIP as a localized air quality concern, must be analyzed for local air quality impacts (i.e., hotspot) in $PM_{2.5}$ nonattainment and maintenance areas. For areas without approved conformity SIPs, a PM_{10} hotspot analysis is to be performed only for POAQCs. For areas with an approved conformity SIP, the 2006 PM Conformity Final Rule does not apply and an analysis must be performed that meets the requirements in the approved PM_{10} SIP until the SIP is updated and subsequently approved by the EPA. Guidance provided by the EPA indicates that there are no areas within California where a conformity SIP has been approved. Consequently, all projects that are POAQCs, must undergo PM_{10} (and $PM_{2.5}$) hotspot conformity determinations. Because the proposed project area is located in a moderate nonattainment area with regards to the federal PM_{10} standard and a nonattainment area with regards to the federal $PM_{2.5}$ standard, a hotspot evaluation must be performed for PM_{10} and $PM_{2.5}$.

Existing and projected AADT on I-80 and I-5 are in excess of the 125,000 POAQC threshold identified by the FHWA and EPA. In addition, as previously indicated, medium trucks are anticipated to account for 5 percent of all traffic on I-5 and heavy trucks account for 5 percent of all traffic and heavy trucks are anticipated to account for 6 percent of all traffic (California Department of Transportation 2007). However, because it has been concluded that diesel truck traffic volumes will not increase by over 5 percent between build and no build conditions, the proposed project is not considered a POAQC for PM10 and PM2.5. Because the project is not considered a POAQC, Clean Air Act and 40 CFR 93.116 requirements were met without a hot-spot analysis, since such the proposed project has been found to not be of air quality concern under 40 CFR 93.123(b)(1). Interagency Consultation occurred on February 25, 2009 and found that the proposed project is not a POAQC based on a <5 percent increase in diesel truck traffic volumes between build and no build conditions.

2.19.4 Avoidance and Minimization Measures

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

- The Contractor shall comply with *Caltrans Standard Specifications* Section 14-9.01 and Section 10 of *Caltrans Standard Specifications* (2006).
- 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 shall be properly tuned and maintained. Low-sulfur fuel shall be used in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.
- Develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- Locate equipment and materials storage sites as far away from residential and park uses as practical. Keep construction areas clean and orderly.
- To the extent feasible, establish ESAs for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited.
- Use track-out reduction measures such as gravel pads at project access points to minimize dust and mud deposits on roads affected by construction traffic.
- Cover all transported loads of soils and wet materials prior to transport, or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM_{10} and deposition of particulate during transportation.
- Remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.
- To the extent feasible, route and schedule construction traffic to reduce congestion and related air quality impacts caused by idling vehicles along local roads during peak travel times.
- Install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area.
- If NOA is found during construction, rules and regulation of the Sacramento Metropolitan Air Quality Management District regarding NOA must be adhered to when handling this material.

2.19.5 Mitigation Measures

No substantial impacts to air quality would result from implementation of the proposed project and no mitigation is required.

Climate Change

Climate change is analyzed in Chapter 3. Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), 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 there have been more requirements 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 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.

2.20 Noise and Vibration

2.20.1 Regulatory Setting

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

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. The rest of this section will focus on the NEPA-23 CFR 772 noise analysis; please see Chapter 3 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). Table 22 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area. A noise level is considered to approach the NAC for a given activity category if it is within 1 dBA (A-weighted decibel) of the NAC. The following table lists the noise abatement criteria for use in the NEPA and 23 CFR 772 analyses. Figure 13 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 22 Activity Categories and Noise Abatement Criteria

Activity Category	Noise Abatement Criteria, A-weighted Noise Level (dBA), Leq(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	--	Undeveloped lands
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: Caltrans Traffic Noise Analysis Protocal, August 2006

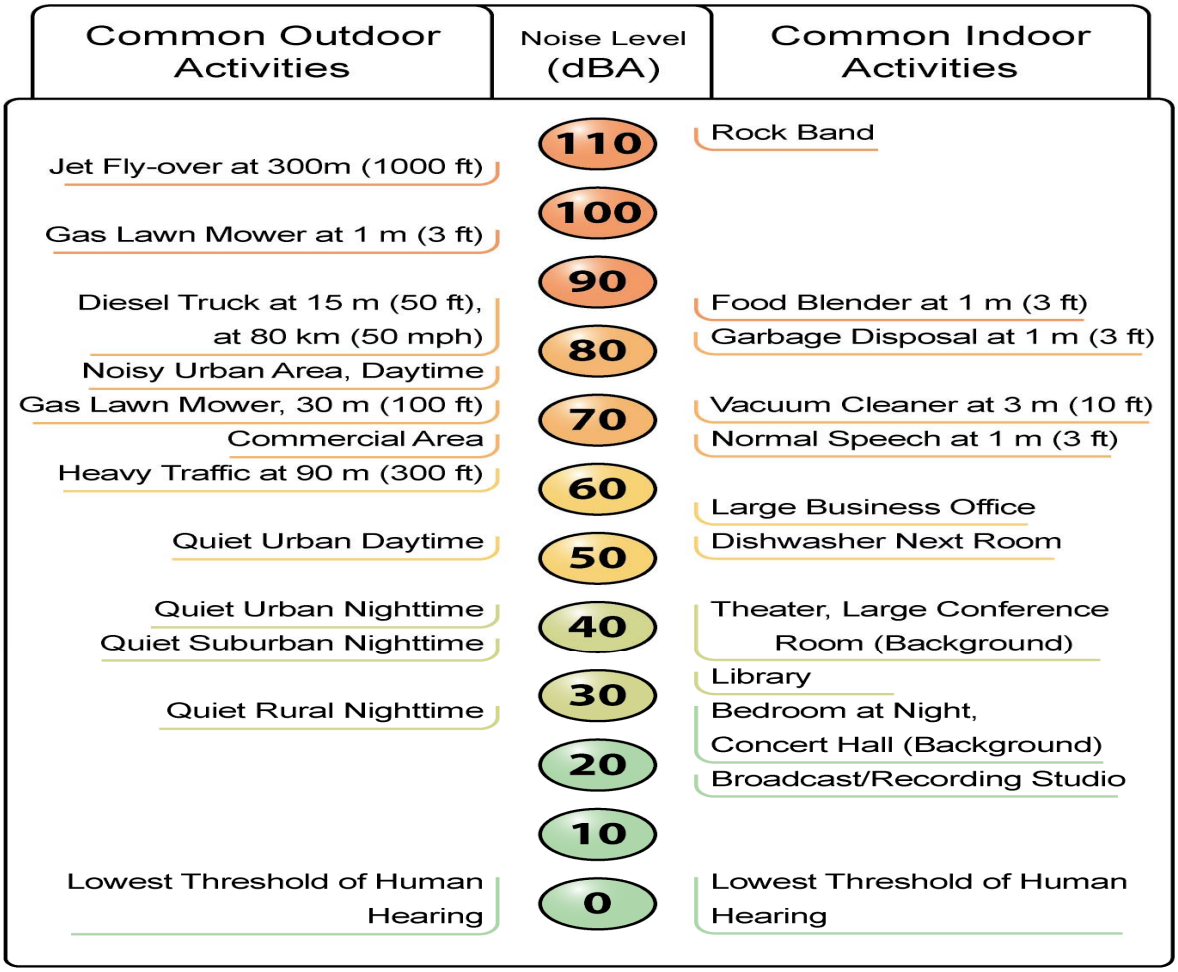
A-weighted decibels (dBA) are adjusted to approximate the way humans perceive sound. Leq(h) is the steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual time-varying levels over one hour.

In accordance with the Caltrans Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006, a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project 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 as appropriate.

Caltrans' Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5-dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. 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.

Figure 13 Typical Noise Levels



2.20.2 Affected Environment

The existing noise environment throughout the project limit varies by location, depending on site characteristics such as proximity to I-5/I-80 and local elevations. There are single-family homes, apartment complexes, and industrial land-uses situated in the project area. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards.

Short-term noise measurements were conducted in order to evaluate the existing noise environment. Noise monitoring was conducted from March 2007 to June 2008. Measurements were taken at 34 locations for duration of 10 to 15 minutes each for the entire project. Figure 14 shows the locations of the receivers. Traffic flow on I-80 and I-5 was videotaped while noise measurements were taken. Traffic was counted and classified by viewing the videotape. Vehicles were classified as automobiles, medium-duty trucks, or heavy-duty trucks. Table 23 summarizes the sound levels collected during the short-term monitoring sessions. The following is a discussion on existing noise levels for each four areas that are within the project limit.

Area 1:

In Area 1, located in the southeast quadrant of the interchange and east along I-80 to the south, noise-sensitive outdoor land uses consists of single-family residents and apartment complexes. Due to topography and change in highway's profile some sensitive receivers are at grade or below the freeway. There is currently an existing 10 foot high soundwall along I-5 and I-80 shielding the affected receivers from the highway noise. Twenty short-term noise measurements (R1 through R18 B) and two long-term measurements (LT1, LT2) were made to quantify the existing worst-hour noise levels. Loudest-hour noise level ranged from 49 to 66 dBA. Two receivers approached or exceeded the NAC of 67 dBA.

Area 2:

Area 2 is located in the southwest quadrant of the I-5/I-80 interchange and west along I-80 to the south. There are Category B and Category C land uses in this area of the project. The Category C land uses that occupy this segment of the project are University of Phoenix, URS., and California Institute of Arts. The measured receivers (R19, R20, R21) are at grade with highway and noise levels vary form 66 to 68. The NAC for Category C land uses is 72 dBA. The Category B land uses are apartments and homes, which are situated further away from the freeway. The measured noise levels were 49.1 and 50.5 dBA (R21A, 21B). None of the receivers approached or exceeded the NAC of 67 dBA.

Area 3:

Area 3 is located in the northwest quadrant of the I-5/I-80 interchange. Activity Category B land uses adjacent to I 5-80 include single-family homes. These homes are newly built and some are still under construction. Some measured receivers (R22 through R30) are at grade with I- 80 and some are below I-5. There are no existing soundwalls, however, the builder has used the first row of homes with no area of frequent human use to serve as the noise barriers for this area. The noise levels vary from 46 to 58. None of receivers approached the NAC of 67 dBA.

Area 4:

Area 4, located in the northeast quadrant of the interchange, is occupied by Natomas Pumping Station, a Category C land use, which would not benefit from a lower noise level. Therefore, no noise abatement measures are considered for this area of the project. One receiver (R31) was measured at 60.3 dBA.