3.9 Noise

This section provides an overview of the existing noise environment at the project site and surrounding area, as well as an analysis of potential impacts and mitigation measures that would result from implementation of the project.

3.9.1 Setting

Noise Principles and Descriptors

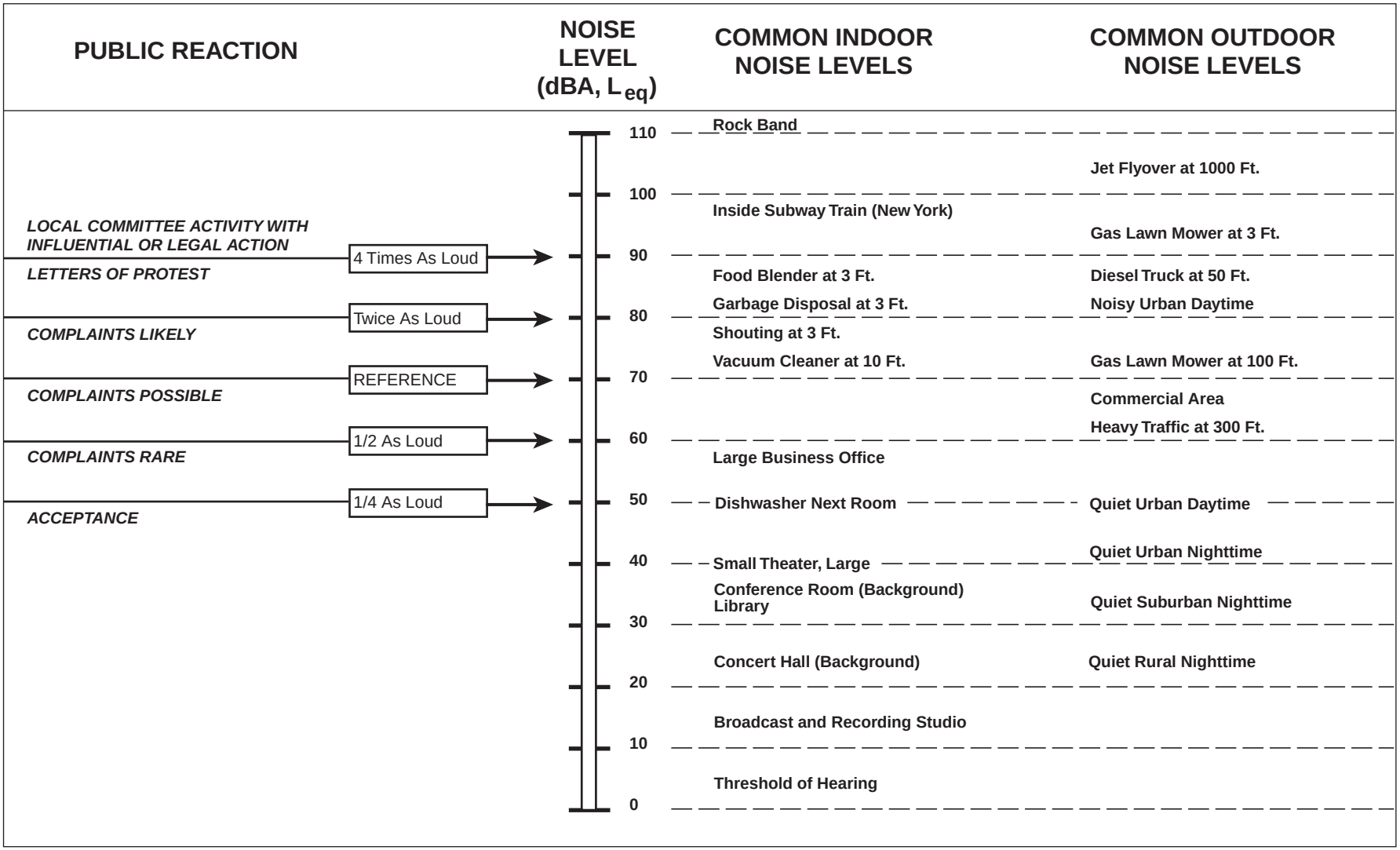
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1000 Hz and above 5000 Hz in a manner corresponding to the human ears decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 3.9-1**.

Noise Exposure and Community Noise

The noise levels presented in Figure 3.9-1 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.



SOURCE: ESA, 2007

Figure 3.9-1
Effect of Noise on People

These successive additions of sound to the community noise environment vary the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: the instantaneous maximum noise level for a specified period of time.

L50: the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.

L90: the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.

DNL: 24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: similar to the DNL the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

As a general rule, in areas where the noise environment is dominated by traffic, the L_{eq} during the peak-hour is generally equivalent to the DNL at that location (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no complete satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- a change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- a 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment (FTA, 2006), ground-borne vibration can be a serious concern for nearby neighbors, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, sheet pile-driving and operating heavy earth-moving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-

made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, students, the elderly and sick), and vibration sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and sheet pile-driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV and the FTA threshold of human annoyance to ground-borne vibration is 80 RMS (FTA, 2006).

3.9.2 Regulatory Framework

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

State

For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local

Local noise issues are addressed through implementation of general plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinance standards. Noise ordinances regulate such sources as mechanical equipment and amplified sounds as well as prescribe noise limits in residential and commercial zones. Although ordinances may not apply to DWR construction projects, it would be a prudent construction practice to work with host

jurisdictions and neighboring communities during project planning and to apply the local environmental protection standards. For this project, noise regulations and standards of the County of Riverside and the City of Perris were considered with respect to the proposed facilities and nearby sensitive receptors.

City of Perris Municipal Code

The following portions of the municipal code are relevant to the project.

7.34.050 General prohibition.

A. It is unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof. The standards for dBA noise level in Section 7.34.040 shall apply to this section (see **Table 3.9-1**). To the extent that the noise created causes the noise level at the property line to exceed the ambient noise level by more than 1.0 decibels, it shall be presumed that the noise being created also is in violation of this section.

TABLE 3.9-1
CITY OF PERRIS NOISE LEVEL STANDARDS

Time Period	Maximum Noise Level (dBA)
10:01 p.m. – 7:00 a.m.	60
7:01 a.m. – 10:00 p.m.	80

SOURCE: City of Perris Ordinance 1082 § 2(part), 2000

B. The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to, the following:

- The level of the noise;
- Whether the nature of the noise is usual or unusual;
- Whether the origin of the noise is natural or unnatural;
- The level of the ambient noise;
- The proximity of the noise to sleeping facilities;
- The nature and zoning of the area from which the noise emanates and the area where it is received;
- The time of day or night the noise occurs;
- The duration of the noise; and
- Whether the noise is recurrent, intermittent or constant.
(Ord. 1082 § 2(part), 2000).

It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's

birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA in residential zones in the city (Ord. 1082 § 2(part), 2000).

County of Riverside General Plan

Noise Element

The County of Riverside is in the process of updating their General Plan. Some draft temporary construction policies are as follows;

> **Policy N 12.1:** Minimize the impacts of construction noise on adjacent uses within acceptable practices. (AI 105, 108)
>
> **Policy N 12.2:** Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas. (AI 105, 108)

County of Riverside Municipal Code

The County of Riverside municipal code identifies the following acceptable noise threshold standards as shown in **Table 3.9-2**. The County of Riverside does not differentiate between anything that causes noise levels that exceed the threshold. Construction noise higher than the threshold would be considered a significant noise contribution.

TABLE 3.9-2
COUNTY OF RIVERSIDE SOUND LEVEL STANDARDS

Land Use	Maximum Decibel Level (dB Lmax)
Residential	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	55
Recreation	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	45

SOURCE: County of Riverside Ordinance 847 § 4, 2006

3.9.3 Existing Noise Environment

The noise environment surrounding the project site is influenced primarily by boating activities, the fairgrounds and traffic on local roadways. Noise levels away from these noise sources can be quite low depending on the amount of nearby human activity.

Metrosonics Model db3080 sound level meters were used to obtain the ambient noise level measurements. The meters were calibrated to ensure the accuracy of the measurements. Twelve short-term noise level measurements were taken near the project site. The noise measurement results are presented below in **Table 3.9-3**.

TABLE 3.9-3
EXISITING NOISE ENVIRONMENTS AT PROJECT LOCATION

Location	Time Period	Leq (dB)	Noise Sources
Short Term 1 North west corner of furthest west parking lot on the lake	August 19 4:29 – 4:34 p.m.	44	55 dB car 45 dB jet ski 53 dB wind
Short Term 2 East of marina, 50 ft from parking lot	August 19 4:46 – 4:51 p.m.	46	Wind People on dock
Short Term 3 10 ft from water south of furthest east parking lot	August 19 5:06 – 5:11 p.m.	53	Wind Car Waves Wind sail
Short Term 4 Corner of Ramona and Fair Way, 50 feet from Ramona, near motocross track	August 19 5:24 – 5:29 p.m.	66	Traffic Water fountain
Short Term 5 Corner of Ramona and Bradley 50 feet from 9' sound wall, 50 feet from Ramona	August 19 5:52 – 5:57 p.m.	62	Dirt bikes Traffic
Short Term 6 Parking lot of recreation area south of lake	August 19 6:14 – 6:19 p.m.	47	Wind Airplane
Short Term 7 North west corner of furthest west parking lot on the lake	August 20 8:15 – 8:20 a.m.	45	Birds 60 dB Cleanup Crew 61 dB Car Noise level lowers to 41 dB
Short Term 8 East of marina, 50 ft from parking lot	August 20 8:25 – 8:30 a.m.	42	People on dock 47 dB van
Short Term 9 10 ft from water south of furthest east parking lot	August 20 8:38 – 8:43 a.m.	43	48 – 55 dB boat Noise level lowers to 40
Short Term 10 Corner of Ramona and Bradley 50 feet from 9' sound wall, 50 feet from Ramona	August 20 8:54 - 8:59 a.m.	62	Traffic 72 dB Truck
Short Term 11 Parking lot of recreation area south of lake	August 20 9:10 - 9:15 a.m.	44	45 dB Plane Noise level lowers to 40 dB
Short Term 12 Corner of Ramona and Fair Way, 50 feet from Ramona, near Perris Auto Speedway/ Starwest Motocross Park	August 20 9:22 – 9:27 a.m.	64	2 dirt bikes 66 dB revved dirt bike engine

SOURCE: ESA 2007

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, rest homes, and hospitals are generally more sensitive to noise than commercial and industrial land uses. Neighborhood parks are not considered to be noise-sensitive, but passive recreational uses such as bird watching or picnicking are considered to be noise-sensitive. The closest sensitive receptors to the project components are described below.

Sensitive receptors in the project vicinity are residential neighborhoods within the City of Perris, Rancho Verde High School, Lake Perris SRA headquarter offices and recreational facilities within the Lake Perris SRA. **Figure 3.9-2** shows the location of nearby land uses that support sensitive receptors including schools and residences. The closest residences are about 1400 feet southeast of the proposed stability berm, and approximately 200 feet from the proposed emergency outlet extension along the Ramona Expressway. Rancho Verde High School is located approximately 3500 feet from the stability berm construction zone.

The entire Lake Perris SRA supports recreational visitors that could be considered sensitive receptors. The construction zone would be fenced, providing an approximately 200-foot buffer between active construction activities and unrestricted use. On the outside of the fence, recreation activities could occur at any time. Fishing and boating on Lake Perris could occur within approximately 200 feet of the shoreline where construction activities are occurring. Bernasconi picnic area is approximately 800 feet from the rock quarry, but would be off-limits to the public during construction of the project.

3.9.4 Impacts and Mitigation Measures

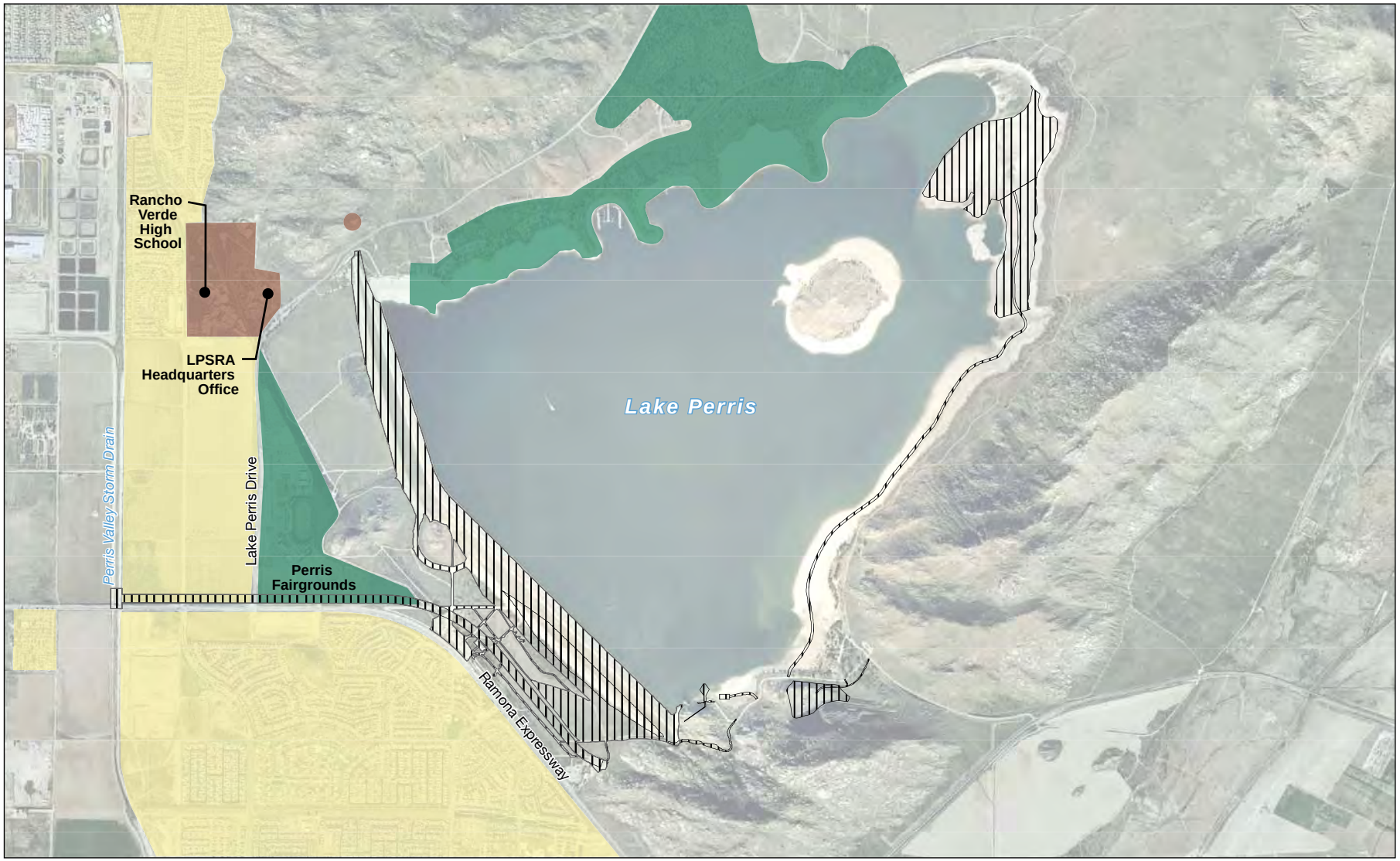
Significance Criteria

Based on Appendix G of the *CEQA Guidelines,* a project may be deemed to have a significant effect on the environment with respect to noise and/or ground-borne vibration if it would result in:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels (for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport); or
- Exposure of people residing or working in the project area to excessive noise levels (for a project within the vicinity of a private airstrip).

The project would result in significant noise impacts if it would generate noise or vibration levels in excess of the following thresholds shown in **Table 3.9-4**.

> **Construction Noise.** The project would result in a significant construction impact if construction activity would occur outside of the daytime hours permitted by the City of Perris Municipal code or cause over 55 dBA in a residential area, or 45 in a recreational area in Riverside County.



SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.9-2
Nearby Sensitive Receptors

TABLE 3.9-4
THRESHOLDS OF SIGNIFICANCE FOR NOISE EXPOSURE

Ambient Noise Level Without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

Vibration. The project would result in a significant vibration impact if buildings would be exposed to the FTA building damage ground-borne vibration threshold level of 0.2 PPV or if sensitive individuals would be exposed to the FTA human annoyance response ground-borne vibration threshold level of 80 RMS.

Stationary Noise. A resulting off-site noise level from stationary non-transportation sources that exceeds 45 dBA Lmax anytime at the property line of recreational land uses in Riverside County jurisdiction (cannot exceed 45 dBA at the recreational sites). A resulting off-site noise level from stationary non-transportation sources that exceeds 80 dBA Lmax in the daytime (7:00 a.m. to 10:00 p.m.) or 60 dBA Leq in the nighttime (10:00 p.m. to 7:00 a.m.) at the property line of residential or other noise sensitive land uses in City of Perris jurisdiction (cannot exceed 80 dBA at the nearest residences in Perris).

Traffic Noise. As described in Table 3.9-4 above, the project would result in a significant traffic noise impact if mobile noise would result in increased noise levels of 1.5 dBA Ldn or more in an ambient noise environment greater than 65 dBA Ldn; or increased noise of 3 dBA Ldn or more in an ambient noise environment between 60 and 65 dBA Ldn; or increased noise of 5 dBA Ldn or more in an ambient environment of less than 60 dBA Ldn.

Airport Compatibility

The project is approximately two miles from March Air Reserve Base. The project would not introduce land uses that would be sensitive to aircraft noise. Therefore, there would be no impact from noise from airport operations. This potential impact will not be discussed further.

Exposure of People to Noise

Operational Noise

The project would not add any new stationary noise sources (e.g., pumps, transformers, emergency generators, etc.). Therefore, operation of the Perris Dam would not increase ambient noise levels from stationary noise sources in the dam vicinity. Project operations would have no impact from new stationary noise sources. Traffic generated by the project operations would be infrequent. Only a few daily vehicle trips would be expected for routine inspection and maintenance, similar to existing conditions. The project would not increase operational noise, and the issue is not discussed further.

Construction Noise

Impact 3.9-1: Project construction could substantially increase ambient noise levels or generate noise levels in excess of standards established in the local general plans or noise ordinances, or applicable standards of other agencies.

Construction activity noise levels at and near the construction areas would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes. In addition, certain types of construction equipment generate impulsive noises such as sheet pile-driving and blasting.

Table 3.9-5 shows typical noise levels during different construction stages. **Table 3.9-6** shows typical noise levels produced by various types of construction equipment.

TABLE 3.9-5
TYPICAL CONSTRUCTION NOISE LEVELS

Construction Phase	Noise Level (dBA, Leq) [a]
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89
Rock Blasting	111 to 115

NOTE: Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971. Except for blasting; rock blasting data provided by the National Park Service.

TABLE 3.9-6
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Sheet Pile Driver	101
Backhoe	85
Rock Blasting	111 to 115

SOURCE: Cunniff, Environmental Noise Pollution, 1977. Except for blasting; rock blasting data provided by the National Park Service.

Construction of the project would generate a significant amount of noise corresponding to the appropriate phase of construction and the noise generating equipment used during those phases. The closest sensitive receptors would be those described in the setting section and other sensitive receptors in the study area vicinity would be exposed to construction noise at incrementally lower

levels. Noise from construction activities generally attenuates at a rate of 4.5 to 7.5 dBA per doubling of distance. Construction noise at the nearest receptor is analyzed below for each project component with an assumed attenuation rate of 6 dBA, because most of the loudest construction activities would attenuate at a rate similar to a point source. Figure 3.9-2 locates nearby sensitive receptors.

Proposed Borrow Area

The borrow area would be located approximately 2000 feet from the picnic areas on the west shoreline. Noise would be generated by excavators, loaders, and heavy-duty trucks hauling soil to the dam. Blasting would not occur in the borrow area. However, blasting would be required for the portion of the haul road over the Bernsconi Hills. Other than during blasting, the loudest noise emissions from construction would be about 88 dBA at 50 feet. Noise levels at the nearest picnic area from the borrow area (on the west shore) are expected to be about 56 dBA. Construction noise at these levels would exceed county noise ordinance levels at the nearest sensitive receptor location and would be significant without mitigation. Blasting would occur infrequently perhaps three or four times a day for a few weeks until the haul road is completed. The loudest noise emissions would be about 115 dBA at 50 feet. The noise levels at the nearest residences are expected to reach about 75 dBA, based on distance attenuation only, noise levels would be reduced further due to the shielding affects of local mountains. Noise levels at the nearest recreation are expected to reach about 69 dBA. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Rock Quarry

The nearest recreational area to the rock quarry is about 9500 feet to the northeast, and the nearest residence is about 5000 feet to the southeast. Blasting would occur in the rock quarry, therefore the loudest noise emissions would be about 115 dBA at 50 feet. Periodic noise from blasting could be heard throughout the area up to three to four times a day potentially for a period of over a year. The duration of each blast event is expected to last for less than five seconds. The noise levels at the nearest residences are expected to reach about 75 dBA, based on distance attenuation only, noise levels would be reduced further due to the shielding affects of local mountains. Noise levels at the nearest recreation are expected to reach about 69 dBA. Blasting is a short term noise event; other construction noise would be more continuous at about 88 dBA at 50 feet, which would be about 48 dBA at the nearest residences and 42 dBA at the nearest recreation area. Mountains between the residences and the rock quarry would provide further attenuation to residences. Construction noise at these levels would be under City noise ordinance levels at the nearest residence but exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards, however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Outlet Tower

The nearest residents to the outlet tower construction zone are about 3000 feet southeast, and the nearest recreation area is about 9000 feet to the northeast. Underwater blasting would occur at the outlet tower, therefore the loudest noise emissions would be about 115 dBA at 50 feet. Periodic noise from blasting could be heard throughout the area up to three to four times a day potentially for a period of over a year. The duration of each blast event is expected to last for less than five seconds. Noise levels would be about 79 dBA at the nearest residences and 70 dBA at the nearest recreation area. However, the dam would act as a noise barrier and further diminish the noise levels to the residential area. Blasting is a short term noise event; other construction noise would be more continuous at about 88 dBA at 50 feet, which would be about 52 dBA at the nearest residence and 43 at the nearest recreation area. Construction noise at these levels would not exceed the City noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Stability Berm

The stability berm is located about 1400 feet from the nearest residence and 5000 feet from the nearest recreational area. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels are expected to be about 59 dBA at the nearest residence and 48 dBA at the nearest recreational area. Construction noise at these levels would not exceed noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. DWR would use CDSM methods to block water seepage during the construction of the stability berm, if necessary, sheet pile-driving may be used. Implementation of Mitigation Measures 3.9-1a through 3.9-1d would reduce these impacts to a less than significant level when work is conducted during day-time hours. However, DWR may need to extend CDSM operations into the night in order to avoid excessive mobilization requirements. Nighttime noise of 59 dBA at the nearest residences would be considered a significant and unavoidable impact of the project since it would cause a temporary nuisance condition.

Proposed Right Abutment Work

The right abutment work is located approximately 3400 feet from the nearest residence and about 1000 feet from the nearest recreational area. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels are expected to be about 51 dBA at the nearest residence and 62 dBA at the nearest recreational area. Construction noise at these levels would not exceed noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Emergency Outlet Extension

The emergency outlet extension would be located about 200 feet from the nearest residences. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels at the nearest sensitive receptors are expected to be about 76 dBA. Construction noise at these levels would exceed city noise ordinance levels at the nearby sensitive receptor location and would be potentially significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Mitigation Measures

Mitigation Measure 3.9-1a: Nighttime work shall not include blasting or sheet pile-driving.

Mitigation Measure 3.9-1b: Construction contractors shall implement the following:

- Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems.
- An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise.

Mitigation Measure 3.9-1c: To reduce noise impacts due to construction, DWR shall require construction contractors to implement the following measures:

- During construction, the contractor shall outfit all equipment, fixed or mobile, with properly operating and maintained exhaust and intake mufflers, consistent with manufacturers' standards.
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used where feasible. Quieter procedures, such as use of drills rather than impact tools, shall be used whenever feasible.
- Stationary noise sources that could affect adjacent receptors shall be located as far from adjacent receptors as possible.
- Daytime construction activities would be limited to the times of 7:00 a.m. and 7:00 p.m.
- Residents and park visitors shall be notified in advance of the night work schedule.

Mitigation Measure 3.9-1d: A Blasting Plan for construction shall be prepared and followed that includes the following:

- Primary components of the Blasting Plan shall include:
  - Identification of blast officer;

  - Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited;
  - Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting;
  - Description of means for transportation and on-site storage and security of explosives in accordance with local, state and federal regulations;
  - Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation);
  - Traffic control standards and traffic safety measures (if applicable);
  - Required personal protective equipment;
  - Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger;
  - Procedures for handling, setting, wiring, and firing explosives. Also procedures for handling misfires per Federal code;
  - Type and quantity of explosives and description of detonation device. Sequence and schedule of blasting rounds, including general method of excavation, lift heights, etc.;
  - Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure;
  - Description of blast vibration and air blast monitoring programs;
  - Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan);
  - Emergency Action Plan to provide emergency telephone numbers and directions to medical facilities. Procedures for action in the event of injury;
  - Material Safety Data Sheets for each explosive or other hazardous materials to be used;
  - Evidence of licensing, experience, and qualifications of blasters;
  - Description of insurance for the blasting work.

- A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls.
- If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting.
- Explosive materials shall be delivered in specially built vehicles marked with United Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting DOT rules within the same vehicle. Vehicles shall have at least two ten-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses (CDL) with Hazmat endorsements, and drivers shall carry

bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators.

- The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required federal explosives license must submit photographs and fingerprints with the application to ATF.
- The contractor shall provide 24-hour security and/or the use of motion-detector and alarmed double wire fencing security measures around the stored explosives.

Significance after Mitigation: Daytime construction would comply with local noise ordinances and result in a Less than Significant impact. However, existing noise levels are generally low within the Lake Perris SRA and the temporary increase due to construction could be considered substantial and therefore significant and unavoidable temporary impact. In addition, nighttime construction could exceed 59 dBA at the nearest residences which would also be considered a significant and unavoidable impact of the project.

Vibration

Impact 3.9-2: Construction activities including blasting could damage structures from groundborne vibration.

As shown in **Table 3.9-7**, use of a large bulldozer for project construction generates vibration levels of up to 0.089 PPV or 87 RMS (large bulldozer) at a distance of 25 feet. Blasting activities can result in even higher vibration levels depending on the magnitude of the blast.

TABLE 3.9-7
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment Activity	PPV at 25 Feet (inches/second)[a]	RMS at 25 Feet (VDB)[b]
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

[a] Buildings can be exposed to ground-borne vibration levels of 0.2 PPV without experiencing structural damage.
[b] The human annoyance response level is 80 RMS.

SOURCE: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

The nearest residential structure to the stability berm construction zone would be approximately 1400 feet from heavy equipment activity. At this distance vibration would not be expected to damage structures. Blasting would occur within the quarry, the outlet structure, and within Bernasconi Hills. These areas are more than 2000 feet from the nearest residential or commercial structures. Groundborne vibration would not likely affect structures at this distance. However, rock faces close to the quarry may be affected. Mitigation Measure 3.9-1d requires that the blasting plan include a vibration monitoring program. The mitigation includes provisions for ceasing blasting activities that may affect stability of the surrounding cliffs, including the rock climbing areas. With implementation of mitigation, the impact would be less than significant.

Mitigation Measures

Implement **Mitigation Measure 3.9-1d**

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.9-8 presents the impacts and mitigation summary for Noise.

TABLE 3.9-8
NOISE IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Excessive Noise: Project construction could substantially increase ambient noise levels or generate noise levels in excess of standards established in the local general plans or noise ordinances, or applicable standards of other agencies.	3.9-1a through 3.9-1d	Significant and Unavoidable
Vibration: Construction activities including blasting could damage structures from groundborne vibration.	3.9-1d	Less than Significant