4.5 NOISE

4.5.1 INTRODUCTION

This section describes ambient noise conditions in the vicinity of the project site and summarizes applicable regulations. This section also analyzes noise impacts associated with the implementation of the California Health Care Facility Stockton project, including a discussion of short-term construction and long-term operational noise sources, and compatibility of surrounding land uses with on-site noise levels.

4.5.2 ENVIRONMENTAL SETTING

ACOUSTIC FUNDAMENTALS

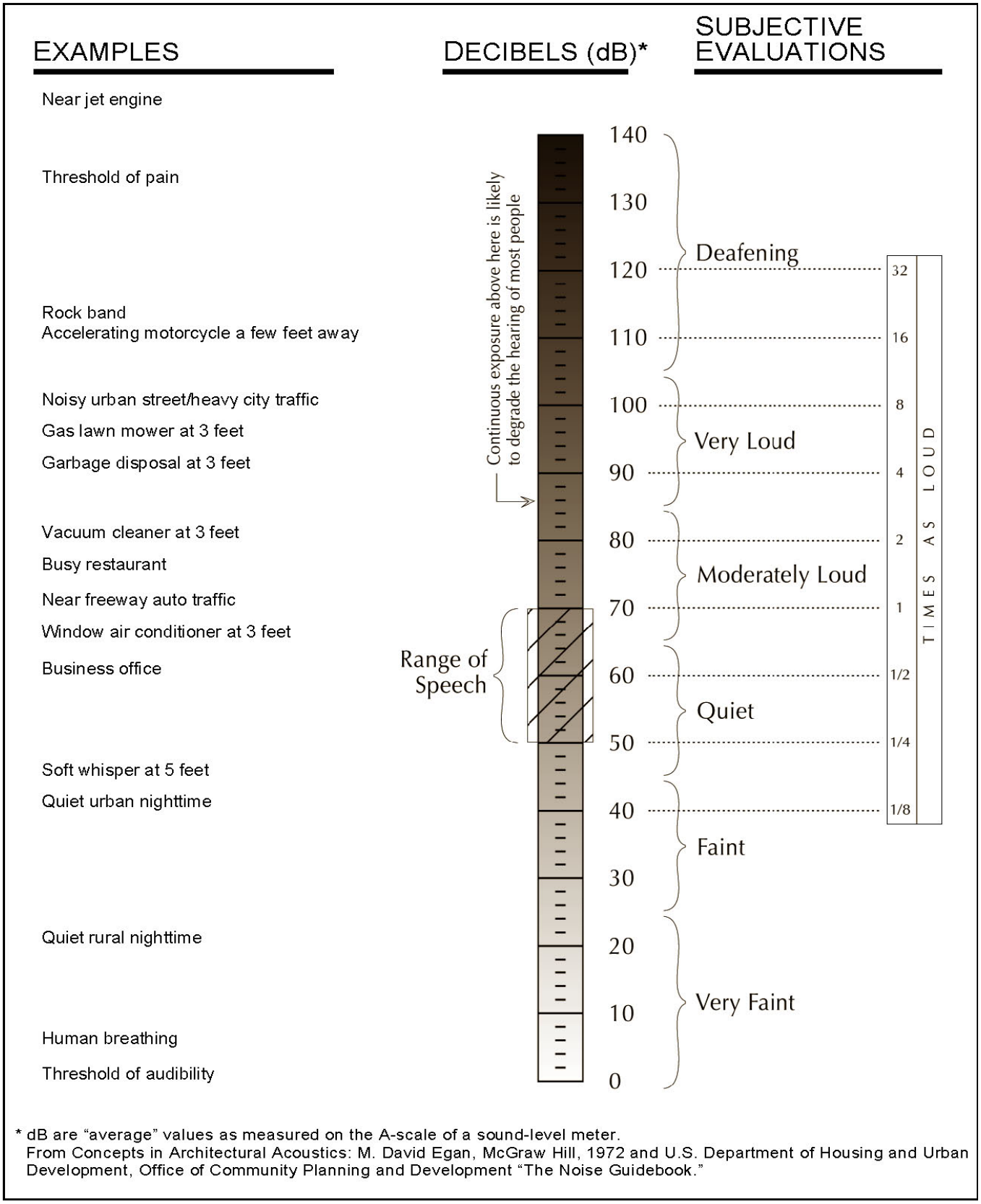
Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Exhibit 4.5-1.

A sound wave is initiated in a medium by a vibrating object (e.g., vocal cords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in Hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more usable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two similar pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air, the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A–E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason, the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

Noise can be generated by a number of sources: mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (nontransportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building facades, berms). Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance (dB/DD). Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 dB to 7.5 dB/DD.



Source: Data compiled by EDAW in 2008

Common Noise Sources and Levels **Exhibit 4.5-1**

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building facades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction or "shielding" provided by a barrier depends primarily on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below.

- L_{max} *(Maximum Noise Level):* The highest A/B/C weighted integrated noise level occurring during a specific period of time.
- L_{min} *(Minimum Noise Level):* The lowest A/B/C weighted integrated noise level during a specific period of time.
- *Peak:* The highest weighted or unweighted instantaneous peak-to-peak value occurring during a measurement period.
- L_n *(Statistical Descriptor):* The noise level exceeded n% of a specific period of time, generally accepted as an hourly statistic. An L_{10} would be the noise level exceeded 10% of the measurement period.
- L_{eq} *(Equivalent Noise Level):* The energy mean (average) noise level. The steady-state sound level that, in a specified period of time, contains the same acoustical energy as a varying sound level over the same time period.
- L_{dn} *(Day-Night Noise Level):* The 24-hour L_{eq} with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10:00 p.m. through 7:00 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- *CNEL (Community Noise Equivalent Level):* Similar to the L_{dn} described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and watching television. If the same 24-hour noise data are used, the CNEL is typically 0.5 dB higher than the L_{dn}.
- *SEL (Sound Exposure Level):* The cumulative exposure to sound energy over a stated period of time.
- *SENEL (Single-Event Noise Exposure Level):* An SEL where the measurement period is defined by the start and end times of a single noise event, such as an automobile passby, aircraft flyover, or individual industrial operation.

EFFECTS OF NOISE ON HUMANS

Excessive and chronic exposure to elevated noise levels can result in auditory and nonauditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Nonauditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The nonauditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications,

sleep, and learning. The nonauditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to nonauditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several nonacoustic factors. The number and effect of these nonacoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustom to, the less tolerable the new noise source will be perceived.

A change in sound level of 1 dB is generally not perceivable by humans, excluding controlled conditions and pure tones. Outside of controlled laboratory conditions, the average human ear barely perceives a change of 3 dB. A change of 5 dB generally fosters a noticeable change in human response, and an increase of 10 dB is subjectively heard as a doubling of loudness.

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as operating factory machinery, or transient in nature, such as explosions. Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, and acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006: **7**-1 - 7-8, Caltrans 2004: 5-7). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration important to the proposed project occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings (FTA 2006 : 8-1 – 8-8).

EXISTING NOISE ENVIRONMENT

The existing noise environment within the project area is influenced primarily by transportation noise emanating from vehicular traffic on area roadways. Most of the vehicular traffic in the area travels along Arch Road, north of the project site. Additional noise sources include occasional aircraft overflights, seasonal operation of agricultural equipment on adjacent parcels, and operational noise generated by the Burlington Northern and Santa Fe (BNSF) Intermodal Transfer Facility to the east.

EXISTING NOISE-SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, places of worship, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Noise-sensitive land uses in the project vicinity include both on-site and off-site residential uses, the nearest of which are on-site housing units for wards at the Northern California Youth Correctional Center (NCYCC) to the west, and inmate housing units at the proposed Northern California Re-Entry Facility (NCRF) (currently the Richard A. McGee Correctional Training Center Annex [CTCA]) to the north. The nearest off-site residential dwellings are located east of Austin Road, adjacent to the eastern boundary of the project site.

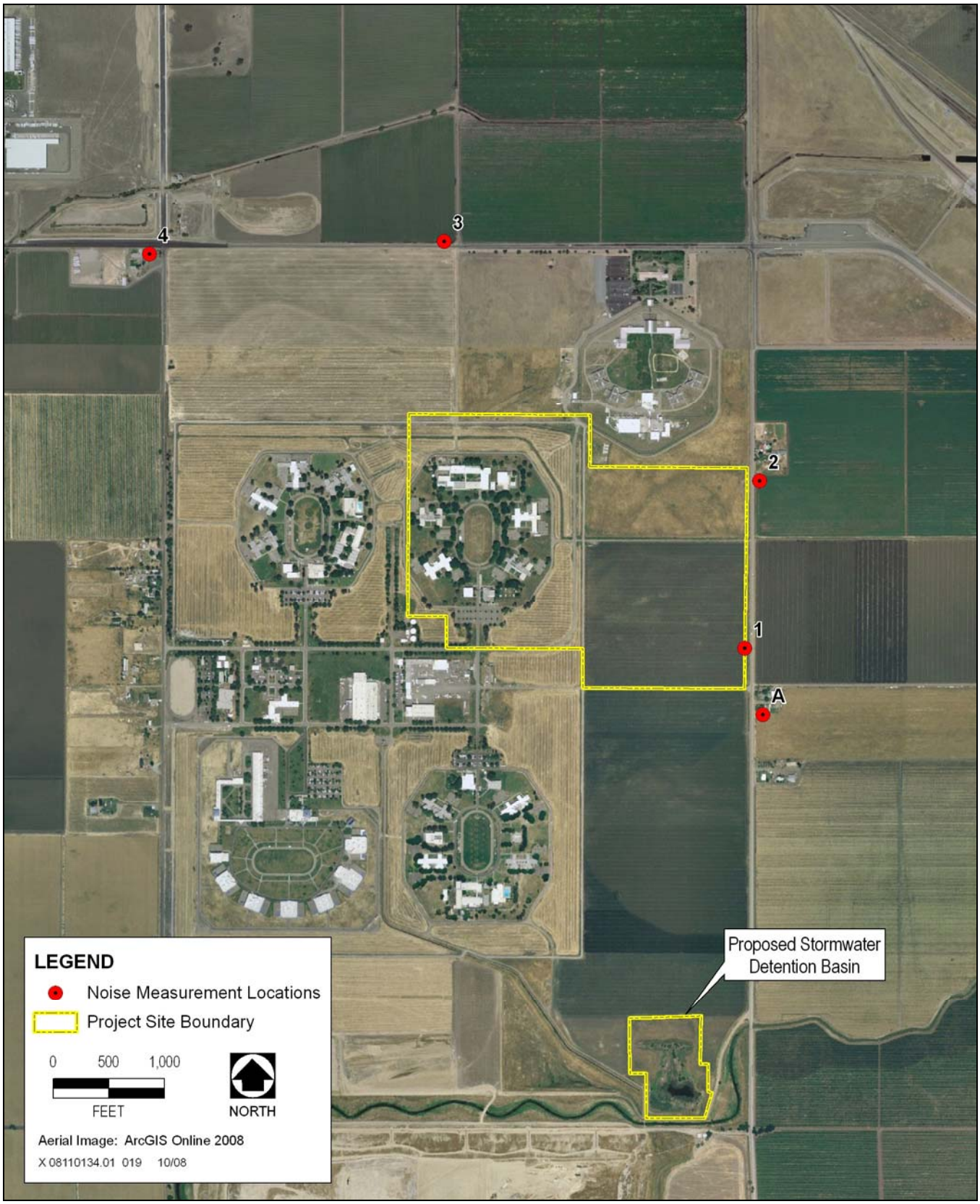
AMBIENT-NOISE SURVEY

An ambient-noise survey was conducted by EDAW on July 11 and 12, 2008, to document the existing noise environment at various locations in the project vicinity. Noise level measurements were taken in accordance with American National Standards Institute (ANSI) standards at six locations using Larson Davis Laboratories (LDL) Model 824 precision integrating sound level meters (SLMs). The SLMs were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the ANSI for Type 1 SLMs (ANSI S1.4-1983[R2006]). Ambient-noise survey locations are shown in Exhibit 4.5-2. The L_{eq}, L_{max}, and L_{50} values taken at each ambient noise measurement location are presented in Table 4.5-1.

Average daytime hourly noise levels measured during the survey ranged from approximately 61 to 68 dB L_{eq}, with maximum noise levels that ranged from 76 to 87 dB $L_{max.}$ The primary noise source affecting noise measurement locations was vehicular traffic on Arch Road and Austin Road. Noise generated from operational activities associated with the NCYCC and CTCA, such as on-site vehicular traffic, generators, pumps, lift stations, mechanical noise, and loudspeakers, was not audible during the measurement period. Meteorological conditions during the measurement period were favorable, with clear skies, temperatures ranging from 55 degrees Fahrenheit (°F) to 85°F, and light winds from the northeast at 5–8 mph.

EXISTING TRAFFIC NOISE

Existing traffic noise levels were calculated for roadway segments in the project vicinity using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978), and traffic data provided in the traffic impact study prepared for the project (DKS Associates 2008). The FHWA model is based on the California vehicle noise (CALVENO) reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on study area roadways were estimated from field observations and data from the California Department of Transportation (Caltrans) where available (Caltrans 2007: 146).



Source: Prepared by EDAW in 2008

Noise Measurement Locations **Exhibit 4.5-2**

Table 4.5-1 Summary of Measured Ambient-Noise Levels									
Site	Location	Time	Average Measured Hourly Noise Levels, dB						
			L_{dn}	Daytime (7 a.m.–10 p.m.)			Nighttime (10 p.m.–7 a.m.)		
				L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
A	Austin Road—Southern Residence	July 11–12, 2008	61.8	60.7	50.4	76.1	53.2	45.7	71.5
1	Austin Road—Proposed Project Drive	2:15 p.m.	–	63.5	42.3	80.0		–	
2	Austin Road—Northern Residence	3:08 p.m.	–	68.3	59.2	84.2		–	
3	Arch Road—North of CTCA	3:47 p.m.	–	67.9	46.1	86.8		–	
4	Arch Road at Newcastle Road	4:18 p.m.	–	68.0	49.5	85.0		–	

Monitoring locations correspond to those depicted on Exhibit 4.5-2.
Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = the equivalent hourly average noise level; L_{50} = the noise level exceeded 50% of a specific period of time; L_{max} = maximum noise level.
Data collected July 11 and 12, 2008.
Source: Data compiled by EDAW in 2008

Table 4.5-2 summarizes the modeled levels of existing traffic noise at a representative distance of 100 feet from the centerline of each major roadway in the project vicinity and lists distances from roadway centerlines to the 60-dB, 65-dB, and 70-dB L_{dn} traffic noise contours. Traffic noise modeling results are based on existing average daily traffic (ADT) volumes. As shown in Table 4.5-2, the location of the 60-dB L_{dn} traffic noise contours along the local roadway network range from 32 to 230 feet from the centerline of the modeled roadways. The extent to which existing land uses in the project area are affected by existing traffic noise depends on their respective proximity to the roadways and their individual sensitivity to noise. Refer to Appendix D of this DEIR for complete modeling inputs and results.

Table 4.5-2 Summary of Modeled Existing Traffic Noise Levels					
Roadway	Segment	L_{dn} (dB) 100 feet	Distance (feet) from Roadway Centerline to L_{dn} Contour		
			70 dB	65 dB	60 dB
SR 99	North of Arch Road	78.0	343	739	1591
SR 99	South of Arch Road	77.9	338	729	1570
Arch Road	East of N. Project Drive	57.5	15	32	68
Arch Road	East of NCRF Drive	57.8	15	33	71
Arch Road	East of Newcastle Road	58.8	18	39	83
Arch Road	East of SR 99	65.4	50	107	230
Arch Road	East of SR 99	63.9	39	84	181
Arch Road	West of Austin Road	58.0	16	34	73
Arch Road	West of N. Project Drive	58.7	18	38	82
Arch Road	West of NCRF Drive	58.5	17	37	79
Arch Road	West of Newcastle Road	60.1	22	47	102
Arch Road	West of SR 99	65.3	49	105	227
Arch Road	West of SR 99	65.4	50	107	230
Austin Road	North of Arch Road	55.0	10	22	47
Austin Road	North of Project Drive	53.0	7	16	34
Austin Road	South of Arch Road	53.0	7	16	34
Austin Road	South of Project Drive	53.0	7	16	34
NCYCC Drive	East of Newcastle Road	52.6	7	15	32
Newcastle Road	North of NCYCC Drive	54.9	10	21	46
Newcastle Road	South of Arch Road	51.4	6	12	27

Notes: dB = decibels; L_{dn} = day-night average noise level; SR = State Route
Source: Data modeled by EDAW in 2008

4.5.3 REGULATORY CONSIDERATIONS

Various private and public agencies have established noise guidelines and standards to protect citizens from potential hearing damage and other adverse physiological and social effects associated with noise. Applicable standards and guidelines are described below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The U.S. Environmental Protection Agency's (EPA's) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in the EPA rulings in prior years remain in place by designated federal agencies where relevant. No federal noise regulations are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. The code provides acoustical regulations for both exterior-to-interior sound insulation as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45 dB L_{dn}, with windows closed, in any habitable room for general residential uses. Section 13-102 of Title 24 presents minimum requirements for detention facilities and requires that all inmate housing areas be constructed so that average noise levels not exceed 70 dB during periods of activity and 45 dB during sleeping hours.

LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Because CPR, acting as a state agency, is the project proponent, compliance with local standards is not required. However, CPR considers local noise standards as they relate to the compatibility between the project and various land uses adjacent to the project site. Local noise standards are used as guidelines for what CPR considers acceptable noise levels in noise-sensitive areas.

San Joaquin County General Plan 2010

The following objectives and policies in the *San Joaquin County General Plan 2010* related to potential noise impacts are applicable to the proposed project.

Noise Element

- **Objective 1:** To ensure acceptable noise environments for each land use.
  - **Policy 1:** The following noise levels shall be considered acceptable:

(a) The maximum allowable noise exposure from transportation noise sources for outdoor activity areas shall be 65 dB (L_{dn}) for residential development; transient lodging, hospitals, nursing homes, and similar health-related facilities; churches, meeting halls, and similar community assembly facilities.

(b) The maximum allowable noise exposure from transportation noise sources for indoor spaces shall be 45 dB (L_{dn}) for residential development; transient lodging, hospitals, nursing homes, and similar health-related facilities; churches, meeting halls, and similar community assembly facilities; office buildings; schools; libraries; museums; and day-care centers.

(c) The hourly equivalent sound level from stationary noise sources shall be 50 dB (L_{eq}) during the daytime and 45 dB (L_{eq}) during the nighttime for outdoor activity areas for residential development; transient lodging, hospitals, nursing homes, and similar health-related facilities; churches, meeting halls, and similar community assembly facilities; office buildings; schools; libraries; museums; and day-care centers.

(d) The maximum sound level from stationary noise sources shall be 70 dB (L_{max}) during the daytime and 65 dB (L_{max}) during the nighttime for outdoor activity areas for residential development; transient lodging, hospitals, nursing homes, and similar health-related facilities; churches, meeting halls, and similar community assembly facilities; office buildings; schools; libraries; museums; and day-care centers.

- Policy 2: The County shall not permit new areas of residential development within the 65 dB (Ldn) contours around public access airports.
- Policy 3: Development shall be planned and designed to minimize noise impacts on neighboring noise-sensitive areas and to minimize noise interference from outside noise sources.
- Policy 4: The County noise regulations shall be based on projections, using the noise contours in Volume III of the General Plan or the best available information.
- Policy 5: The County shall seek to alleviate existing community noise problems.

San Joaquin County Development Code

The following objectives and policies in the *San Joaquin County Development Code* related to potential noise impacts are applicable to the proposed project.

Noise Ordinances

Section 9-1022.5 Noise Attenuation Walls

Walls, fences, berms, and/or landscaping for the purpose of noise attenuation may be required in any zone when adjacent to a high noise generator such as a major roadway or railroad. Noise attenuation requirements shall be developed in response to the noise level and source affecting a specific property. Where noise attenuation walls are required, height and yard restrictions for walls shall be waived by the Director as required for effective noise reduction.

Section 9-1025.9 Noise

All uses and property shall be subject to the following provisions concerning noise levels:

(a) Transportation Noise Sources.

(1) Excluding proposed noise-sensitive land uses on infill lots, proposed noise-sensitive land uses that will be impacted by existing or planned transportation noise sources shall be required to mitigate the noise levels from these transportation noise sources so that the resulting noise levels on said proposed noise-sensitive land uses do not exceed the standards specified in Table 4.5-3. Proposed noise-sensitive land uses on infill lots that will be impacted by existing or planned transportation noise sources shall be required to mitigate the noise levels from these transportation facilities so that the resulting noise levels on said proposed noise-sensitive land uses on such infill lots do not exceed the standards specified in Table 4.5-3 for interior spaces only.

Table 4.5-3
San Joaquin County Development Code
Part I—Transportation Noise Sources

Noise-Sensitive Land Use (use types)	Outdoor Activity Areas[1] (dB L_{dn})	Interior Spaces (dB L_{dn})
Residential	65	45
Administrative Office	–	45
Child Care Services—Child Care Centers	–	45
Community Assembly	65	45
Cultural & Library Services	–	45
Educational Services: General	–	45
Funeral & Interment Services—Undertaking	65	45
Lodging Services	65	45
Medical Services	65	45
Professional Services (excluding Hospitals)	–	45
Public Services (hospitals only)	65	45
Recreation—Indoor Spectator	–	45
Religious Assembly	65	45
Part II—Stationary Noise Sources		
	Outdoor Activity Areas[1]—Daytime[2] (7 a.m.–10 p.m.)	Outdoor Activity Areas[1]—Nighttime[2] (10 p.m.–7 a.m.)
Hourly Equivalent Sound Level (L_{eq}), dB	50	45
Maximum Sound Level (L_{max}), dB	70	65

Notes:
dB = decibels; L_{dn} = day-night average noise level
[1] Where the location of outdoor activity areas is unknown or is not applicable, the noise standard shall be applied at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards shall be applied on the receiving side of noise barriers or other property line noise mitigation measures.
[2] Each of the noise level standards specified shall be reduced by 5 dB for impulsive noise, single-tone noise, or noise consisting primarily of speech or music.
Source: *San Joaquin County Development Code*, Title 9, Table 9-1025.9.

(b) Stationary Noise Sources.

(1) Excluding proposed noise-sensitive land uses on infill lots, proposed noise-sensitive land uses that will be impacted by stationary noise sources shall be required to mitigate the noise levels from these stationary noise sources so that the resulting noise levels on said proposed noise-sensitive land uses do not exceed the standards specified in Table 4.5-3.

(2) Proposed projects that will create new stationary noise sources or expand existing stationary noise sources shall be required to mitigate the noise levels from these stationary noise sources so as not to exceed the noise level standards specified in Table 4.5-3.

(c) Exemptions. The following shall be exempt from the provisions of this Chapter:

(1) Activities conducted in public parks, public playgrounds, and public or private school grounds, including but not limited to school athletic and school entertainment events;

(2) Any mechanical device, apparatus, or equipment used, related to, or connected with emergency activities or emergency work;

(3) Noise sources associated with construction, provided such activities do not take place before 6:00 a.m. or after 9:00 p.m. on any day;

(4) Noise sources associated with the maintenance of residential property located in a residential zone, provided such activities shall take place between the hours of 8:00 a.m. and 9:00 p.m. on any day;

(5) Noise sources emanating from any agricultural operation, including activities associated with the processing or transportation of crops when such activities are conducted on agriculturally zoned lands;

(6) Noise sources associated with residential air conditioning equipment, provided such equipment is in good repair;

(7) Noise sources associated with work performed by private or public utilities in the maintenance or modification of its facilities;

(8) Noise sources associated with the collection of waste or garbage;

(9) Any activity whose regulation has been preempted by State or Federal law.

(d) Acoustical Study. The Review Authority shall require the preparation of an acoustical study in instances where it has [been] determined that a project may expose existing or proposed noise-sensitive land uses to noise levels exceeding the noise standards specified in Table [4.5-3].

(f) Prohibited Activities. The outdoor operation of any industrial, commercial, or residential property maintenance tool or equipment powered by an internal combustion engine or electric motor including, but not limited to, leaf blower, chainsaw, lawn mower, hedger, and vacuum cleaner is prohibited with[in] 500 feet of a residence located in a residential zone between the hours of 9:00 p.m. and 8:00 a.m.

City of Stockton General Plan 2035

The following goals and policies in the *City of Stockton General Plan 2035* relating to potential noise impacts are applicable to the proposed project.

- **Goal HS-2:** To protect the community from health hazards and annoyance associated with excessive noise levels.

  - Policy HS-2.1: Sensitive Receptors. The City shall prohibit the development of new commercial, industrial, or other noise-generating land uses adjacent to existing residential uses, and other sensitive noise receptors such as schools, health care facilities, libraries, and churches if noise levels are expected to exceed 70 dBA Community Noise Equivalent (CNEL) (decibels on A-weighted scale CNEL) measured at the property line of the noise-sensitive land use.

  - Policy HS-2.2: Noise Compatibility Guidelines. The City shall allow the development of noise-sensitive land uses (which include, but are not limited to, residential neighborhoods, schools, and hospitals) only in areas where existing or projected noise levels are "acceptable" according to Table [4.5-4], "Land Use Compatibility for Community Noise Environments." Noise mitigation measures may be required to reduce noise in outdoor activity areas and interior spaces to achieve these levels.

Table 4.5-4
Land Use Compatibility for Community Noise Environments
Maximum Allowable Ambient Noise Exposure by Land Use

Land Use Type	Noise Level (L_{dn}), dB						
	0–55	56–60	60–65	66–70	71–75	76–80	> 80
Residential							
Hotels, Motels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arenas, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial & Professional							
Industrial, Manufacturing, Utilities, Agriculture							

	Normally Acceptable. *Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*
	Conditionally Acceptable. *New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed insulation features have been included in the design.*
	Unacceptable. *New construction or development should not be undertaken.*

If existing noise standards are currently exceeded, a proposed project shall not incrementally increase noise levels by more than 3 dBA.

Source: *City of Stockton General Plan 2035* Noise Element, Table HS-11.1, 2007

- Policy HS-2.3: Noise Analysis. The City shall require noise analysis of proposed development projects as part of the environmental review process and require mitigation measures to reduce noise impacts to acceptable levels.
- Policy HS-2.8: Development Surrounding Airport. The City shall require that development around the Stockton Metropolitan Airport be consistent with the noise standards contained in the approved Airport Land Use Plan.
- Policy HS-2.10: Construction Noise. The City shall seek to limit the potential noise impacts of construction activities on surrounding land uses.
- Policy HS-2.11: Limiting Construction Activities. The City shall limit construction activities to the hours of 7 a.m. to 7 p.m., Monday through Saturday. No construction shall occur on Sundays or national holidays without a written permit from the City.
- Policy HS-2.12: Sound Attenuation Features. The City shall require sound attenuation features such as walls, berming, or heavy landscaping between commercial, industrial, and residential uses to reduce noise and vibration impacts.
- Policy HS-2.13: Noise Buffering. The City shall require noise buffering or construction treatments (additional insulation, double paned glass, etc.) in new development that includes noise-sensitive uses located near major streets, highways, the airport, railroad tracks, or other significant noise sources.
- Policy HS-2.14: State Noise Insulation Standards. The City shall enforce the State Noise Insulation Standards (California Administrative Code, Title 24) and Chapter 35 of the Uniform Building Code.
- Policy HS-2.15: California Vehicle Code Standards. The City shall actively support enforcement of California Vehicle Code sections relating to vehicle mufflers and modified exhaust systems.
- Policy HS-2.17: Commercial Uses. The City shall require that noise produced by commercial uses not exceed 75 dB Ldn/CNEL at the nearest property line.
- Policy HS-2.18: Noise Easements. The City shall grant exceptions to the noise standards for commercial and industrial uses only if a recorded noise easement is conveyed by the affected property owners.

Vibration Regulations

CEQA states that the potential for any excessive groundborne noise and vibration levels must be analyzed; however, it does not define the term “excessive” vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration; however, the federal, state, and local governments have yet to establish specific groundborne noise and vibration requirements. Publications of the Federal Transit Administration (FTA) and Caltrans are two of the seminal works for the analysis of groundborne noise and vibration relating to transportation and construction-induced vibration. Caltrans guidelines recommend that a standard of 0.2 in/sec PPV not be exceeded for the protection of normal residential buildings, and that 0.08 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2004: 17). With respect to human response within residential uses (i.e., annoyance), FTA recommends a maximum acceptable vibration standard of 80 VdB (FTA 2006).

San Joaquin County

The San Joaquin County Development Code further establishes the following specific vibration criteria for application in land uses incorporating a general industrial zone:

Section 9-1025.5. Vibration.

(a) Perceptible Displacement. No use shall cause any perceptible displacement at any lot line abutting any zone except an I-G Zone.

(b) Displacement Within the General Industrial Zone. Vibration displacement along any lot line within an I-G Zone shall not exceed the levels set forth in Table [4.5-5]. Vibration displacement shall be measured by a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line within an I-G Zone.

(c) Exceptions. The limits of this section shall not apply to operations involved in the construction or demolition of structures or infrastructure or to vibration caused by motor vehicles or trains.

Table 4.5-5
Maximum Displacement Levels at Any Lot Line (in Inches)

Frequency (cycles per second)	Steady State	Impact
10 and below	0.0010	0.0020
10–20	0.0008	0.0016
20–30	0.0007	0.0014
30–40	0.0003	0.0006
40–50	0.0002	0.0004
50–60	0.0001	0.0002
60 and over	0.0001	0.0002

Source: San Joaquin County Development Code, Title 9, Table 9-1025.5

Degradation of the Ambient Community Noise Environment

In addition to the criteria described above, another consideration in defining impact criteria is based on the degradation of the existing ambient noise environment. In community noise assessments, it is "generally not significant" if no noise-sensitive sites are located within the project vicinity, or if increases in community noise levels associated with implementation of the project would not exceed +3 dB at noise-sensitive locations in the project vicinity (Caltrans 1998 : 40-43). A limitation in using a single value to evaluate an impact related to a noise level increase would be the failure to account for the preexisting ambient noise environment to which a person has become accustomed. Studies assessing the percentage of people highly annoyed by changes in ambient noise levels indicate that when ambient noise levels are low, a greater change is needed to cause a response. As ambient noise levels increase, a lesser change in noise levels is required to elicit significant annoyance. The significance criteria listed in Table 4.5-6 are considered to correlate well with human response to changes in ambient noise levels and assess degradation of the ambient community noise environment.

Table 4.5-6
Significant Change in Ambient Noise Levels

Existing Ambient Noise Level, L_{dn}/CNEL	Significant Increase
< 60 dB	+ 5 dB or greater
> 60 dB	+ 3 dB or greater

Note: CNEL = community noise equivalent level; dB = decibels; L_{dn} = day-night average noise level
Sources: Adapted from FICON 1992, Caltrans 1998

4.5.4 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

In accordance with Appendix G of the State *CEQA Guidelines*, an impact of the proposed project related to noise would be considered significant if project implementation would:

- expose persons to or generate noise levels (during both construction and operation) in excess of applicable standards (e.g., exterior and interior noise levels from the *San Joaquin County General Plan 2010* and San Joaquin County Development Code as presented above in Section 4.5.3, "Regulatory Considerations," and in Table 4.5-3);
- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, as listed in Table 4.5-6;
- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, as listed in Table 4.5-6;
- expose people residing or working in the 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 2 miles of a public airport or public use airport;
- expose people residing or working in the project area to excessive noise levels, for a project within the vicinity of a private airstrip; or
- expose persons to or generate excessive groundborne vibration or groundborne noise levels (specifically, vibration impacts would be significant if levels exceed the Caltrans recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or FTA's maximum acceptable vibration standard of 80 VdB with respect to human response [i.e., annoyance] at nearby vibration-sensitive land uses [i.e., residential]).

Generally, a project may have a significant effect on the environment if it would substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been implemented. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local planning criteria or ordinances, or substantially increase noise levels at noise-sensitive land uses.

For the proposed project, the significance of anticipated noise effects is based on a comparison between predicted noise levels and noise criteria defined by San Joaquin County. For this project, noise impacts are considered significant if existing or proposed noise-sensitive land uses would be exposed to noise levels in excess of the *San Joaquin County General Plan* Noise Element or San Joaquin County Development Code standards as described above (see Section 4.5.3, "Regulatory Considerations"), or if implementation of the proposed project would result in an increase in ambient noise levels in excess of those listed in Table 4.5-6.

PROJECT IMPACTS AND MITIGATION MEASURES

IMPACT NOI-1 Short-Term Construction-Generated Noise Levels Exceeding Applicable Noise Standards. *Implementation of the proposed project would result in short-term construction activities associated with demolishing existing structures and constructing new buildings. These construction activities could expose sensitive receptors to noise levels that exceed the applicable noise standards and/or result in a noticeable increase in ambient noise levels. (Significant; less than significant with mitigation)*

Construction noise levels in the project vicinity would fluctuate depending on the particular type, number, and duration of usage for the various pieces of equipment. The effects of construction noise depend largely on the types of construction activities occurring on any given day, noise levels generated by those activities, distances to noise-sensitive receptors, and the existing ambient noise environment in the vicinity of the receiver. Construction generally occurs in several discrete stages, with each operation varying the equipment mix and the associated noise characteristics. These stages alter the characteristics of the noise environment generated on the project site and in the surrounding community for the duration of the construction process. Construction of the project is expected to begin in March 2009 and would be completed in approximately 25 months. The proposed project is planned to be fully operational by mid to late 2011.

The site preparation phase typically generates the most substantial noise levels because of on-site equipment associated with grading, compacting, and excavation. Site preparation equipment includes backhoes, bulldozers, and loaders; excavation equipment such as graders and scrapers; and compaction equipment. Erecting large structural elements and mechanical systems could require the use of a crane for placement and assembly tasks, which may also generate substantial noise. Although a detailed construction equipment list is not currently available, it is expected that the primary sources of noise would include backhoes, compressors, bulldozers, excavators, and other related equipment. Table 4.5-7 lists the noise levels typically generated by various types of construction equipment.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes, mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, dozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations. Thus, it is necessary to determine the location of stationary sources during specific phases, or the effective acoustical center of operations for mobile equipment during various phases of the construction process. Operational characteristics of heavy construction equipment are additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

As indicated in Table 4.5-7, operational noise levels for typical construction activities would range from 74 to 101 dB at a distance of 50 feet. Continuous combined noise levels generated by the simultaneous operation of the loudest pieces of equipment would result in noise levels of 101 dB at 50 feet. Accounting for the usage factor of individual pieces of equipment, topographical shielding and absorption effects, construction activities on the project site would be expected to result in hourly average noise levels of 95 dB L_{eq}, at a distance of 50 feet. Maximum noise levels generated by construction activities are not predicted to exceed 101 dB L_{max} at 50 feet.

The nearest off-site noise-sensitive receptors in the project vicinity are the single-family residential land uses located approximately 1,100 feet east of the acoustical center of the site, east of Austin Road. Noise from localized point sources (such as construction sites) typically decreases by 6 to 7.5 dB with each doubling of distance from source to receptor. Conservatively assuming an attenuation rate of 6 dB per doubling of distance, construction operations and related activities are predicted to generate exterior hourly noise levels of 68 dB L_{eq} and 74 dB L_{max} at the nearest off-site noise-sensitive receptor, when propagated from the acoustical center of construction operations.

Table 4.5-7 Noise Emission Levels from Construction Equipment	
Equipment Type	Typical Noise Level (dB) at 50 feet
Air Compressor	78
Asphalt Paver	77
Backhoe	78
Compactor	83
Concrete Breaker	82
Concrete Pump	81
Concrete Saw	90
Crane, Mobile	81
Dozer	82
Front-End Loader	79
Generator	81
Grader	85
Hoe Ram Extension	90
Jack Hammer	89
Pneumatic Tools	85
Pile Driver	101
Rock Drill	81
Scraper	84
Trucks	74–81
Water Pump	81

Notes:
dB = A-weighted decibels.
All equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture specified noise levels for each piece of heavy construction equipment.
Source: Bolt Beranek and Newman Inc. 1981, FTA 2006

On-site noise-sensitive receptors include youth correctional housing units located more than 1,600 feet from the acoustical center of the project site. Common outdoor activity areas for these housing facilities are oriented such that the direct line of sight to construction activities would be shielded by the facility housing units. The acoustical shielding provided by on-site buildings would result in a 5- to 8-dB reduction in noise levels at the receiver. Resultant noise levels at nearby on-site receptors would be less than 64 dB L_{eq} at the housing units. Assuming an average exterior-to-interior noise reduction of 25 dB (with windows closed; prison windows are not operable), interior noise levels would not exceed 45 dB L_{dn}.

In consideration of local noise control ordinances for the evaluation of potential impacts (as stated previously, state agencies and entities like CPR that act as state agencies are not required to comply with the ordinances but use them as an indicator of project significance), noise levels associated with construction activities occurring between 6:00 a.m. and 9:00 p.m. on any day are exempt under the San Joaquin County Development Code. If construction activities occur during the more noise-sensitive hours (i.e., evening, nighttime, and early morning) or if construction equipment is not properly equipped with noise control devices, project-generated noise levels from construction sources could exceed the applicable standards at nearby noise-sensitive receptors or result in a substantial temporary increase in the ambient noise environment.

Construction activities could result in a substantial (i.e., 3- to 5-dB or greater) temporary increase in ambient noise levels at nearby noise-sensitive land uses. Furthermore, if construction activities occur before 6:00 a.m. or after 9:00 p.m., project-generated noise levels would exceed the San Joaquin County noise standards at the single-family residential land uses east of Austin Road. As a result, this impact would be significant.

Mitigation Measure(s) for Impact NOI-1:

CPR will implement the following mitigation measures to reduce noise levels generated by on-site construction-equipment:

- Construction equipment will be properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All impact tools will be shrouded or shielded and all intake and exhaust ports on power equipment will be muffled or shielded.
- Construction equipment will not be idled for extended periods of time in the vicinity of noise-sensitive receptors.
- Fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) will be located as far as possible from noise-sensitive receptors.
- A disturbance coordinator will be designated by CPR, which will post contact information in a conspicuous location near the entrance so that it is clearly visible to nearby receivers most likely to be disturbed. The coordinator will manage complaints resulting from the construction noise. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by CPR to ensure compliance with applicable standards. The disturbance coordinator will contact nearby noise-sensitive receptors, advising them of the construction schedule.
- Where feasible, project construction and related activities will occur between 6 a.m. and 9 p.m., the operational hours outlined in the San Joaquin County Development Code's Noise Ordinance.
- Where construction operations and related activities occur during more sensitive evening and nighttime hours (9 p.m. to 6 a.m.), CPR will notify the three residences along Austin Road 24 hours in advance of nighttime construction activities, and temporary noise barriers will be erected to minimize noise disturbances at nearby noise-sensitive land uses. Temporary barriers will be placed as close to the noise source or as close to the receptor as possible and break the line of sight between the source and receptor. Acoustical barriers will be constructed of material with a minimum surface weight of 2 pounds per square foot or greater, and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by American Society for Testing and Materials (ASTM) Test Method E90. Placement, orientation, size, and density of acoustical barriers will be specified by a qualified acoustical consultant (when specific equipment configurations, locations, and operational details become available) such that noise generated by construction activities occurring after 9 p.m. would not exceed applicable County standards at the single-family residences. Alternatively, contingent upon agreement by the occupants, CPR may pay to temporarily relocate occupants of the residences during periods of nighttime construction.
- Pile holes shall be pre-drilled to the maximum feasible depth. Pre-drilling pile holes shall reduce the number of blows required to completely seat the pile, and shall concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.

Significance after Mitigation

Implementation of the above mitigation measures and attaining consistency with the provisions of the San Joaquin County Development Code would reduce construction-generated noise levels by 15–25 dB at noise-sensitive receptors in the project vicinity. Furthermore, operation of construction-related equipment in accordance with the

San Joaquin County Development Code would be exempt from the provisions of the noise ordinance. As a result, this impact would be reduced to a less-than-significant level.

IMPACT NOI-2 **Groundborne Noise and Vibration Levels due to Construction Activities at Sensitive Receptors.** *Implementation of the proposed project could expose sensitive receptors to groundborne noise and vibration levels that could exceed the County's threshold of significance. These groundborne noise and vibration levels could expose on- and off- site sensitive receptors or damage structures.* ***(Less than significant)***

Implementation of the proposed project could expose sensitive receptors to groundborne noise and vibration levels that could exceed the County's threshold of significance (Table 4.5-5). These groundborne noise and vibration levels could expose on- and off-site sensitive receptors or damage historic structures. Construction activities may generate intermittent groundborne noise and vibration for a short term. For the purposes of this analysis, project related construction groundborne vibration impacts will be evaluated utilizing the County's threshold of significance discussed above.

Construction and demolition activities on the proposed project site may result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. Groundborne vibration levels caused by various types of construction equipment are summarized in Table 4.5-8. The representative vibration levels identified for various construction equipment types show that sensitive receptors located close to construction activities could be exposed to groundborne vibration levels exceeding the County's thresholds of significance for exposing existing residential areas to peak particle velocities.

To evaluate vibration impacts at residential receptors the construction activity generating the highest PPV (pile-driving) were analyzed. The assumed distance to the nearest on-site sensitive receptor is 1,100 feet from pile-driving activities. The resulting groundborne vibration levels due to construction activities is predicted to be 0.005 in/sec PPV at the nearest residential receptor. Therefore groundborne vibration levels attributable to construction activities would not exceed the County's threshold of significance for exposing residential uses to vibration peak particle velocities due to construction. As a result this impact is less than significant.

Mitigation Measure(s) for Impact NOI-2:

No significant impacts would occur, so no mitigation measures are required.

Table 4.5-8
Representative Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 feet (in/sec)[1]	Approximate Lv (VdB) at 25 feet[2]
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

[1] Where PPV is the peak particle velocity
[2] Where Lv is the RMS velocity expressed in vibration decibels (VdB), assuming a crest factor of 4.
Source: Federal Transit Administration 2006

IMPACT NOI-3 **Off-Site Construction-Generated Traffic Noise Levels Exceeding Applicable Noise Standards.** *Implementation of the proposed project would result in temporary increases in roadway traffic noise associated with project construction. Construction activities could expose sensitive receptors to noise that exceed the applicable noise standards and/or result in a noticeable increase in ambient noise levels. (Significant and unavoidable)*

Approximately 1,700 construction workers per day are anticipated to be required for the proposed project during peak construction periods. Assuming average vehicle occupancy of one person per vehicle and two one-way trips per person, 3,400 trips would be generated by construction personnel during peak operations. Additionally, construction traffic would include the use of dump trucks, haul trucks, cement trucks, and various deliveries occurring throughout the construction period. It is estimated that 55 daily truck trips would occur during peak construction operations (DKS Associates 2008).

Primary access to the construction site would occur on Arch Road and Austin Road, between State Route (SR) 99 and the project driveways. Existing ADT volumes on Arch Road and Austin Road at the project site are 2,380 and 1,130, respectively. Additional traffic noise level increases generated by the construction phase of the proposed project are listed in Table 4.5-9.

Table 4.5-9
Predicted Construction Traffic Noise Levels

Roadway	Segment Location	L_{dn} at 100 Feet, dB			
		No Project	Plus Project	Net Change	Significant Impact?
Arch Road	West of Austin Road	58.0	61.7	+ 3.7	No
Austin Road	South of Arch Road	53.3	59.1	+ 5.8	Yes

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level
* Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures.
Source: Data modeled by EDAW in 2008

Adding construction traffic to the local roadway network would result in a substantial temporary increase in traffic noise levels in the project vicinity ranging from +3.7 to + 5.8 dB L_{dn}. Based on existing ADT volumes and modeled traffic noise levels for Arch Road, noise-sensitive receptors along Arch Road would not be exposed to a substantial increase traffic noise generated by off-site construction traffic associated with the proposed project. Noise-sensitive land uses in the project vicinity that would be exposed to temporary increases in traffic noise levels during construction of the proposed project would be the three single-family residences located along Austin Road, east of the project site. In consideration of the ambient noise environment degradation criteria listed in Table 4.5-6, noise level increases greater than 3 and 5 dB are considered significant. As a result, this impact would be significant.

Mitigation Measure(s) for Impact NOI-3:

CPR will ensure that the mitigation measures described below are implemented to reduce exposure of noise-sensitive receptors to excessive off-site construction-generated traffic noise levels:

- All heavy trucks will be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications.
- All haul trucks will be inspected before use and a minimum of once per year to ensure proper maintenance and presence of noise-control devices (e.g., lubrication, nonleaking mufflers, and shrouding).

- Construction entrances and heavy truck haul routes will be located as far as possible from nearby noise-sensitive receptors.
- Reduced heavy-truck speed limits will be established and enforced within 600 feet of noise-sensitive receptors.

Significance after Mitigation

Incorporation of the mitigation measures for Impact NOI-2 could reduce off-site construction-generated traffic noise levels by 5 dB. However, because of the low traffic volumes and relatively low traffic noise levels at noise-sensitive receptors along Austin Road, off-site construction traffic could result in a significant temporary increase in the ambient noise environment in the project vicinity. As a result, this impact would remain significant and unavoidable**.**

IMPACT NOI-4 Long-Term Increase in Traffic Noise Levels at Existing Noise-Sensitive Receptors. *Implementation of the proposed project could result in an increase of average daily vehicle trips in the project vicinity. The increased traffic volumes could result in a noticeable (3–5 dB or greater) increase in traffic noise along roadways in the vicinity of the project site. (Significant and unavoidable)*

Long-term operation of the proposed project would result in an increase in ADT volumes on the local roadway network and, consequently, an increase in noise levels from traffic sources along affected segments. To examine the traffic noise impacts, traffic noise levels associated with the project were calculated for roadway segments in the project study area using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978). Traffic noise levels were modeled under existing, Existing plus Approved Projects (EPAP), and cumulative 2035 City General Plan conditions, with and without the project. ADT volumes and distributions of those volumes were obtained from the transportation impact analysis prepared for this project (DKS Associates 2008). Vehicle speeds and truck volumes on local area roadways were calculated from field observations and *2006 Annual Average Daily Truck Traffic on the California State Highway System* prepared by Caltrans (2007). Tables 4.5-10 through 4.5-12 summarize modeled L_{dn} noise levels at 100 feet from the roadway centerline for affected roadway segments in the project vicinity under modeled conditions, with and without project implementation. The traffic noise levels presented in Tables 4.5-10 through 4.5-12 represent an application of conservative traffic noise modeling methodologies, which assume no natural or artificial shielding from existing or proposed structures or topography. Actual traffic noise exposure levels at noise-sensitive receptors in the project vicinity would vary depending on a combination of factors such as variations in daily traffic volumes, shielding provided by existing and proposed structures, and meteorological conditions. Refer to Appendix D for complete modeling inputs and results.

Based on the modeling conducted, implementation of the proposed project would result in changes in traffic noise levels ranging from -5.3 dB to +8.3 dB L_{dn}, relative to noise levels without the project. Traffic volumes on the local roadway network in the project vicinity under existing and near-term conditions are subjectively low; as a result, minimal increases in traffic volumes can potentially result in substantial increases in traffic noise levels. Under existing and EPAP conditions, the proposed project would result in significant increases in traffic noise levels along Arch Road and Austin Road.

As development and growth occur in the region, approaching cumulative 2035 City General Plan buildout conditions and larger projects such as Mariposa Lakes begin to be implemented, traffic noise contributions from the proposed project would be masked by those associated with regional development. There are no traffic noise level impacts due to the implementation of the proposed project, under cumulative 2035 City General Plan conditions.

Implementation of the proposed project under existing, EPAP conditions would result in significant increases in traffic noise levels in the project vicinity. Thus, long-term noise levels from project-generated vehicular traffic would result in a substantial (3–5 dB or greater) increase in ambient noise levels. As a result, this impact would be significant.

Table 4.5-10
Predicted Traffic Noise Levels
Existing Conditions and Existing Plus Project

Roadway	Segment Location	L_{dn} at 100 Feet, dB			
		Existing Conditions*	Existing Plus Project	Net Change	Significant Impact?
SR 99	North of Arch Road	78.0	78.1	+0.1	No
SR 99	South of Arch Road	77.9	78.8	+0.9	No
Arch Road	East of N. Project Drive	57.5	62.1	+4.7	Yes
Arch Road	East of NCRF Drive	57.8	62.3	+4.5	Yes
Arch Road	East of Newcastle Road	58.8	62.6	+3.8	Yes
Arch Road	East of SR 99	65.4	66.8	+1.4	No
Arch Road	East of SR 99	63.9	65.4	+1.6	No
Arch Road	West of Austin Road	58.0	62.3	+4.4	Yes
Arch Road	West of N. Project Drive	58.7	62.6	+3.9	Yes
Arch Road	West of NCRF Drive	58.5	62.5	+4.0	Yes
Arch Road	West of Newcastle Road	60.1	63.2	+3.1	Yes
Arch Road	West of SR 99	65.3	65.9	+0.5	No
Arch Road	West of SR 99	65.4	66.6	+1.2	No
Austin Road	North of Arch Road	55.0	58.4	+3.4	Yes
Austin Road	North of Project Drive	53.0	60.2	+7.2	Yes
Austin Road	South of Arch Road	53.0	60.2	+7.2	Yes
Austin Road	South of Project Drive	53.0	53.7	+0.7	No
NCYCC Drive	East of Newcastle Road	52.6	52.6	0.0	No
Newcastle Road	North of NCYCC Drive	54.9	54.9	0.0	No
Newcastle Road	South of Arch Road	51.4	51.4	0.0	No

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level
* Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Data modeled by EDAW in 2008

Table 4.5-11
Predicted Traffic Noise Levels
Existing Plus Approved Projects (EPAP) and EPAP Plus Project

Roadway	Segment Location	L_{dn} at 100 Feet, dB			
		EPAP Conditions	EPAP Plus Project	Net Change	Significant Impact?
SR 99	North of Arch Road	79.1	79.2	+0.1	No
SR 99	South of Arch Road	78.6	78.6	+0.1	No
Arch Road	East of N. Project Drive	60.5	63.4	+2.9	No
Arch Road	East of NCRF Drive	60.0	63.2	+3.2	Yes
Arch Road	East of Newcastle Road	67.4	68.2	+0.8	No
Arch Road	East of SR 99	69.9	70.4	+0.6	No
Arch Road	East of SR 99	69.7	70.0	+0.3	No
Arch Road	West of Austin Road	61.0	63.7	+2.7	No
Arch Road	West of N. Project Drive	61.5	64.0	+2.5	No
Arch Road	West of NCRF Drive	60.8	63.6	+2.8	No
Arch Road	West of Newcastle Road	67.6	68.4	+0.7	No
Arch Road	West of SR 99	67.7	67.9	+0.2	No
Arch Road	West of SR 99	70.0	70.4	+0.4	No
Austin Road	North of Arch Road	59.0	59.4	+0.4	No
Austin Road	North of Project Drive	53.7	60.3	+6.6	Yes
Austin Road	South of Arch Road	53.7	59.9	+6.2	Yes
Austin Road	South of Project Drive	55.3	54.4	-1.0	No
NCYCC Drive	East of Newcastle Road	52.6	52.5	0.0	No
Newcastle Road	North of NCYCC Drive	55.5	55.5	0.0	No
Newcastle Road	South of Arch Road	52.6	52.6	0.0	No

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level, EPAP = Existing Plus Approved Projects.
* Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Data modeled by EDAW in 2008

Table 4.5-12 Predicted Traffic Noise Levels Cumulative 2035 City General Plan Buildout					
Roadway	Segment Location	L_{dn} at 100 Feet, dB			
		Cumulative 2035 GP	Cumulative 2035 GP Plus Project	Net Change	Significant Impact?
SR 99	North of Arch Road	81.8	81.8	+0.1	No
SR 99	South of Arch Road	81.1	81.1	0.0	No
Arch Road	East of N. Project Drive	66.6	67.5	+0.9	No
Arch Road	East of NCRF Drive	66.4	67.3	+1.0	No
Arch Road	East of Newcastle Road	69.8	70.3	+0.5	No
Arch Road	East of SR 99	71.9	72.3	+0.4	No
Arch Road	East of SR 99	70.9	71.2	+0.4	No
Arch Road	West of Austin Road	69.0	69.2	+0.3	No
Arch Road	West of N. Project Drive	67.0	67.8	+0.9	No
Arch Road	West of NCRF Drive	66.5	67.4	+0.9	No
Arch Road	West of Newcastle Road	69.9	70.4	+0.5	No
Arch Road	West of SR 99	71.2	71.3	+0.1	No
Arch Road	West of SR 99	72.6	72.3	-0.3	No
Austin Road	North of Arch Road	69.2	69.2	+0.0	No
Austin Road	North of Project Drive	65.8	66.6	+0.9	No
Austin Road	South of Arch Road	65.8	66.2	+0.4	No
Austin Road	South of Project Drive	65.8	65.8	0.0	No
NCYCC Drive	East of Newcastle Road	52.6	52.6	0.0	No
Newcastle Road	North of NCYCC Drive	55.9	55.9	0.0	No
Newcastle Road	South of Arch Road	59.0	59.0	0.0	No

Notes: dB = A-weighted decibels; L_{dn} = day-night average noise level.
* Traffic noise levels are predicted at a standard distance of 100 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
[1] Traffic data not available for analysis.
Source: Data modeled by EDAW in 2008

Mitigation Measure(s) for Impact NOI-4:

Feasible mitigation measures are not available to effectively reduce impacts to a less-than-significant level.

Exposure of existing noise-sensitive land uses to significant traffic noise levels generally is difficult to feasibly mitigate. Furthermore, increases in traffic noise levels, with the exception of Austin Road south of Arch Road, would be driven primarily by increases in traffic volumes resulting from cumulative development and regional growth. For this reason, mitigation of near-term traffic noise level increases on the local roadway network in the project vicinity is not be expected to result in effective mitigation of cumulative traffic noise levels.

Effective methods for reducing the effect of roadway traffic noise typically include the use of noise barriers, roadway design modifications, and traffic management. Various mitigation methodologies as they apply to the proposed project are described in further detail below. Roadway design modifications such as roadway realignment, lane configuration changes, and the application of alternative pavement surfaces are often not considered reasonable for projects not incorporating roadway improvements. The proposed project does not include roadway improvements beyond those required for site access, and therefore roadway design modifications are not considered an effective means of mitigation for this project.

Traffic management measures could include reducing roadway speed limits, improving traffic control equipment, and restricting or eliminating truck traffic along a roadway segment. However, implementing traffic management measures in rural and light suburban areas does not result substantially reduce traffic-generated noise levels without resulting in impacts on the functional operation of local roadway networks.

Construction of noise barriers between the roadway and impacted receptors would reduce noise levels by interrupting the transmission path of traffic noise levels. Noise barriers are generally constructed along roadway rights-of-way, or on the property line of the receiving land use. Noise barriers must be of significant height to break the line of sight to a noise source, and of a significant length to prevent sound from flanking or bending around the ends of the barrier; furthermore, openings and breaks in noise barriers substantially reduce barrier effectiveness. Noise-sensitive receptors of primary concern in the project vicinity are the three single-family residences located along Austin Road, south of Arch Road. These single-family residences are accessed directly from Austin Road via driveways; building facades and outdoor activity areas are located 30–65 feet from the right-of-way. Assuming that noise barriers are located at the property line/right-of-way, that the barriers would require openings of 12–15 feet for driveway access, and also that barriers return to the east along the northern and southern property lines, the maximum noise barrier effectiveness would be limited to 1–3 dB. The predicted noise level reduction resulting from the aforementioned noise barriers falls within the 1.5-dB level of uncertainty associated with the model. Additionally, Caltrans guidelines do not consider a noise barrier feasible unless noise level reductions of at least 5 dB will be achieved. Therefore, constructing noise barriers would not be an effective means of mitigating project-generated traffic noise levels at the noise-sensitive receptors.

For the reasons described above, this impact would remain significant and unavoidable.

IMPACT NOI-5 **Long-Term Increase in On-Site Noise Levels from Operation of Stationary Noise Sources.** *Implementation of the proposed project would result in increases in on-site stationary-source noise associated with operation of the facility. These stationary noise sources could exceed the County's noise standards (hourly and maximum) and result in a noticeable increase in ambient noise levels.* ***(Significant; less than significant with mitigation)***

The O.H. Close youth correctional facility is located over 1,400 feet west of the acoustical center of the project site (during project operation). Institutional facilities where the use is residential in nature are generally considered a noise-sensitive use, although to a lesser extent than other noise-sensitive uses such as single- and multifamily residential uses. The California Code of Regulations Title 24 establishes noise exposure limits for institutional land uses of 70 dB L_{eq} during daytime hours, and 45 dB L_{eq} during periods of rest. Based on typical exterior to interior noise levels reduction of 25 dB to 30 dB for standard wall construction, with windows closed (windows in the youth facility are not operable); the youth facility could be exposed to sustained exterior noise levels up to 95 dB L_{eq} before exceeding the Title 24 noise exposure levels. In addition, sight and sound separation (typically a wall or berm) would be installed between the proposed project and the youth facility, which would further reduce noise. Noise levels generated from the proposed project would not approach the required levels to result in exceeding the interior noise level standards of Title 24 for institutional facilities. Therefore, exposure of the O.H. Close youth correctional facility to noise levels generated by the proposed project will not be discussed further in this analysis.

The proposed California Health Care Facility project could introduce several on-site stationary noise sources associated with the support and operation of the facility. Stationary noise sources associated with facility operations could include rooftop heating, ventilation, and air conditioning (HVAC) equipment; mechanical equipment; emergency electrical generators; parking lot activities; and loading dock operations. Detention and medical facilities generally incorporate outdoor paging systems, multiple alarms, and outdoor recreation facilities for inmates. The noise levels associated with the operation of these sources are described separately below.

Public Address System

The project could include the installation of additional public address (PA) systems throughout the proposed medical and support facilities. The exact number and orientation of PA system components have not yet been determined. Based on noise measurements conducted at similar detention facilities, noise levels for prison outdoor PA systems can reach intermittent levels of approximately 70–90 dB L_{max} at 50 feet. The operation of PA systems is generally intermittent by nature (i.e., less than approximately 1 minute in duration). Although PA announcements may be audible for brief periods of time at nearby noise-sensitive receptors, particularly during the quieter evening and nighttime hours, predicted intermittent noise levels would not be anticipated to exceed noise standards typically recommended for the protection of human annoyance and sleep disruption.

The nearest off-site noise-sensitive land use is a single-family residence located east of Austin Road, approximately 1,500 feet northeast of the acoustical center of the proposed project. Accounting for typical attenuation rates of 6 dB per doubling of distance and shielding provided by on-site structures, noise levels attributed to the PA system would range from 33 dB to 53 dB L_{max} at the nearest residential receptors. This would be less than the maximum noise-level standards set in the *San Joaquin County General Plan* Noise Element and San Joaquin County Development Code Noise Ordinance of 70 dB L_{max} and 65 dB L_{max}, for daytime and nighttime periods, respectively (Table 4.5-3). As a result, the impact of noise from PA system operation would be less than significant.

Mechanical HVAC Equipment

HVAC equipment could be a primary noise source associated with commercial or industrial uses. HVAC equipment is often mounted on rooftops, located on the ground, or located within mechanical rooms. The noise sources could take the form of fans, pumps, air compressors, chillers, or cooling towers. As stated in Chapter 3, “Project Description,” the proposed project is assumed to incorporate a central plant that would provide for the majority of facility HVAC requirements. Noise levels from HVAC equipment vary significantly depending on unit efficiency, size, and location, but generally range from 45 to 70 dB L_{eq} at a distance of 50 feet (EPA 1971). Accounting for typical attenuation rates of 6 dB per doubling of distance and shielding provided by on-site structures, noise levels attributed to HVAC mechanical systems would not be anticipated to exceed stationary-source noise level criteria in the *San Joaquin County General Plan* and San Joaquin County Development Code. As a result, the impact of noise from HVAC equipment would be less than significant.

Emergency Electrical Generators

Emergency generators supply necessary power requirements to vital systems within the facilities, ensuring public safety and the health and safety of patients, caregivers, and correctional personnel. Detention facilities typically include two main electrical generators, providing redundant power backup for core operational systems; auxiliary generators for smaller, more vital systems; and additional generators to maintain power for access control systems and electrical fencing. Emergency generators are typically operated under two conditions: loss of main electrical supply or preventive maintenance/testing. The operation of mechanical equipment associated with emergency operations is exempt from the noise standards outlined in the San Joaquin County Development Code; thus, this analysis focuses on routine preventive maintenance and testing operations, which are conducted on a periodic basis. Detailed plans for the locations and types of emergency electrical generators for these facilities were not available. Reference noise-level measurements conducted for emergency generators with rated power outputs

from 25 kilowatts (kW) to 220 kW resulted in noise levels ranging from 61 to 73 dB L_{eq} and 63–84 dB L_{max}. Based on these reference noise levels, emergency electrical generators located within 700 feet of noise-sensitive land uses could potentially exceed the level specified in the San Joaquin County Development Code for daytime stationary-source noise, 50 dB L_{eq}. In addition, generators located within 1,200 feet of noise-sensitive land uses could potentially exceed the level specified in the San Joaquin County Development Code for nighttime stationary-source noise, 45 dB L_{eq}. As a result, the impact of noise levels from preventive maintenance testing/operation of emergency electrical generators would be significant.

Parking Lot Activities

The proposed project would include 1,429 parking stalls, generally located in the eastern portion of the project site. Parking would be located directly adjacent to the proposed facility, bounded by Austin Road to the east and the proposed facility to the west. As stated in Section 4.3, "Traffic and Circulation," during the hours of peak parking demand, 8:00 a.m. to 2:00 p.m., 1,272 parking events would occur. Parking demand was calculated to include the estimated number of employees per shift, maximum number of visitors, and deliveries. Previously conducted reference-noise-level measurements of parking lot activities indicate that average sound exposure levels (SEL) associated with a single parking event are approximately 71 dB SEL at distance of 50 feet. Activities making up a single parking event included vehicle arrival, limited idling, occupants exiting the vehicle, door closures, conversations among passengers, occupants entering the vehicle, startup, and departure of the vehicle. Based on a parking demand of 1,272 cars and assuming a standard attenuation rate of 6 dB/DD, the combined noise level from parking lot activities would be 44.2 dB L_{eq} at the nearest noise-sensitive receiver, located approximately 600 feet northeast of the center of parking activity. This would be less than San Joaquin County's stationary-source noise performance standards of 50 dB L_{eq} and 45 dB L_{eq} for daytime and nighttime periods, respectively. As a result, the impact of noise generated from parking activities would be less than significant.

Loading Dock and Delivery Activity

Noise sources associated with loading dock and delivery activities can include trucks idling, on-site truck circulation, trailer-mounted refrigeration units, pallets dropping, and the operation of forklifts. Previously conducted noise monitoring at loading docks indicates that typical hourly average noise levels range from 55 to 60 dB L_{eq} and from 80 to 84 dB L_{max} at a distance of 50 feet. The nearest noise-sensitive receptor is located approximately 1,000 feet from the proposed warehouse support facility, which is expected to receive the highest volume of deliveries. Detailed site plans and building configurations are not available; therefore, it is assumed that receptors would be directly exposed to noise levels generated by loading dock/delivery activities. Direct exposure to the noise source would result in loading dock and delivery noise levels up to 34 dB L_{eq} and 56 dB L_{max} at the residential property line, 1,000 feet southeast. With loading dock and delivery activities taking place exclusively during daytime hours, associated noise levels would be less than the San Joaquin County hourly performance criteria of 50 dB L_{eq} and 70 dB L_{max}. As a result, the impact of noise generated from loading dock and delivery activities would be less than significant.

Emergency Vehicle Sirens

Emergency vehicles are expected to accessing the proposed medical facility with some frequency. Depending on the severity of the emergency, ambulance, paramedics, and law enforcement vehicles could require the use of their emergency sirens, horns, and lights. The use of emergency sirens, horns, and lights may cause temporary elevation of ambient noise levels on an intermittent basis at nearby noise-sensitive land uses. The San Joaquin County Noise Ordinance exempts "any mechanical, apparatus, or equipment used, related to, or connected with emergency activities or emergency work". As such, emergency vehicles and noise generated from the operation of emergency sirens, and horns while accessing the proposed medical facility are considered exempt from the provisions in the Noise Element. Therefore, noise generated and associated with the operation of emergency vehicles would be less than significant.

Other Stationary Noise Sources

Additional intermittent noise sources attributable to operation of the proposed project include the opening and closing of entries, adult voices, various mechanical equipment, and the use of maintenance equipment. Such noise-generating activities occur infrequently and are generally intermittent. Because of the infrequent and intermittent nature of these noise sources, it is not feasible to address the individual noise impacts. Because such noise events occur infrequently and would be similar to noise events and noise levels already occurring in the project vicinity, significant noise level increases (i.e., 3–5 dB or greater) at nearby noise-sensitive receptors would not be anticipated. As a result, the impact of noise generated from other on-site intermittent noise sources would be less than significant.

Mitigation Measure(s) for Impact NOI-5:

For the proposed project, CPR will implement one of the following two mitigation measures to reduce the effect of noise levels generated by on-site stationary noise sources located within 1,200 feet from a sensitive receptor:

- Routine testing and preventive maintenance will be conducted during the less sensitive daytime hours (i.e., 7:00 a.m. to 6:00 p.m.). All electrical generators will be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications. OR

- Electrical generators will be located within equipment rooms or enclosures that incorporate noise-reduction features, such as acoustical louvers, and exhaust and intake silencers. Equipment enclosures will be oriented so that major openings (i.e., intake louvers, exhaust) are directed away from nearby noise-sensitive receptors.

Significance after Mitigation

With the implementation of the mitigation measure for Impact NOI-4, the effect of noise levels generated by operation of stationary noise sources would be substantially reduced. Through the use of noise control devices and restricted operational periods, noise levels at nearby noise-sensitive land uses from operation of on-site stationary noise would be less than San Joaquin County noise criteria. As a result, this impact would be reduced to a less-than-significant level.

IMPACT NOI-6 **Potential for Incompatibility of Proposed On-Site Land Uses with the Ambient Noise Environment.** *The proposed project includes development of on-site noise-sensitive land uses that could be exposed to noise levels exceeding applicable criteria.* ***(Less than significant)***

The state has established noise compatibility standards for prisons within Title 24 of the California Code of Regulations. The section states: "Housing areas shall be designed and constructed so that the average noise level does not exceed 70 decibels during periods of activity and 45 decibels during sleeping hours."

Based on the noise monitoring conducted at the project site, average daytime noise levels currently range from approximately 53 to 68 dB L_{eq}. Implementation of the proposed project would result in a substantial increase in traffic noise levels along area roadways; however, increased traffic noise levels from Austin Road and Arch Road adjacent to the project site would not result in an overall increase in the ambient noise environment. Intermittent noise events associated with the proposed project, such as the use of PA systems, would occur infrequently and only for brief periods of time, and therefore would have a nominal effect on the noise environment. The proposed project is located approximately 2 miles from the Stockton Municipal Airport and is more than 1.5 miles outside of the 65-dB CNEL airport noise contour. Thus, aircraft noise may be audible depending on varying environmental effects, but it is not anticipated to substantially contribute to the ambient noise environment on the project site. Based on the measurements of ambient noise levels obtained at the project site and assuming an average exterior-to-interior noise reduction of 25 dB, predicted ambient interior noise levels are anticipated to be less than 45 dB L_{eq}.

Predicted ambient interior noise levels would not exceed the state's recommended daytime or nighttime noise compatibility standards for prisons of 70 dB L_{eq} and 45 dB L_{eq}, respectively. As a result, this impact would be less than significant.

Mitigation Measure(s) for Impact NOI-6

No significant impacts would occur, so no mitigation measures are required.