3.11 NOISE

3.11.1 AFFECTED ENVIRONMENT

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 3.11-1.

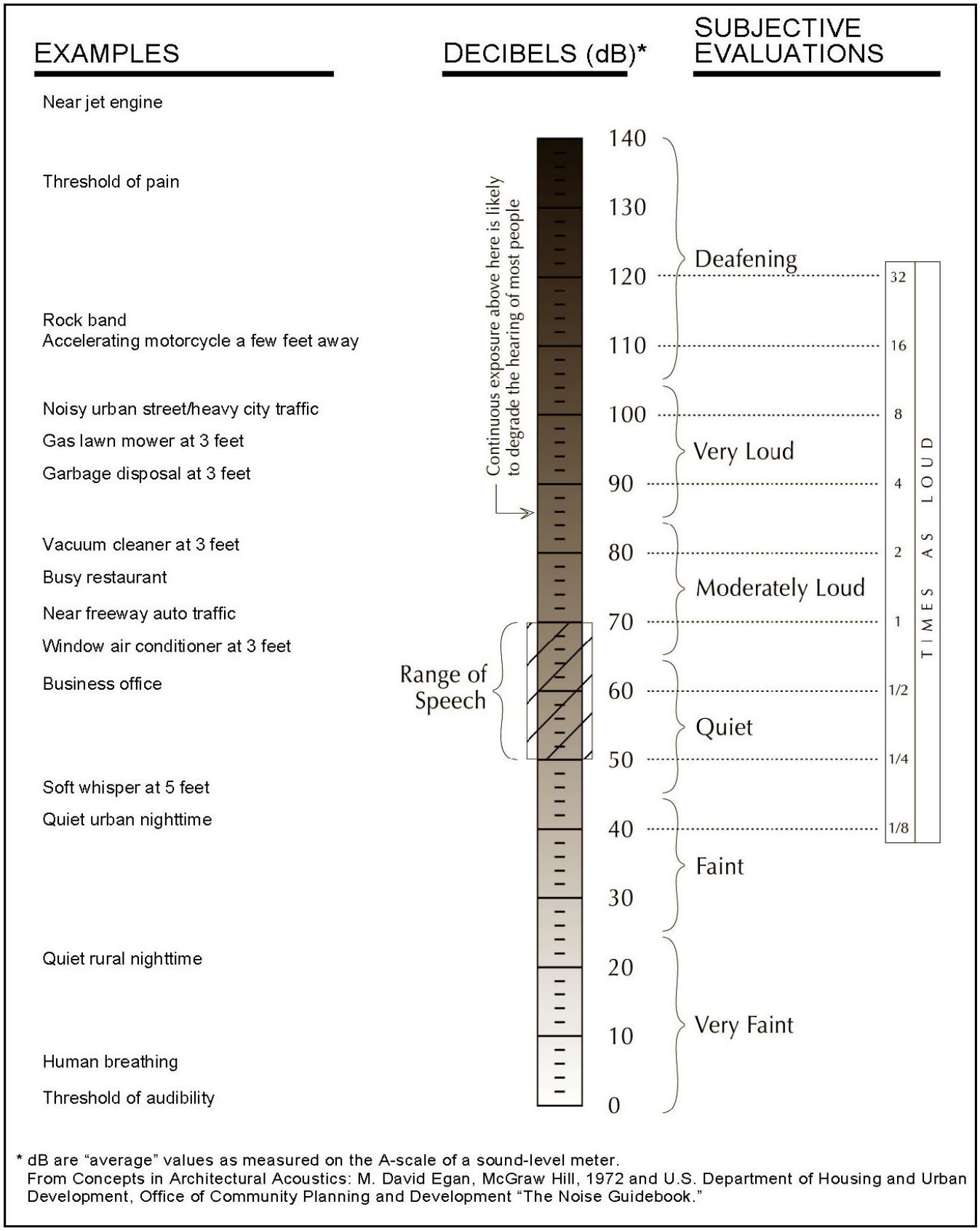
A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring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

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 useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like 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 through 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.

Noise can be generated by a number of sources, including mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (non-transportation 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 (e.g., walls, building façades, or berms). Noise generated from mobile sources generally attenuates at a rate of 3 dBA (typical for hard surfaces, such as asphalt) to 4.5 dBA (typical for soft surfaces, such as grasslands) per doubling of distance, depending on the intervening ground type. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 dBA (hard surfaces) to 7.5 dBA (soft surfaces) per doubling of distance.

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 façades) between the source and the receptor can provide substantial attenuation of noise levels at the receiver. The amount of noise level reduction or "shielding" provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the



* dB are "average" values as measured on the A-scale of a sound-level meter.
From Concepts in Architectural Acoustics: M. David Egan, McGraw Hill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook."

Source: Data adapted by AECOM in 2010

Typical Noise Levels **Exhibit 3.11-1**

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 maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- *L_{min} (Minimum Noise Level):* The minimum instantaneous noise level during a specific period of time.
- *L_x (Statistical Descriptor):* The noise level exceeded X% of a specific period of time. For example, L_{50} is the median noise level, or level exceeded 50% of the time.
- *L_{eq} (Equivalent Noise Level):* The average noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}. In noise environments determined by major noise events, such as aircraft overflights, the L_{eq} value is heavily influenced by the magnitude and number of single events that produce the high noise levels.
- *L_{dn} (Day-Night Average Noise Level):* The 24-hour L_{eq} with a 10-dBA "penalty" for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. 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):* The CNEL is similar to the L_{dn} described above, but with an additional 5-dBA "penalty" added to noise events that occur during the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. When the same 24-hour noise data are used, the reported CNEL is typically approximately 0.5 dBA higher than the L_{dn}.
- *SEL (Sound Exposure Level):* The cumulative exposure to sound energy over a stated period of time.

Community noise is commonly described in terms of the ambient noise level which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level L_{eq} which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and shows very good correlation with community response to noise.

CHARACTERISTICS OF SOUND PROPAGATION AND ATTENUATION

As sound (or noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law describes the attenuation caused by the pattern of sound traveling from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance. However, from a line source (e.g., a road), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA per doubling of distance. The surface

characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels.

Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (California Department of Transportation [Caltrans] 2009:2-39 through 2-40).

HUMAN RESPONSE TO NOISE

Excessive and chronic exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The non-auditory 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 non-auditory 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 non-auditory 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 non-acoustic factors. The number and effect of these non-acoustic 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 accustomed to, the less tolerable the new noise source will be to the new noise source.

With respect to how humans perceive and react to changes in noise levels, a 1-dBA increase is imperceptible, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly noticeable, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 1988:21). These subjective reactions to changes in noise levels were developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 dBA to 70 dBA, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dBA or more is typically considered substantial in terms of the degradation of the existing noise environment.

FUNDAMENTAL NOISE CONTROL OPTIONS

Any noise problem may be considered as being composed of three basic elements: noise source, transmission path, and receiver. The appropriate acoustical treatment for a given project considers the nature of the noise source and the sensitivity of the receiver. The problem may be defined in terms of appropriate criteria (L_{dn}, L_{eq}, or L_{max}), location of the sensitive receiver (inside or outside), and time that the noise occurs (daytime or nighttime). Noise control techniques may then be selected to provide an acceptable noise environment for the sensitive receiver while remaining consistent with local aesthetic standards and practical structural and economic limits. Description of potential noise control options are provided below.

Setbacks

Noise exposure may be reduced by increasing the distance between the noise source and the receiving use. Examples of setback areas applicable to development projects can take the form of open space, wetlands, recreational areas (e.g., parks), and storage yards. The available noise attenuation from this technique is limited by the characteristics of the noise source but is generally between 4–6 dBA.

Barriers

Shielding by barriers can be obtained by placing walls, berms, or other structures (e.g., buildings) between the noise source and the receiver. The effectiveness of a barrier depends on the ability to block the line of sight between the source and receiver; effectiveness is improved when sound must travel a longer distance to pass over the barrier than if it were traveling in a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference" and is the basis for calculating barrier noise reduction.

Barrier effectiveness also depends upon the relative heights of the source, barrier, and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path length difference for a given increase in barrier height than does a location closer to either source or receiver.

For maximum effectiveness, barriers must be continuous and airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 pounds per square foot, although a lesser mass may be acceptable if the barrier material will still ensure that a substantial amount of transmission loss does not occur. Satisfaction of the above criteria requires substantial and well-fitted barrier materials placed to intercept the line of sight to all substantial noise sources. Earth, in the form of berms or the face of a depressed area, is also an effective barrier material.

There are practical limits to the noise reduction provided by barriers. For vehicle traffic or railroad noise, a noise reduction of between 5–10 dBA may often be reasonably attained. Barriers usually are provided in the form of walls, berms, or berm/wall combinations. The use of an earth berm in lieu of a solid wall may provide up to 3 dBA additional attenuation over that attained by a solid wall alone because of the absorption provided by the earth. Berm/wall combinations offer slightly better acoustical performance than solid walls alone and they are often preferred for aesthetic reasons.

Site Design

Buildings can be placed on a project site to shield other structures or activity areas from intruding noise and prevent an increase in noise levels attributable to surface reflections when accounting for on-site building placement geometry. The use of one building to shield another can substantially reduce a project's overall noise control costs, particularly if the shielding structure is insensitive to noise.

Site design should account for building placement to avoid creating reflecting surfaces that may increase on-site noise levels. For example, two buildings placed at an angle facing a noise source may cause noise levels within that angle to increase by up to 3 dBA. The open end of U-shaped buildings should point away from noise sources for the same reason. Landscaping walls or noise barriers located within a development may inadvertently reflect noise back to a noise-sensitive area unless located carefully and appropriate landscaping materials are utilized. Avoidance of these problems while attaining an aesthetic site design requires close coordination between local agencies, project engineer, architect, and noise consultant.

Noise Reduction by Building Façades

When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through detailed acoustical design of building façades. Standard construction practices provide an interior to exterior noise reduction of 10 to 15 dBA for building façades with doors and windows open and a noise reduction of approximately 25 dBA when doors and windows are closed. Thus, an exterior-to-interior noise reduction of 25 dBA can be obtained by requiring building designs to include adequate ventilation systems that allow windows on a noise-affected facade to remain closed under any weather condition.

Where greater noise reduction is required, acoustical treatment of the building façade becomes necessary. Reducing window surface area of building façades is the most effective control technique followed by providing acoustical glazing (thicker glass or increased air space between panes) in frames with low air infiltration rates, using fixed (non-movable) acoustical glazing, or eliminating windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members through the use of double or staggered stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways can be provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments can also reduce noise by increasing the mass of plywood sheathing under roofing materials.

Use of Vegetation

Trees and other vegetation are often considered by the public to provide substantial noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve 5 dBA attenuation of traffic noise. Thus, the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.

Vegetation can be used to acoustically "soften" intervening ground between a noise source and a receiver, by increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting trees and shrubs also offers aesthetic and psychological value that could reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected. It should be noted, however, that trees planted on the top of a noise-control berm can actually slightly degrade the acoustical performance of the barrier. This effect can occur when high-frequency sounds are diffracted (bent) by foliage and directed downward over a barrier. Typically, evergreen trees acoustically perform better than broad leaf foliage, which could act as a reflective surface.

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, or landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, or construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or 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 (Federal Transit Administration [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 that is relevant to this analysis 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 through 8-8).

EXISTING NOISE ENVIRONMENT

Project Location

The SPA consists of approximately 1,253 acres in southern Rancho Cordova. Surrounding land uses generally include open space and agricultural uses to the south and east; Kiefer Landfill located across Grant Line Road to the southeast at 12701 Kiefer Boulevard; and the Sacramento Rendering Company located across Sunrise Boulevard to the southwest at 11350 Kiefer Boulevard. Residential land uses are currently being developed and have been developed to the west and north of the project site. Specifically, the Anatolia development is under construction and is situated to the north adjacent to the SPA, north of Kiefer Road and west of Rancho Cordova Parkway. The Ranch at Sunridge development is located adjacent to and north of the proposed North Campus Drive. In addition, the SPA is located approximately 3.5 miles southeast of the sphere of influence and departure flight paths of Mather Airport.

Ambient-Noise Survey

To document the existing noise environment, ambient-noise surveys were conducted at various locations within the SPA and in the surrounding area. The daytime A-weighted sound levels (i.e., weighted to represent the frequency range of human hearing) measured during the surveys are summarized in Table 3.11-1. Based on the measurements conducted, average daytime noise levels (in dBA L_{eq}) within the SPA and the surrounding area generally range from 42.2-dBA L_{eq} to 71.7-dBA L_{eq}, depending primarily on distance from nearby roadways. Exhibit 3.11-2 shows the locations of the short-term ambient noise measurement sites.

EXISTING NOISE SOURCES

The existing noise environment in and surrounding the project site is influenced primarily by surface-transportation noise emanating from vehicular traffic on area roadways. Vehicle traffic noise levels are attributed to Sunrise Boulevard, Grant Line Road, and Jackson Road (State Route [SR] 16). Aircraft overflights originating from Mather Airport also contribute to the ambient noise level on the SPA; however, based upon field observations, the contribution is relatively low. The ambient noise levels on the SPA are not influenced by noise generated by nearby commercial and industrial land uses, including the Sacramento Rendering Company located approximately 2,000 feet west of the SPA, and Kiefer Landfill located approximately 7,000 feet southeast of the SPA. Noise levels associated with these transportation and nontransportation noise sources, as perceived within the vicinity of the SPA, are discussed separately below.

Mather Airport

Mather Airport (formerly Mather Air Force Base [AFB], or Mather Field) has been open as a public-use air cargo and general-aviation airport since May 5, 1995. Managed by the County of Sacramento (County) Department of Airports, the airport, which operates 24 hours per day, seven days a week, consists of two primary runways, one

Table 3.11-1
Daytime Ambient-Noise Levels

Location	Noise Sources	Date/Time	A-Weighted Sound Level (dBA)	
			L_{eq}	L_{max}
Site 1 – North of the Grant Line Road and Jackson Road intersection	Vehicle traffic on Grant Line Road and Jackson Road; 90 feet from the Grant Line Road centerline	5/1/07 10:15–10:30	62.0	77.0
Site 2 – North of Kiefer Road, south of Kiefer Landfill	Overall landfill operations: dump trucks, grinder/screener, dozers, compactors, excavators, energy plant, front loaders	5/1/07 11:15–11:30	54.7	60.4
Site 3 – North of Blodgett Reservoir	Distant traffic on Grant Line Road; aircraft overflight; birds (water fowl) and crickets	5/1/07 12:45–13:00	52.1	65.9
Site 4 – East of the Anatolia development, north of Kiefer Boulevard	Distant traffic on Sunrise Boulevard; distant constructions noise; aircraft overflight; birds (water fowl) and crickets	5/1/07 13:15–13:30	42.2	59.0
Site 5 – West of Grant Line Road	Vehicle traffic on Grant Line Road; 50 feet from the roadway centerline	5/1/07 14:05–14:20	65.8	77.8
Site 6 – South of Kiefer Boulevard, east of Sunrise Boulevard	Distant traffic on Sunrise Boulevard; aircraft overflight; birds (water fowl) and crickets	5/1/07 15:00–15:15	44.5	58.6
Site 7 – Sunrise Boulevard, south of Kiefer Boulevard	Vehicle traffic on Sunrise Boulevard, 50 feet from roadway centerline	5/1/07 15:30–15:45	71.7	82.0
Site 8 – East of Jaeger Road, north of Kiefer Boulevard	Construction noise; birds (water fowl) and crickets	5/1/07 16:30–16:45	43.0	56.5

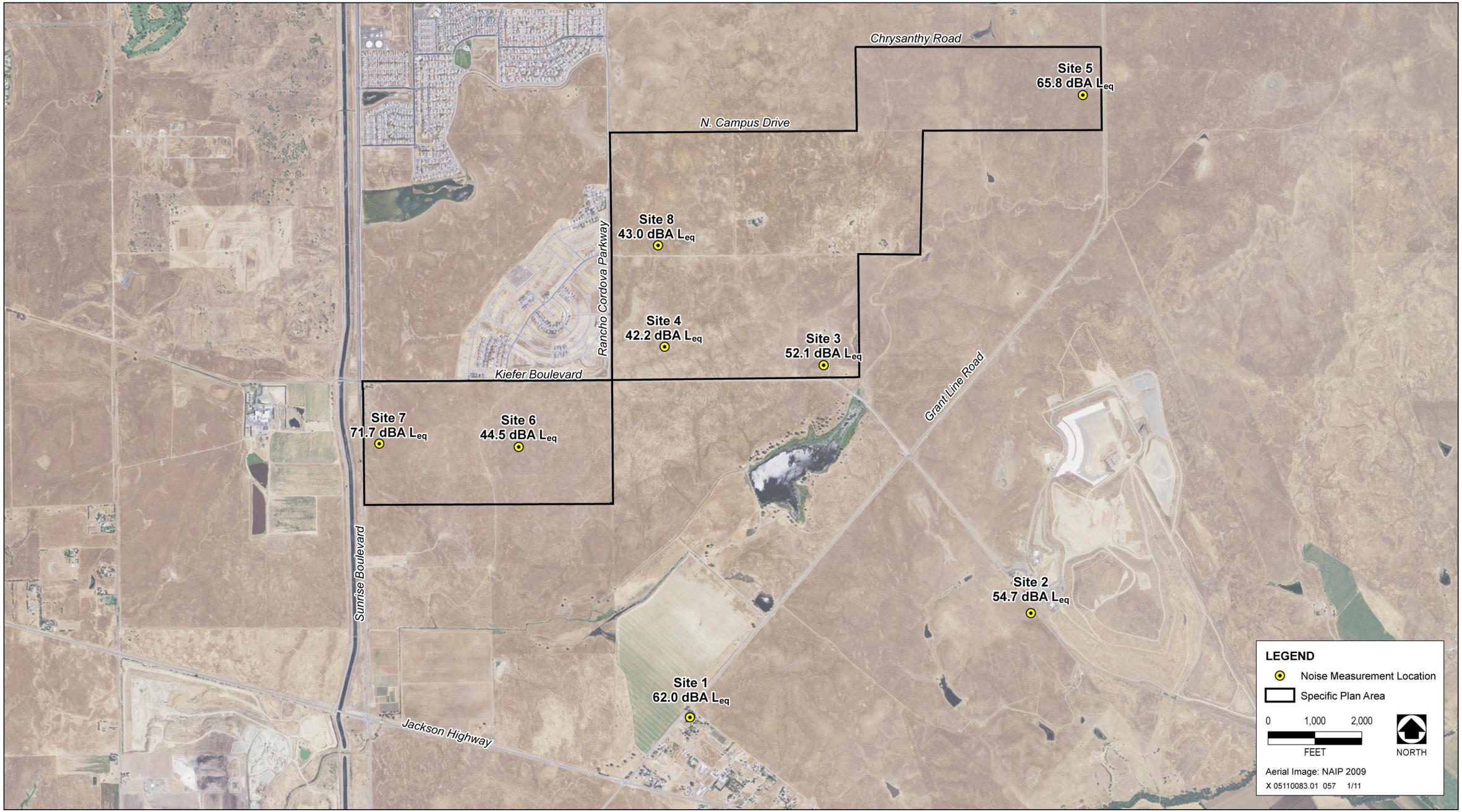
Notes: Measurements were conducted using a Larson Davis 820 sound-level meter placed 5.5 feet above ground surface, calibrated before and after each measurement.
dBA = A-weighted decibels; L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level
Source: AECOM (formerly EDAW) field observations and noise measurements 2007

11,300 feet long and the other 6,100 feet long, generally aligned in a northeast-to-southwest direction. Mather Airport is a joint-use facility that supports both military and commercial operations, and it is rapidly developing as an air cargo depot. The airport includes approximately 40 acres of exclusive air cargo apron space.

Following the closure of Mather AFB in 1988, the County adopted a reuse plan for Mather Airport in fall 1991. The Airport Land Use Compatibility Plan (ALUCP) for Mather Airport was subsequently adopted in May 1997. As depicted in Exhibit 3.11-3, the project site is not located within the currently adopted 60- and 65-dBA CNEL noise contours of the ALUCP for Mather Airport. These noise contours, however, have been proposed for revision as part of the development of the *Mather Airport Master Plan*, which is currently being prepared by the Sacramento County Airport System. The revised noise contours have been proposed to account for existing and projected changes in aircraft operations that have occurred since development of the ALUCP for Mather Airport. The project would be located approximately 1.75 miles from the nearest point of the 60 dBA CNEL airport noise contour. As stated previously, the project site is located approximately 3.5 miles southeast of the sphere of influence and departure flight paths of Mather Airport.

Roadway Vehicle Traffic

Predicted roadway traffic noise levels were calculated using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis



Source: Prepared by AECOM 2011

Short-Term Ambient Noise Measurement Sites **Exhibit 3.11-2**

prepared by Fehr & Peers for this project. Additional input data included day/night percentages of automobiles, medium-duty trucks, and heavy-duty trucks; vehicle speeds; ground attenuation factors; and roadway widths. Existing traffic noise levels for area roadway segments most affected by project implementation are summarized in Table 3.11-2. Actual noise levels will vary from day to day, dependent on various factors including local traffic volumes, shielding from existing structures, variations in attenuation rates attributable to changes in surface parameters, and meteorological conditions. Appendix R provides a complete listing of the FHWA model inputs and results.

Industrial Land Uses

Industrial land uses in proximity of the SPA include Sacramento Rendering Company, Kiefer Landfill, Lopez Ag Service, and Sac Agg Plant located to the west, east, and south, respectively. These industrial uses include a variety of operations: articulated haul trucks, front loaders, excavators, bulldozers, grinder/screeners, belly dump trucks and an energy plant containing compressors and flare for waste gas burn off. Hours of operation for these land uses vary, but are generally limited to daytime hours. Noise levels associated with industrial land uses can vary greatly depending on the activities conducted. Activities involving the use of heavy-duty equipment such as front-end loaders, forklifts, and diesel-powered trucks are common noise sources typically associated with these land uses. Noise typically associated with industrial operations, including the use of heavy-duty equipment, can reach maximum levels of approximately 85 dBA at 50 feet (U.S. Environmental Protection Agency [EPA] 1971).

Sacramento Rendering Company

The Sacramento Rendering Company is located at 11350 Kiefer Boulevard, west of Sunrise Boulevard and adjacent to the southern portion of the SPA. The rendering facility is situated approximately 2,000 feet to the west of the SPA. Primary noise-generating activities at this facility include on-site truck traffic, augers, shredders, shaker screens, and compressors. Based upon AECOM's field observations, noise attributed to the Sacramento Rendering Company is not audible on the SPA.

Kiefer Landfill

The Kiefer Landfill is located at 12701 Kiefer Boulevard, approximately 7,000 feet southeast of the SPA. Primary noise-generating activities at the landfill include: grinder/screener, D-9 Dozers, CAT 836 compactors, dump trucks, excavators, motor graders, front loaders, compressors, gas plant, and flare. A short-term noise measurement was conducted at the south property line of the facility at approximately 890 feet from the overall landfill operations. Table 3.11-1 shows the results of the short-term noise measurement, labeled Site 2. Based upon AECOM field observations, noise from Kiefer Landfill is not audible on the SPA and does not affect the ambient noise levels.

Lopez Ag Service and Sac Agg Plant

The Lopez Ag Service and Sac Agg Plant are located at 11501 Florin Road and 11499 Florin Road, respectively. Both aggregate facilities are approximately 1.3 miles south of the SPA. Primary noise-generating activities associated with these facilities include: bottom dump trucks, front loaders, water trucks, conveyor belt systems, and hoppers. Based upon AECOM field observations, noise from these two facilities are not audible on the project site and do not affect the ambient noise levels.

3.11.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The EPA 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

Table 3.11-2
Summary of Modeled Existing Traffic Noise Levels

Roadway Segment	Between		CNEL/L_{dn} (dBA) 50 Feet from Centerline of Near Travel Lane	Distance (ft) from Roadway Centerline to CNEL/L_{dn} (dBA)			
				70 CNEL	65 CNEL	60 CNEL	55 CNEL
SR 16	Excelsior Road	Eagles Nest Road	70.8	60	190	600	1,897
SR 16	Sunrise Boulevard	Grant Line Road	72.1	81	256	810	2,562
Kiefer Boulevard	Grant Line Road	north of SR 161	61.7	7	23	74	235
Mather Boulevard	Femoyer Street	Douglas Road	66.9	25	78	247	782
Douglas Road	Mather Boulevard	Sunrise Boulevard	66.2	21	65	206	652
Douglas Road	Sunrise Boulevard	Grant Line Road	62.8	9	30	95	300
International Drive	South White Rock Road	Zinfandel Drive	68.8	38	120	380	1,200
International Drive	Zinfandel Drive	Kilgore Road	66.3	22	68	215	680
White Rock Road	Zinfandel Drive	Sunrise Boulevard	71.2	66	208	658	2,081
White Rock Road	Sunrise Boulevard	Grant Line Road	64.4	14	44	139	440
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	71.1	64	203	642	2,031
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	69.3	42	133	421	1,331
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	73.4	109	344	1,088	3,441
Mather Field Road	U.S. 50 eastbound ramps	International Drive	74.4	139	439	1,389	4,393
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	71.6	72	227	718	2,271
Zinfandel Drive	U.S. 50 eastbound ramps	White Rock Road	74.2	133	419	1,326	4,192
Zinfandel Drive	White Rock Road	International Drive	71.0	62	197	623	1,971
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	76.7	235	744	2,354	7,443
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	76.5	224	707	2,237	7,073
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.2	165	521	1,648	5,212
Sunrise Boulevard	Folsom Boulevard	White Rock Road	73.9	122	387	1,224	3,872
Sunrise Boulevard	White Rock Road	Douglas Road	73.1	101	321	1,014	3,206
Sunrise Boulevard	Douglas Road	SR 16	72.2	82	261	824	2,607
Sunrise Boulevard	SR 16	Grant Line Road	69.5	44	139	441	1,395
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	75.3	168	530	1,677	5,302
Grant Line Road	White Rock Road	Douglas Road	66.9	25	78	247	782
Grant Line Road	Douglas Road	SR 16	67.4	28	87	276	873
Grant Line Road	SR 16	Sunrise Boulevard	66.6	23	73	231	730

Notes: CNEL = community equivalent noise level; L_{dn} = day-night average noise level; dBA = A-weighted decibels; ft = feet; SR = State Route; U.S. 50 = U.S. Highway 50.

Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).

Source: Data provided by AECOM in 2010

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 lower 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 EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, state, and local government agencies.

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of EPA. For fragile structures, CHABA recommends a maximum limit of 0.25 in/sec PPV (Caltrans 2004:17).

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} (see Section 3.11.1, "Acoustic Fundamentals" for a description of dBA and L_{dn} is described in Section 4.11.2.1, "Noise Descriptors"), with windows closed, in any habitable room for general residential uses.

Though not adopted by law, the *State of California General Plan Guidelines 2003*, published by the California Governor's Office of Planning and Research (OPR), provides guidance for the compatibility of projects within areas of specific noise exposure. Table 3.11-3 presents acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

California Department of Transportation

For the protection of fragile, historic, and residential structures, Caltrans recommends a more conservative threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant (as defined under CEQA) structures (Caltrans 2004:17). These standards are more stringent than the recommended guidelines established by FTA, presented above.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Mather Airport Land Use Compatibility Plan

The State of California has adopted airport noise and safety standards that are implemented through Comprehensive Land Use Plans (CLUPs) prepared for public-use airports. The CLUPs are prepared and maintained by the Airport Land Use Commissions (ALUCs). In Sacramento County, the Sacramento Area Council of Governments (SACOG) serves as the ALUC. The noise and safety standards identified in the CLUPs for local airports are implemented through the control of land use around airports with regard to the noise, safety, and height restrictions. SACOG also works with cities and counties to ensure consistency between local land use plans and CLUPs developed for local airports.

Table 3.11-3
State of California Noise Compatibility Guidelines by Land Use Category

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential—Low-Density Single-Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential—Multiple-Family	<65	60–70	70–75	75+
Transient Lodging, Motel, Hotel	<65	60–70	70–80	80+
School, Library, Church, Hospital, Nursing Home	<70	60–70	70–80	80+
Auditorium, Concert Hall, Amphitheater		<70	65+	
Sports Arenas, Outdoor Spectator Sports		<75	70+	
Playground, Neighborhood Park	<70		67.5–75	72.5+
Golf Courses, Stable, Water Recreation, Cemetery	<75		70–80	80+
Office Building, Business Commercial, and Professional	<70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70–80	75+	

Notes: L_{dn} = day-night average noise level; CNEL = community equivalent noise level; dBA = A-weighted decibels.

[1] Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

[2] New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

[3] New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

[4] New construction or development should generally not be undertaken.

Source: OPR 2003:244-254

The ALUCP for Mather Airport, formerly called the Mather Airport CLUP, was adopted in May 1997 and includes regional policies for land use compatibility with respect to aircraft noise. The ALUCP for Mather Airport requires that as development occurs in the area near the airport, affected cities and counties should evaluate the impact of aircraft noise on proposed development. The ALUCP prohibits new residential development within the 65-dBA CNEL noise contours.

In addition, the County is currently in the process of developing the *Mather Airport Master Plan*. The Master Plan will be used to guide airport development in the Mather Airport Policy Area (MAPA) over the next 20 years, while attempting to resolve related aviation, environmental, and socioeconomic issues existing in the community. One of the primary issues to be addressed in the plan relates to the exposure of citizens in nearby communities to noise generated by aircraft on approach and departure routes from Mather Airport.

The MAPA was approved by the Sacramento County Board of Supervisors in 1998 and is intended to create additional protection beyond the restrictions described in the ALUCP for Mather Airport. In addition to prohibiting new residential development within the 65-dBA CNEL contour, per the ALUCP for Mather Airport, the MAPA prohibits new residential development within the 60-dBA CNEL contour. New residential development within the MAPA, but outside the 60-dBA CNEL contour, may be approved but will be subject to the following conditions:

- provision of minimum noise insulation to achieve 45 dB within new residential dwellings, including detached single-family dwellings, with windows closed in any habitable room;
- notification in the public report prepared by the California Department of Real Estate disclosing to prospective buyers that the parcel is located within the MAPA; and

- an aviation easement prepared by the County Counsel's Office, granted to the County, recorded with the County Recorder, and filed with the County Department of Airports. Such an aviation easement shall acknowledge the property location within the MAPA and shall grant the right of flight and unobstructed passage of all aircraft into and out of Mather Airport.

City of Rancho Cordova General Plan

The *City of Rancho Cordova General Plan* (City General Plan 2006) Noise Element identifies noise criteria for various stationary and transportation noise sources. The Noise Element of the City General Plan supersedes the Noise Element of the *County of Sacramento General Plan* (County General Plan). Goals and policies of the City General Plan relating to noise that the City has found to be applicable to the Proposed Project and alternatives under consideration are listed in Appendix K.

Performance standards for stationary noise sources and maximum allowable noise exposure from transportation noise sources, as specified in the Noise Element of the City General Plan, are included below as Tables 3.11-4, 3.11-5, and 3.11-6, because they are part of the thresholds for determining the significance of impacts for this analysis.

Table 3.11-4
Performance Standards for Typical Stationary Noise Sources—
Rancho Cordova General Plan Noise Element

Noise Level Descriptor	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Hourly L_{eq}, dB	55	45

Note: dB = decibels; L_{eq} = energy-equivalent noise level
Source: City of Rancho Cordova 2006

Table 3.11-5
Performance Standards for Stationary Noise Sources that Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music—Rancho Cordova General Plan Noise Element

Noise Level Descriptor	Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Hourly L_{eq}, dB	50	40

Note: dB = decibels; L_{eq} = energy-equivalent noise level
Source: City of Rancho Cordova 2006

3.11.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. A noise impact is considered significant if implementation of the proposed project or alternatives under consideration would do any of the following:

- result in short-term noise levels during construction that would exceed applicable City noise standards (Tables 3.11-4 and 3.11-7) or result in increased levels of annoyance or sleep disruption during noise-sensitive periods of the day (for purposes of this analysis, between 7 p.m. and 7 a.m.);

Table 3.11-6
Maximum Allowable Noise Exposure, Transportation Noise Sources—
Rancho Cordova General Plan Noise Element

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL, dB	L_{eq}, dB[2]
Residential	60[3]	45	–
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources that produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources such as roadways)	60[3]	40[5]	–
Transient Lodging	60[4]	45	–
Hospitals, Nursing Homes	60[3]	45	–
Theaters, Auditoriums, Music Halls	–	–	35
Churches, Meeting Halls	60[3]	–	40
Office Buildings	–	–	45
Schools, Libraries, Museums	–	–	45
Playgrounds, Neighborhood Parks	70	–	–

Note: L_{dn}= day-night average noise level; CNEL = community equivalent noise level; dB = decibels; L_{eq} = energy-equivalent noise level

[1] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

[2] As determined for a typical worst-case hour during periods of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

[4] In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.

[5] The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.

Source: City of Rancho Cordova 2006

- result in long-term stationary-source noise levels that would exceed applicable City noise standards (Tables 3.11-4, 3.11-5, and 3.11-7);
- result in a noticeable increase in traffic noise levels (i.e., 3 dBA CNEL or greater) or contribute to existing or predicted traffic noise levels that exceed applicable noise standards (Table 3.11-6) at noise-sensitive receptors (persons and land uses);
- result in predicted noise levels at on-site receptors exceeding applicable noise criteria for land use compatibility (Table 3.11-6); or
- expose on-site receptors to single-event aircraft noise that would result in potential speech interference or sleep disruption. For purposes of this analysis, speech interference and sleep disruption would be anticipated to occur at noise levels of 60- dBA and 80-dBA SEL, respectively (Caltrans 2002, Federal Interagency Committee on Noise [FICON] 1992);

Table 3.11-7
City of Rancho Cordova Noise Control Ordinance Standards

Land Use	Period of Measurement	Maximum Acceptable Noise Standards	
		Exterior Noise Standards[1]	Interior Noise Standards
Residential, School, Church, Hospital, Agricultural Land Uses	7 a.m.–10 p.m.	55 dBA[2]	-
	10 p.m.–7 a.m.	50 dBA[2]	-
Apartment, Condominium, Townhouse, Duplex, or Multidwelling Unit	10 p.m.–7 a.m.[3] 5 minutes/hour: 15 minutes/hour: Any period of time:	-	 45 dBA 50 dBA 55 dBA

Note: dBA = A-weighted decibels

[1] The following noise standards, unless otherwise specifically indicated in the City of Rancho Cordova Municipal Code, shall apply to all properties within a designated noise area.

[2] Cumulative duration of intrusive sound: It is unlawful for any person within the city to create any noise that causes the noise level on the affected property, when measured in the designated noise area, to exceed for the duration of time set forth following, the specified exterior noise standards in any one hour by (noise limits shall be reduced by 5 dBA for impulsive or simple tone noise, or noise consisting of speech or music):

A. 30 minutes: +0 dBA

B. 15 minutes: +5 dBA

C. 5 minutes: +10 dBA

D. 1 minute: +15 dBA

E. Level not to be exceeded for any time: +20 dBA

In addition to the above standards, interfering noise at schools, churches, or hospitals, while the same is in use, that is 10 dBA or greater than the ambient noise level at the building, shall be deemed excessive and unlawful. Residential-use HVAC [heating, ventilation, and air conditioning] system equipment, such as pumps, fans, air conditioners, and cooling towers, shall not exceed 60 dBA at any point at least 1 foot inside the property line of the affected residential or agricultural property line, or 55 dBA when measured in the center of a neighboring patio or at the exterior window of the affected residential unit.

[3] Based on cumulative periods of time during any one hour. Interior noise levels, when measured in the neighboring unit, shall not exceed the specified standards for the corresponding cumulative period of time during any hour.

Source: City of Rancho Cordova Municipal Code, Noise Control Ordinance

- expose persons to or generate excessive groundborne vibration or groundborne noise levels (i.e., 0.2 in/sec PPV for the prevention of structural damage and 78 VdB for the prevention of human disturbance at sensitive land uses).

- expose persons to or generate excessive groundborne vibration or groundborne noise levels (i.e., 0.2 in/sec PPV for the prevention of structural damage and 78 VdB for the prevention of human disturbance at sensitive land uses).

The land use compatibility noise criteria in the City General Plan are listed in Table 3.11-6. Additional noise standards, including the State of California interior noise standards for multifamily residential dwellings (Title 24 of the California Code of Regulations) and the City noise standards for nontransportation noise sources (Tables 3.11-4, 3.11-5, and 3.11-7), were also taken into consideration.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Land Use Compatibility Related to Exposure of On-Site Receptors to 24-hour Aircraft Noise—As noted previously, Mather Airport is located approximately 3.5 miles from the SPA. Per the contour maps prepared in 2004 for the Mather Airport Master Plan, which update the contour maps included as part of the currently adopted

Mather Airport Comprehensive Land Use Plan, the SPA is located approximately 1.75 miles from the nearest point of the airport's 60-dBA CNEL contour. Title 24 and the Rancho Cordova General Plan establish 45-dBA L_{dn}/CNEL as an interior noise threshold for acceptable residential development. Assuming an average interior-exterior noise attenuation of 25 dBA with windows closed (Veneklasen 1973), interior noise levels associated with aircraft operations would be well below the 45-dBA standard, and residents within the SPA would not be exposed to excessive aircraft noise. Therefore, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

Single-Event Aircraft Noise—Regarding single event aircraft noise, the SPA is not located within the direct continuous descent approach flight path used by Mather Airport aircraft (ESA Airports 2006:Figure 2). Single-event noise measurements for aircraft were taken most recently in February 2006; the nearest measurement to the SPA was taken at 2305 Farnoon Court in Folsom (ESA Airports 2006:3). Single-event noise levels at 2305 Farnoon Court were approximately 74-dBA SEL. This location is directly in the Mather Airport runway 22L flight path and is approximately 7.75 miles northeast of the SPA. Because of the distance between the SPA and Mather Airport, the project would not be located within identified existing and future noise contours of Mather Airport or the SNEL noise abatement area for Mather Airport runway 22L (Sacramento County Airport System [SCAS] 2011:4), and because the flight path from runway 22L is located 3.5 miles north of the project site, noise levels of 60-dBA or 80-dBA SEL from single-event aircraft noise would not be experienced at sensitive receptors on the SPA. Therefore, there would be no impact, and this issue is not evaluated further in this EIR/EIS.

ANALYSIS METHODOLOGY

To assess potential temporary and short-term (construction-related, including demolition) noise impacts, sensitive receptors and their relative exposure were identified. Project-generated construction-source noise levels at these sensitive receptors were determined using the Federal Transit Noise and Vibration Impact Assessment methodology for construction noise prediction (FTA 2006) along with reference emission noise levels and usage factors based on information contained in the *FHWA Roadway Construction Noise Model User's Guide* (FHWA 2006).

Regarding project-generated increases in traffic noise, AECOM conducted modeling for affected roadway segments using the FHWA Highway Traffic Noise Prediction Model (RD-77-108) (FHWA 1978) and traffic data (e.g., average daily traffic [ADT] volumes, vehicle speeds, percent distribution of vehicle types) from Fehr & Peers and Caltrans. This 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 and does not assume any natural or human-made shielding (e.g., vegetation, berms, walls, or buildings). Increases in traffic noise levels attributable to the project were calculated by comparing the predicted noise levels at 50 feet from the centerline with and without project-generated traffic under baseline and cumulative conditions.

To determine the project's land use compatibility with future traffic noise levels attributable to project area roadways (e.g., Sunrise Boulevard, Rancho Cordova Parkway, North Campus Drive, Grant Line Road, Kiefer Boulevard), AECOM used the FHWA Traffic Noise Model (TNM). TNM computes traffic noise levels by considering topography, ground type, intervening structures, vehicle speed, roadway grade, and traffic volume. Modeling the project using TNM ensures that the project's land uses are compatible with the applicable interior and exterior noise levels modeled on the SPA. The modeled traffic noise levels reveal whether development of the project would exceed the applicable noise criteria. Where traffic noise levels are predicted to exceed applicable noise criteria, TNM is used to determine barrier heights that would reduce traffic noise levels to acceptable levels at outdoor activity areas.

With respect to nontransportation noise sources (e.g., stationary) associated with project implementation, the assessment of long-term (operational-related) impacts was based on reconnaissance data, existing documentation, and standard attenuation rates and modeling techniques.

The methods identified above for transportation and nontransportation source noise were also used to assess the compatibility of the project with future on-site noise levels.

To assess the potential exposure of sensitive receptors to, and generation of excessive groundborne vibration and noise levels, sensitive receptors and their relative exposure were determined based on documented source-specific vibration levels and standard modeling procedures as recommended by Federal and state agency guidance.

To evaluate relative significance, noise and vibration impacts were determined based on comparisons to applicable regulations and guidance provided by Federal, state, and local agencies.

Construction-noise and stationary-source noise impacts were calculated based on the distance from source to receptor, assuming an average noise attenuation rate of 6 dBA per doubling of distance.

Impact Analysis

Impacts that would occur under each alternative development scenario are identified as follows: NP (No Project), NCP (No USACE permit), PP (Proposed Project), BIM (Biological Impact Minimization), CS (Conceptual Strategy), and ID (Increased Development). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3.11-1 **Possible Temporary, Short-Term Exposure of Sensitive Receptors to Construction-Generated Equipment Noise.** *Project implementation would result in temporary, short-term construction activities associated with project development. Project-related construction activities could expose existing off-site and future on-site sensitive receptors to temporary noise levels that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.*

NP

Because no new project-related construction would occur under the No Project Alternative, no sensitive receptors would be exposed to construction noise; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

The project includes a mix of land uses, including residential, commercial, schools, community parks, and open space. Construction of on-site public services, utilities, and other infrastructure improvements, such as roadways and bicycle paths, would be needed to support development of the project. Construction of the proposed land uses and improvements would occur by sub-areas, within each phase of the SPA, in a sequence established by individual land owners and influenced by market demand. See Exhibit 2-19 in Chapter 2, "Alternatives" for the proposed phasing plan.

Construction noise typically occurs intermittently and varies depending upon the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, and erection). Construction noise in any one particular area would be temporary and short-term and would include noise from activities such as site preparation, truck hauling of material, pouring of concrete, and use of power tools. Noise would also be generated by construction equipment, including earthmovers, material handlers, and portable generators, and could reach high levels for brief periods. Although noise ranges are generally similar for all construction phases, the grading phase tends to involve the most equipment. The EPA has found that the noisiest equipment types operating at construction sites typically range from 88-dBA to 91-dBA L_{max} at 50 feet (Table 3.11-8). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average noise levels at construction sites typically range from approximately 65- to 89-dBA L_{eq} at 50 feet, depending on the activities performed (FTA 2006:12-6).

Table 3.11-8
Typical Construction Equipment Noise Levels

Equipment Item	Typical Maximum Noise Level (dB) at 50 Feet
Earthmoving	
Backhoes	80
Bulldozers	85
Front Loaders	80
Graders	85
Paver	85
Roller	85
Scrapers	85
Tractors	84
Slurry Trencher	82
Dump Truck	84
Pickup Truck	55
Materials Handling	
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Man Lift	85
Stationary Equipment	
Compressors	80
Generator	82
Pumps	77
Impact Equipment	
Compactor	80
Jack Hammers	85
Impact Pile Drivers (Peak Level)	95
Pneumatic Tools	85
Rock Drills	85
Other Equipment	
Concrete Saws	90
Vibrating Hopper	85
Welding Machine/Torch	73

Notes: dB = decibels
Noise levels are for equipment fitted with properly maintained and operational noise control devices, per manufacturer specifications.
Sources: Bolt, Beranek and Newman Inc. 1981, FTA 2006:12-6

The City Noise Ordinance exempts construction operations that occur during the hours of 7 a.m.–6 p.m. Monday through Saturday and 9 a.m.–6 p.m. on Sundays. Construction activities that do not occur during these specified hours are not exempt and would be required to comply with the standards in the City Noise Ordinance and performance standards in the Noise Element of the City General Plan. Activities occurring during the more noise-sensitive evening and nighttime hours of 6 p.m.–7 a.m. Monday through Saturday or 6 p.m.–9 a.m. on Sunday are

of increased concern given the potential for increased levels of annoyance and potential sleep disruption to occupants of the nearby residential dwellings east of Rancho Cordova Parkway and north of Kiefer Boulevard in the Anatolia development. In addition, implementation of the phased development of the site would result in potential disruption of on-site noise sensitive receptors constructed in earlier phases. It is important to note that currently the only noise-sensitive land uses are the newly developing residential areas south of Douglas Road in the Sunridge Specific Plan area. However, phased development of the SPA would result in potential on-site noise conflicts.

In addition, construction operations occurring during the daytime hours and in the vicinity of schools or other noise-sensitive daytime land uses such as childcare and convalescent care facilities, hospitals, residences, or places of worship may result in increased interior noise levels. Assuming an average exterior-to-interior noise reduction of 25 dBA (with windows closed), exterior construction-generated noise levels in excess of 70 dBA at the façade of a building would be considered to result in potential increases in interior noise levels in excess of 45-dBA L_{eq}. Based on this same assumption, and assuming a maximum construction noise level of 89 dBA L_{eq} and an average attenuation rate of 6 dBA per doubling of distance from the source, construction activities located within approximately 800 feet of daytime noise-sensitive receptors could result in interior noise levels in excess of 45-dBA L_{eq}. Construction-generated noise would therefore be considered to result in a **direct**, **potentially significant** temporary, short-term noise impact on nearby noise-sensitive land uses. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.11-1: Implement Measures to Prevent Exposure of Sensitive Receptors to Temporary Construction-Generated Equipment Noise.

To reduce impacts associated with noise generated during construction activities, the project applicants for any particular discretionary development application shall conform to the following requirements:

- Noise-generating construction operations shall be limited to the hours between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturday and Sunday.

- All construction equipment and equipment staging areas shall be located as far as feasible from nearby noise-sensitive land uses.

- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

- All motorized construction equipment shall be shut down when not in use to prevent excessive idling noise.

- The following measures shall be required for exterior activities that involve the use of heavy-duty construction equipment (see Table 3.11-8) located within 800 feet of occupied noise-sensitive daytime land uses (e.g., school classrooms, childcare and convalescent care facilities, inpatient medical facilities, and places of worship):

    - Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site).

    - Written notification of construction activities shall be provided to all noise-sensitive receptors located within 800 feet of construction activities. Notification shall include anticipated dates and hours during which construction activities are anticipated to occur and contact information, including a daytime telephone number, for the project representative to be contacted in the event that noise levels are deemed excessive. Recommendations to assist noise-sensitive land uses in

reducing interior noise levels (e.g., closing windows and doors) shall also be included in the notification.

- To the extent feasible, acoustic barriers (e.g., plywood, sound blankets) shall be constructed to reduce construction-generated noise levels at affected noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment. When installed properly, acoustic barriers can reduce construction noise levels by approximately 8–10 dBA (EPA 1971).

Implementation: Project applicants for any particular discretionary development application.

Timing: During all phases of project construction.

Enforcement: City of Rancho Cordova Planning Department.

With implementation of Mitigation Measure 3.11-1, construction would be limited to daytime hours, for which associated noise levels are considered exempt from the provisions of the City Noise Ordinance, and equipment would be properly maintained and sound barriers installed, resulting in levels below the City's noise standards. Therefore, implementation of this mitigation measure would reduce potentially significant impacts from temporary construction noise under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level.

IMPACT 3.11-2 **Possible Temporary, Short-Term Exposure of Sensitive Receptors to Increased Traffic Noise Levels from Project Construction.** *Project implementation would result in temporary increases in on- and off-site roadway traffic noise associated with project construction. Construction-generated traffic could expose sensitive receptors to noise levels along on- and off-site roadways that exceed the applicable noise standards and/or result in a substantial increase in ambient noise levels.*

NP

Under the No Project Alternative, no project-related development would occur. Therefore, there would be no exposure of sensitive receptors to project-generated construction traffic, and **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP, PP, BIM, CS, ID

Construction of all five action alternatives would result in additional vehicle trips on the local roadway network from worker commute and the transport of equipment and materials. The exact number of daily trips required for project construction is not known at this time. However, said activities typically do not include more than 500 daily one-way trips even with projects that involve intensive earth movement activities (e.g., soil import/export), which would not be anticipated for construction of any of the on- or off-site elements. An increase in traffic noise levels of 3-dB CNEL/L_{dn} or greater at noise-sensitive receptors along affected roadway segments would be considered substantial as such is perceivable to the human ear. Typically, when the ADT volume is doubled on a roadway segment in comparison to existing conditions, the resultant increase is approximately 3-dB CNEL/L_{dn}. According to the traffic analysis, ADT volumes on roadway segments in the project vicinity range from 1,800 to 74,700 under existing no-project conditions. Therefore, project construction would not be anticipated to result in a doubling of ADT volumes (e.g., assuming a maximum of 500 additional one-way trip to roadways with a minimum of 1,800 under existing conditions) along affected roadway segments even when considering the increased tire and engine source noise from these types of trips (e.g., primarily heavy-duty trucks). Thus, implementation of the Proposed Project and the other four action alternatives would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the

project from project construction traffic; or, consequently, expose sensitive receptors to or generate noise levels in excess of applicable standards. As a result, this **direct** impact would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.11-3 **Possible Long-Term Exposure of Sensitive Receptors to Stationary-Source Noise Generated by On-site Land Uses During Project Operation.** *Project implementation would result in increases in on-site stationary-source noise levels associated with the proposed residential, commercial, mixed-use, office/ industrial, park, and educational land uses. These stationary noise sources could exceed the applicable noise standards (hourly and maximum) and result in a substantial increase in ambient noise levels.*

NP

Because no project-related stationary-noise sources would be introduced under the No Project Alternative, no sensitive receptors would be exposed to on-site stationary noise sources; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP

Various types of nontransportation noise sources would accompany new development in the SPA. The sources and levels of noise typically associated with each land use are discussed separately below.

Residential

Substantial stationary sources of noise associated with residential land uses are typically limited to the operation of exterior central air conditioning units. Residential-use central air conditioning units typically range from 45 to 70-dB L_{eq} at a distance of 50 feet (EPA 1971). Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would result. This impact would be less than under the Proposed Project because 338 fewer residential units would be constructed. ***[Lesser]***

Commercial

The No USACE Permit Alternative includes a total of only 7.8 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the proposed 60-acre Local Town Center would not be constructed under this alternative. Substantial sources of noise from commercial mixed uses are generated mainly by heating and ventilation equipment and loading and unloading activities. Because residential land uses would be placed in close proximity to commercial mixed-use development, these sensitive receptors could be exposed to higher noise levels.

Noise levels from commercial central air conditioning units can reach 100 dBA at very close distances (EPA 1971). However, these units usually have noise shielding cabinets and therefore are not usually substantial sources of noise impacts. Limited volumes of small delivery vehicle traffic would occur at small loading/unloading areas in the commercial areas and thus could be a periodic and temporary source of noise to nearby or adjacent sensitive receptors for short periods. This type of delivery vehicle would not require the use of ancillary equipment (e.g., forklift) and would generally consist of side-step box trucks with a delivery time of 10 to 15 minutes.

Emergency generators may be used to supply necessary power requirements to vital systems within commercial/offices facilities. 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 City of Rancho Cordova Noise Ordinance; thus, this analysis focuses on routine preventive maintenance and testing operations, which are conducted on a periodic basis.

Reference noise-level measurements of emergency generators with rated power outputs from 50 kilowatts (kW) to 125 kW results in noise levels ranging from 61- to 73-dB L_{eq} and 63- to 84-dB L_{max} at a distance of 45 feet (EPA 1971, FHWA 2006). Based on these reference noise levels, emergency electrical generators located within 700 feet of noise-sensitive land uses could exceed the City noise standard for daytime stationary-source noise. In addition, generators located within 1,200 feet of noise-sensitive land uses could exceed the City noise standard for nighttime stationary-source noise.

As a result, increased noise levels associated with the proposed commercial mixed-use land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would result. This impact would be substantially smaller than under the Proposed Project Alternative because only 6.7 acres of commercial mixed-uses would be constructed (as compared to 91.3 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed. ***[Lesser]***

Public/Quasi-Public

The proposed land uses would also include emergency facilities such as a fire station (along Rancho Cordova Parkway south of Kiefer Boulevard) that would generate high noise levels from alarms and vehicle movements when station crews respond to emergency situations. Noise levels associated with the operation of emergency activities are exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the No USACE Permit Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. This impact would be smaller than the Proposed Project Alternative because only 4 acres of public/quasi public land uses would be constructed, as compared to approximately 13 acres under the Proposed Project Alternative. ***[Lesser]***

Schools and Neighborhood Parks

The No USACE Permit Alternative includes development of school-related uses and neighborhood parks. Noise-generating activities occurring at such facilities would be controlled by the school and the recreation and park districts, and would depend on facility type. Daytime noise associated with schools and neighborhood parks typically includes intermittent noise such as adults' and children's voices, opening and closing of vehicle doors in parking lots, and use of landscape maintenance equipment. School uses may also result in mechanical noise associated with building ventilation systems. Maximum intermittent noise levels commonly associated with parking lots can reach levels of 70 dBA at 500 feet from the occasional sounding of car alarms and amplification of music. Noise levels associated with landscape maintenance activities, including the use of large gasoline-powered mowers and leaf blowers, can range from approximately 66 to 72 dBA at 25 feet. Mechanical noise associated with operation of ventilation equipment required to service school facilities can result in average noise levels of 55 dBA at approximately 175 feet from the source.

Recreational facilities at neighborhood parks, middle schools, and high schools could generate additional noise extending into the evening and nighttime hours during competitive sporting events (e.g., soccer games, football

games, softball games, and track and field events). Noise sources commonly associated with these types of events include elevated voices from crowds, exterior public-address systems, and musical instruments. Previously conducted noise measurements by AECOM for similar activities indicates that noise can exceed 50 dBA L_{eq} within 800 feet of the event associated with recreational events (such as soccer and football games), including noise from spectators and players. If an amplified speaker system is used during sporting events, additional increases in ambient noise levels could occur. Activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings.

As a result, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. This impact would be substantially smaller than under the Proposed Project Alternative because only 29 acres of schools and 33 acres of neighborhood parks would be constructed, as compared to the Proposed Project Alternative which includes 110 acres of schools, the neighborhood parks, and a 39-acre and 15-acre community park. ***[Lesser]***

Community Parks

The No USACE Permit Alternative does not include any community parks. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure 3.11-3: Implement Measures to Reduce Potential Exposure of Sensitive Receptors to Stationary Source–Generated Noise.

To reduce potential long-term exposure of sensitive receptors to noise generated by project-related stationary noise sources, the City shall evaluate individual facilities, subdivisions, and other project elements for compliance with the City Noise Ordinance and policies contained in the City General Plan at the time that tentative subdivision maps and improvements plans are submitted. All project elements shall comply with City noise standards. The project applicants for any particular discretionary development application shall implement the following measures to assure maximum reduction of project interior and exterior noise levels from operational activities.

- The proposed land uses shall be designed so that on-site mechanical equipment (e.g., HVAC units, compressors, generators) and area-source operations (e.g., loading docks, parking lots, and recreational-use areas) are located as far as feasible from or shielded from nearby noise-sensitive land uses.

- Residential air conditioning units shall be located a minimum of 10 feet from adjacent residential dwellings, including outdoor entertainment and relaxation areas, or shall be shielded to reduce operational noise levels at adjacent dwellings or designed to meet City noise standards. Shielding may include the use of fences or partial equipment enclosures. To provide effectiveness, fences or barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings. (Achievable noise reductions from fences or barriers can vary, but typically range from approximately 5 to 10 dBA, depending on construction characteristics, height, and location.)

- To the extent feasible, residential land uses located within 2,500 feet of and within the direct line of sight of major noise-generating commercial uses (e.g., loading docks and equipment/vehicle storage repair facilities,) shall be shielded from the line of sight of these facilities by construction of a noise barrier. To provide effectiveness, noise barriers shall be continuous or solid, with no gaps, and shall block the line of sight to windows of neighboring dwellings. (Achievable noise reductions from barriers can vary, but typically range from approximately 5 to 10 dBA, depending on construction characteristics, height, and location.) The applicant shall retain the services of a professional acoustician to determine the design and location of noise barriers to be constructed prior to City issuance of building permits or improvement plans.

- Dual-pane, noise-rated windows; mechanical air systems; exterior wall insulation; and other noise-reducing building materials shall be used.

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

In addition, the City shall seek to reduce potential long-term exposure of sensitive receptors to noise generated by project-related stationary noise sources from public activities on school grounds, in neighborhood and community parks, and in open-space areas. Specifically, the City shall encourage the controlling agencies (i.e., schools and park and recreation districts) to implement measures to reduce project-generated interior and exterior noise levels to within acceptable levels, including but not limited to the following:

- On-site landscape maintenance equipment shall be equipped with properly operating exhaust mufflers and engine shrouds, in accordance with manufacturers' specifications.

- For maintenance areas located within 500 feet of noise-sensitive land uses, the operation of on-site landscape maintenance equipment shall be limited to the least noise-sensitive periods of the day, between the hours of 7 a.m. and 7 p.m.

- Outdoor use of amplified sound systems within 500 feet of noise-sensitive land uses shall be permitted only between 7 a.m. and 10 p.m. Sunday through Thursday, and between 7 a.m. and 11 p.m. on Friday and Saturday.

Implementation: Project applicants for any particular discretionary development application.

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for all project phases. For measures that the City should encourage other agencies to undertake, before the approval of final maps for all project phases for noise-generating school and park and recreation sites.

Enforcement: City of Rancho Cordova Building and Safety, and Planning Departments; Cordova Recreation & Park District; Elk Grove Unified School District.

PP

The land use plan under the Proposed Project Alternative features a mix of various land uses, including residential, schools, and public/quasi-public (similar to those discussed above under the No USACE Permit Alternative), plus 39-acre and 15-acre community parks, additional acreage of commercial mixed-use (which could include offices), and an approximately 60-acre Local Town Center (commercial).

Residential

Residential-use central air conditioning units typically range from 45- to 70-dB L_{eq} at a distance of 50 feet (EPA 1971). Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Proposed Project Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Commercial

The Proposed Project Alternative includes approximately 32 acres of commercial-mixed use, which would generate the same types of noise as discussed above under the No USACE Permit Alternative, including the use of emergency generators. The Proposed Project Alternative also includes a 60-acre Local Town Center, which could include large commercial loading and unloading docks. The Local Town Center may include additional noise sources such as the use of forklifts for loading and unloading of materials, as well as the operation of hydraulic lifts, pneumatic tools, and air compressors at automotive repair facilities. Early-morning deliveries from large trucks may also be a source of elevated noise levels at nearby sensitive receptors. Noise from such equipment and activities can reach intermittent levels of up to 90 dBA at 50 feet from the source (EPA 1971). In addition, mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment) housed at the exterior of buildings is also a potential stationary source of noise, especially if these pieces of equipment are not properly enclosed. Based on this noise level, and assuming an attenuation rate of 6 dBA per doubling of distance from the source, areas within approximately 2,500 feet could experience noise levels in excess of 55 dBA.

Therefore, operational noise levels associated with the proposed commercial uses could potentially exceed the City's noise standards at nearby existing and future noise-sensitive receptors. In addition, increases in single-event noise levels, such as backup alarms from material delivery trucks and periodic testing of emergency generators, occurring during the more noise-sensitive evening and nighttime hours could result in increased levels of disturbance and sleep disruption to occupants of nearby residential dwellings. As a result, increased noise levels associated with the proposed commercial land uses are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Public/Quasi-Public

The Proposed Project Alternative would include construction of a new fire station along Rancho Cordova Parkway south of Kiefer Boulevard that would generate high noise levels from alarms and vehicle movements when station crews respond to emergency situations. Noise levels associated with the operation of emergency activities are exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Proposed Project Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Schools and Neighborhood Parks

The Proposed Project Alternative includes approximately 111 acres of schools and approximately 91 acres of neighborhood parks. School and neighborhood park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur.

Community Parks

The Proposed Project Alternative includes a 39-acre and 15-acre community park adjacent to the proposed high school/middle school and west of Americanos Boulevard, respectively. Uses at the 39-acre community park could include six sports fields (four lighted fields) for soccer, softball and baseball, a synthetic turf soccer field, indoor aquatic center, water feature, picnic areas, and a building containing restrooms, concessions, and storage. Uses at the 15-acre community park would be expected to include sports fields, picnic areas, restrooms, concessions, and storage. The same types of noise sources would occur at the community parks as are described for the neighborhood parks, above. It is also assumed that the lighted sports fields would be active during nighttime hours and may have the potential to exceed the City's nighttime performance standards of 40 dBA L_{eq} (Table 3.11-5). This is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur.

Mitigation Measure: Implement Mitigation Measure 3.11-3.

BIM

Residential

The Biological Impact Minimization Alternative would construct approximately 466 fewer residential units as compared to the Proposed Project Alternative. However, the types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Biological Impact Minimization Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Commercial

The biological Impact Minimization Alternative does not include any type of commercial land uses. Therefore, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Biological Impact Minimization Alternative would construct approximately 4 acres of public/quasi public land uses, as compared to approximately 13 acres under the Proposed Project Alternative; however, the types of noise sources would be the same as those discussed above. Noise levels associated with the operation of the proposed fire station would be exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Biological Impact Minimization Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Schools and Neighborhood Parks

The Biological Impact Minimization Alternative would construct a similar acreage of neighborhood parks, but only about half as many acres of schools, as compared to the Proposed Project Alternative. However, the types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and

musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Community Parks

The Biological Impact Minimization Alternative includes two community parks in the same locations as the Proposed Project Alternative, although with slightly smaller acreages. The types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

CS

Residential

Under the Conceptual Strategy Alternative, a similar amount of residential dwelling units on a similar amount of acres would be constructed as compared to the Proposed Project Alternative. The types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Commercial

The Conceptual Strategy Alternative includes a total of only 10.9 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed under this alternative. Noise levels from commercial central air conditioning units, from limited volumes of small delivery vehicle traffic at small loading/unloading areas, and periodic testing of emergency generators associated with the proposed commercial mixed-use land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Conceptual Strategy Alternative would construct approximately 7 acres of public/quasi public land uses, as compared to approximately 13 acres under the Proposed Project Alternative; however, the types of noise sources would be the same as those discussed above. Noise levels associated with the operation of the proposed fire station would be exempt from the City of Rancho Cordova Noise Ordinance and the proposed fire station is anticipated to include perimeter walls around the emergency facilities to shield noise-sensitive receptors from facility operational noise. However, emergency situations to which fire stations respond are associated with excessively high noise levels in order to alert vehicles and pedestrians of oncoming emergency vehicles. Although the City's noise ordinance exempts emergency activities, the potential to cause a temporary increase in ambient noise levels (i.e., greater than 3 dBA) exists and may be considered annoying by receptors. As a result, increased noise levels associated with the proposed public/quasi public land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Schools and Neighborhood Parks

The Conceptual Strategy Alternative would construct a similar acreage of neighborhood parks and schools as compared to the Proposed Project Alternative. The types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; car alarms; amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments. Noise levels may exceed the City noise standards at nearby sensitive receptors, and activities occurring during the more noise-sensitive evening and nighttime hours may result in increased levels of annoyance and sleep disruption for occupants of nearby residential dwellings. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Similar]***

Community Parks

The Conceptual Strategy Alternative includes two community parks in the same locations as the Proposed Project Alternative, although with slightly smaller acreages. The types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

ID

Residential

Under the Increased Development Alternative, 253 more acres of residential housing and approximately 701 more residential units would be constructed as compared to the Proposed Project Alternative. However, the types of residential noise sources would be the same as those described above. Depending on the distance between residential dwellings, noise levels associated with air conditioning units located within side-yard areas of residential land uses could potentially exceed the City's noise standards. As a result, increased noise levels associated with the proposed residential land uses under the Conceptual Strategy Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Greater]***

Commercial

The Increased Development Alternative includes a total of only 17.7 acres of commercial mixed-uses (as compared to approximately 32 acres under the Proposed Project Alternative), and the 60-acre Local Town Center would not be constructed under this alternative. Noise levels from commercial central air conditioning units, from limited volumes of small delivery vehicle traffic at small loading/unloading areas, and periodic testing of emergency generators associated with the proposed commercial mixed-use land uses under the Increased Development Alternative are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Public/Quasi-Public

The Increased Development Alternative would not include construction of any public/quasi-public land uses. Therefore **no direct** or **indirect** impacts would occur. ***[Lesser]***

Schools and Neighborhood Parks

The Increased Development Alternative would construct a similar acreage of neighborhood parks and schools as compared to the Proposed Project Alternative; however, the joint middle school/high school would not be

constructed. The types of school and park noise sources would be the same as those described above, and would typically include adults' and children's' voices; opening and closing of vehicle doors in parking lots; use of landscape maintenance equipment; mechanical noise associated with building ventilation systems; and car alarms. However, because the joint middle school/high school would not be constructed under this alternative, amplification of music; and noise from nighttime sporting events such as elevated voices from crowds, exterior public-address systems, and musical instruments, would not be expected to occur. Nevertheless, noise levels from landscape maintenance equipment and mechanical noise associated with building ventilation systems may exceed the City noise standards at nearby sensitive receptors. Therefore, increased noise levels associated with the proposed schools and neighborhood parks are considered a **potentially significant, direct** impact. **No indirect** impacts would occur. ***[Lesser]***

Community Parks

The Increased Development Alternative includes two community parks, although in different locations and on slightly smaller acreages, as compared the Proposed Project Alternative. However, the types of noise sources at the community parks would be the same as those described above. Because noise from the community parks may have the potential to exceed the City's noise standards, this is considered a **direct**, **potentially significant** impact. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

Compliance with the City Noise Ordinance and implementation of additional mitigation measures for the control of stationary-source noise as identified above in Mitigation Measure 3.11-3, would reduce stationary-source noise levels under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a **less-than-significant** level.

IMPACT 3.11-4 **Project-Generated Increases in Traffic Noise Levels on Area Roadways**. *Project implementation would result in long-term increases in average daily traffic volumes on affected roadway segments. Increased traffic volumes would result in a substantial (e.g., 3 dB L_{dn}/CNEL) increase in ambient noise levels on- and off-site at nearby noise-sensitive receptors.*

NP

Because no new traffic would be generated under the No Project Alternative, traffic noise levels on area roadways would not increase; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

NCP

Project implementation would result in an increase in ADT volumes on affected roadway segments and, consequently, an increase in traffic source noise. To assess this impact, traffic noise levels associated with the project under existing no project and plus project conditions were predicted for affected roadway segments using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978) and traffic data (e.g., ADT volumes, vehicle speeds, and percent distribution of vehicle types) from Fehr & Peers (see Section 3.15, "Traffic and Transportation"). This model is based on the 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 and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings).

The project's contribution to the existing traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Table 3.11-9 summarizes the CNEL/L_{dn} at 50 feet from the centerline of the near travel lane of area roadways for baseline conditions, with and without

buildout of the project. In Table 3.11-9, those modeled increases that would be considered substantial (i.e., a 3-dB L_{dn}/CNEL increase) in comparison to existing no project conditions are indicated in bold. Table 3.11-9 also shows the net difference in roadside noise levels for all the project alternatives analyzed. Modeled roadway noise levels assume no natural or artificial shielding between the roadway and the receptor. A noticeable increase of 3 dBA (CNEL/L_{dn}) would typically occur with a doubling of roadway traffic volumes.

As shown in Table 3.11-9, traffic generated under baseline conditions by the No USACE Permit Alternative would not contribute a substantial increase in traffic noise along project area roadways. As shown in Table 3.11-9, traffic noise level increases under the No USACE Permit Alternative range from 0.0 to 2.2 dBA. As a result, this **direct** impact would be **less than significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

PP

As shown in Table 3.11-9, traffic noise level increases from the Proposed Project Alternative under baseline conditions range from 0.0 to 2.9 dBA. However, there would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur.

Mitigation Measure: No mitigation measures are required.

BIM

Under the Biological Impact Minimization Alternative, there would be slightly fewer trips generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Biological Impact Minimization Alternative under baseline conditions ranges from 0.0 to 2.6 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

CS

Under the Conceptual Strategy Alternative, there would be slightly fewer trips generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Conceptual Strategy Alternative under baseline conditions range from 0.0 to 2.6 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

ID

Under the Increased Development Alternative, a slightly higher number of trips would be generated on area roadways than under the Proposed Project Alternative. As shown in Table 3.11-9, traffic noise level increases from the Increased Development Alternative under baseline conditions range from 0.0 to 2.7 dBA. There would not be enough additional trips to result in noise level increases of 3 dBA or higher under this alternative. As a result, this **direct** impact is considered a **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

Table 3.11-9
Summary of Modeled Baseline Traffic Noise Levels

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/L_{dn}) at 50 Feet from Near Travel Lane Centerline										
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
SR 16	Excelsior Road	Eagles Nest Road	71.3	72.7	1.4	73.0	1.7	72.6	1.3	72.6	1.3	72.8	1.5
SR 16	Sunrise Boulevard	Grant Line Road	72.1	72.4	0.3	72.5	0.4	72.6	0.5	72.5	0.4	72.5	0.4
Kiefer Boulevard	Grant Line Road	north of SR 16	57.9	58.4	0.5	58.8	0.9	58.4	0.5	58.4	0.5	58.4	0.5
Mather Boulevard	Femoyer Street	Douglas Road	70.3	71.3	1.0	71.5	1.2	71.3	1.0	71.4	1.1	71.6	1.3
Douglas Road	Mather Boulevard	Sunrise Boulevard	69.8	71.1	1.3	71.4	1.6	71.1	1.3	71.1	1.3	71.4	1.6
International Drive	South White Rock Road	Zinfandel Drive	68.8	68.9	0.1	68.9	0.1	68.8	0.0	68.9	0.1	68.9	0.1
International Drive	Zinfandel Drive	Kilgore Road	66.3	66.5	0.2	66.6	0.3	66.5	0.2	66.5	0.2	66.6	0.3
White Rock Road	Zinfandel Drive	Sunrise Boulevard	71.8	72.2	0.4	72.2	0.4	72.2	0.4	72.2	0.4	72.2	0.4
White Rock Road	Sunrise Boulevard	Grant Line Road	66.8	66.9	0.1	66.9	0.1	66.9	0.1	66.9	0.1	66.9	0.1
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	71.1	71.1	0.0	71.1	0.0	71.1	0.0	71.1	0.0	71.2	0.1
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	69.3	69.3	0.0	69.3	0.0	69.3	0.0	69.3	0.0	69.3	0.0
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	73.5	73.6	0.1	73.6	0.1	73.6	0.2	73.6	0.2	73.6	0.1
Mather Field Road	U.S. 50 eastbound ramps	International Drive	75.0	75.3	0.3	75.4	0.4	75.3	0.3	75.3	0.3	75.4	0.4
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	71.6	71.7	0.1	71.7	0.1	71.7	0.1	71.7	0.1	71.8	0.2
Zinfandel Drive	US 50 eastbound ramps	White Rock Road	74.3	74.4	0.1	74.4	0.1	74.3	0.0	74.4	0.1	74.4	0.1
Zinfandel Drive	White Rock Road	International Drive	71.0	71.0	0.0	71.0	0.0	71.0	0.0	71.0	0.0	71.0	0.0
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	76.7	76.9	0.2	77.0	0.3	76.9	0.2	76.9	0.2	76.9	0.2
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	76.6	76.8	0.2	76.9	0.3	76.8	0.2	76.8	0.2	76.8	0.2
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.4	75.8	0.4	75.9	0.5	75.7	0.3	75.8	0.4	75.8	0.4
Sunrise Boulevard	Folsom Boulevard	White Rock Road	74.4	74.9	0.5	75.0	0.6	74.9	0.5	74.9	0.5	75.0	0.6
Sunrise Boulevard	White Rock Road	Douglas Road	74.0	75.3	1.3	75.4	1.4	75.2	1.2	75.2	1.2	75.4	1.4
Sunrise Boulevard	SR 16	Grant Line Road	69.7	70.6	0.9	71.1	1.4	70.4	0.7	70.5	0.8	70.7	1.0
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	75.4	75.4	0.0	75.4	0.0	75.4	0.0	75.4	0.0	75.4	0.0
Grant Line Road	White Rock Road	Douglas Road	68.2	70.3	2.1	70.9	2.7	70.4	2.2	70.6	2.4	70.6	2.4
Grant Line Road	Douglas Road	SR 16	67.4	69.6	2.2	70.3	2.9	70.0	2.6	70.0	2.6	70.1	2.7
Grant Line Road	SR 16	Sunrise Boulevard	66.6	68.4	1.8	68.7	2.1	68.5	1.9	68.5	1.9	68.5	1.9
Douglas Road	Sunrise Boulevard	Rancho Cordova Parkway	70.5	72.7	2.2	72.3	1.8	72.5	2.5	72.8	2.3	73.0	2.5
Douglas Road	Americanos Boulevard	Grant Line Road	65.7	66.3	0.6	65.7	0.0	66.5	0.8	67.5	1.8	66.6	0.9
Sunrise Boulevard	Douglas Road	Kiefer Boulevard	73.6	74.4	0.8	74.8	1.2	74.5	0.9	74.4	0.8	74.6	1.0
Sunrise Boulevard	Kiefer Boulevard	SR 16	72.8	73.9	1.1	74.4	1.6	73.5	0.7	73.5	0.7	73.8	1.0

Notes: dBA = A-weighted decibels; CNEL = community noise equivalent level; L_{dn} = day-night average noise level; NP = No Project Alternative; NCP = No USACE Permit Alternative; Δ in dB = change in decibels; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative; SR = State Route; U.S. 50 = U.S. Highway 50; FHWA = Federal Highway Administration.
Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).
Source: Modeled by AECOM in 2010

IMPACT 3.11-5 **Compatibility of Proposed On-Site Land Uses with the Ambient Noise Environment**. *The project includes development of on-site noise-sensitive land uses that could be exposed to noise levels that exceed the noise standards set forth in the City's General Plan Noise Element.*

NP

Because no new project-related sensitive receptors would be generated under the No Project Alternative, no sensitive receptors would be exposed to noise generated from existing stationary- or roadway-source noise; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, BIM, CS, ID

Off-Site Stationary Noise Sources

There are no stationary sources in the project vicinity that would have the potential to affect the ambient noise environment of proposed on-site sensitive receptors. Kiefer Landfill and the Sacramento Rendering Company are sources of considerable stationary noises. However, the landfill is located approximately 7,000 feet southeast of the project site and the primary noise-generating activities are shielded by intervening topography. The rendering plant is located 2,000 feet to the west of the SPA and was not observed to produce audible noise on the SPA during AECOM field visits. Therefore, **no direct** or **indirect** impact would occur. ***[Similar]***

Exterior Traffic Noise Levels

As discussed above, ambient noise levels in the SPA would be influenced largely by vehicle traffic on area roadways. Predicted traffic noise levels within the project site were calculated using the FHWA Noise Prediction Model (FHWA-RD-77-108) based on traffic information (i.e., average daily traffic, vehicle speeds, roadway width) obtained from the traffic analysis prepared by Fehr & Peers for this project (see Section 3.15, "Transportation and Traffic"). Input data used in the model included average daily traffic levels for nearby area roadways, day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings). Traffic noise levels were calculated for future conditions with and without buildout of the project alternatives; these noise levels are summarized in Table 3.11-11.

The 60-dBA CNEL noise contours for adjacent roadways (i.e., Sunrise Boulevard, Kiefer Boulevard, and Grant Line Road) and on-site proposed roadways (i.e., Rancho Cordova Parkway, Chrysanthy Road, and Americanos Boulevard) extend onto portions of the SPA, including areas of proposed single-family and multifamily residential development (see Table 3.11-11). Predicted on-site noise levels at residential dwellings located within these projected noise contours could potentially exceed the City's land-use compatibility standard of 60-dBA CNEL. Thus, on-site noise levels at residential dwellings within the 60-dBA CNEL noise contours for adjacent roadways may be within the 60-dBA CNEL contour, and therefore, this **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Similar]***

Interior Traffic Noise Levels

Interior noise levels may exceed the City's interior noise standard of 45-dBA CNEL due to traffic noise. Preliminary interior noise analyses indicate that the first row of houses along Rancho Cordova Parkway, Americanos Boulevard, Sunrise Boulevard, and Grant Line Road may be exposed to noise levels in excess of 70-dBA CNEL. Typical construction requirements (wood siding or two-coat stucco, STC-26 windows, door weather-stripping, exterior wall insulation, composition plywood roof) provide an exterior-to-interior noise reduction of approximately 25 dBA with windows closed and 15 dBA with windows open. Second and third floor façades would typically be exposed to noise levels of approximately 2-3 dB higher than those at first floor façades.

It is expected that first, second, and third floor façades would require window assembly upgrades to comply with the City's interior traffic noise level standard. Based on the noise levels shown in Table 3.11-11, building façades located along Rancho Cordova Parkway, Americanos Boulevard, Sunrise Boulevard, and Grant Line Road would require window assemblies to have higher Sound Transmission Class ratings (STC) than typical construction requirements. Thus, on-site interior noise levels at second and third floor façades of residential dwellings within the 70-dBA CNEL noise contours for adjacent roadways would be considered a **significant** impact. **No indirect** impacts would occur. ***[Greater]***

Mitigation Measure: Implement Mitigation Measure 3.11-3.

Mitigation Measure 3.11-5: Implement Measures to Improve Land Use Compatibility with Noise Sources.

To meet City noise standards set forth in the City General Plan and Noise Ordinance and improve compatibility between project land uses and noise sources, the project applicants for any particular discretionary development application for all project phases shall implement the following:

- Obtain the services of a qualified acoustical consultant to develop noise attenuation measures for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) that will provide a minimum composite Sound Transmission Class (STC) rating for buildings of 30 or greater, individually computed for the walls and the floor/ceiling construction of buildings, for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms).

- When a project alternative is adopted, and prior to the submittal of small-lot tentative subdivision maps and improvement plans, the project applicants shall conduct a site-specific acoustical analysis to determine predicted roadway noise impacts attributable to the project, taking into account site-specific conditions (e.g., site design, location of structures, building characteristics). The acoustical analysis shall evaluate stationary- and mobile-source noise attributable to the proposed use or uses and impacts on nearby noise-sensitive land uses, in accordance with adopted City noise standards. For any noise impacts identified in the acoustical analysis that would be greater than City noise standards, the project applicant shall submit a noise reduction plan to reduce any identified impacts above adopted City noise standards. The noise reduction plan shall be reviewed and approved by the City and its implementation shall be required as a condition of approval of tentative maps or improvement plans. Feasible measures to be included in the noise reduction plan to reduce project-related noise impacts may include, but are not limited to, the following:

    - limiting noise-generating operational activities associated with proposed commercial land uses, including truck deliveries;

    - construction of exterior sound walls;

    - use of "quiet pavement" (e.g., rubberized asphalt) construction methods; or

    - use of increased noise-attenuation measures in building construction (e.g., dual-pane, sound-rated windows; exterior wall insulation); and

    - installation of noise barriers ranging from 6 to 14 feet in height to reduce exterior noise levels to the normally acceptable noise standard of 60 dBA CNEL at noise-sensitive locations. Noise barriers in excess of 10 feet may not be considered desirable or feasible.

Where noise barrier heights are not feasible, the City may, at its discretion, require the project applicant to instead achieve the conditionally-acceptable noise level of 65-dBA CNEL at noise-sensitive locations, provided that interior noise levels are in compliance with the City's 45-dBA L_{dn} interior noise level

standard. Noise barriers ranging from 6 to 10 feet in height would be required to reduce exterior noise levels to a conditionally acceptable level of 65-dBA CNEL at noise-sensitive locations relative to the corresponding roadway segment.

As an alternative, site design may be taken into consideration to reduce noise levels within compliance of applicable noise standards. Where noise levels require sound walls in excess of a desirable height deemed by the City, residential areas may be redesigned so that houses front the noise source. For example, fronting the residences to the noise source would achieve a 5-dBA to 8-dBA reduction in traffic noise levels due to shielding provided by the intervening residential building facade at the outdoor activity area. Another alternative would be to increase minimum setback distances from the noise source.

Implementation: Project applicants of any particular discretionary development application.

Timing: Before the recordation of final maps and during all project construction activities for all project phases where applicable.

Enforcement: City of Rancho Cordova Planning Department.

PP

Noise levels within the project site are influenced largely by vehicle traffic on area roadways. The compatibility of proposed land uses, based on City criteria, with respect to vehicle traffic under the Proposed Project Alternative is discussed below. Detailed site plans showing grading elevations, roadway alignments, and pad locations were only available for the Proposed Project Alternative during this analysis. To evaluate recommended barrier heights, the TNM was utilized for the Proposed Project Alternative to represent a three-dimensional noise model that accounts for distance, ground surface parameters, meteorological conditions, roadway speeds, and vehicle percentages. The preliminary barrier analysis assumes all outdoor activity areas are located adjacent to the relative roadway segment. Assumptions for roadway width, roadway vehicle speed, minimum residential setback distances, and outdoor activity areas were based on the Draft SunCreek Specific Plan (attached as Appendix C). Note that the Proposed Project Alternative includes a 60-acre Local Town Center along Grant Line Road; therefore, no on-site project-generated sensitive receptors would be placed along Grant Line Road under this alternative.

Exterior Traffic Noise Levels—"Traffic Noise Model"

The TNM is a computer model for highway traffic noise prediction and analysis that computes traffic noise at nearby noise-sensitive receptors and aids in the design of noise abatement. As part of TNM's computations, noise source inputs include automobiles, medium trucks, heavy trucks, buses, and motorcycles. Noise emission levels calculated by TNM consist of A-weighted sound levels.

The Proposed Project Alternative was modeled in TNM based on available data and assumptions. Coordinates for roadways, receivers, building rows, and terrain were estimated using the Contour Grading Plan (MacKay & Somps 2008) for the proposed SunCreek Specific Plan, which showed the location of parcel lines and roadway right-of-ways. Roadway widths were assumed to be 24 feet (two lanes in each direction) for the entire project site and all intersections were considered to be signalized. To estimate the worst-case noise levels, receivers were only modeled along the first row of buildings. Traffic volumes were taken from the traffic impact analysis performed by Fehr & Peers in 2010. Local roadways traffic volumes were taken from forecast models provided in 2007 by Fehr & Peers. Speeds along roadways were conservatively assumed to be 50 miles per hour (mph) for automobiles and 45 mph for trucks.

CNEL (L_{den}) noise levels were calculated for each sensitive receptor on the project site. The default TNM values for day, evening, and night percentages were used, and the truck percentages were assumed to be 2% for medium trucks

(double axel vehicles) and 1% for heavy trucks (multi-axel vehicles). Lastly, for sensitive receptors where the noise levels would be 65 dBA or more, noise barriers were modeled and evaluated at heights ranging from 6 to 10 feet. The noise barriers were modeled either along parcel lines.

Based on the TNM modeling, noise barriers were determined to be needed along the specific roadways and would require the following barrier height ranges to achieve the City's conditionally acceptable exterior noise level standard of 65-dBA L_{dn}/CNEL:

- Sunrise Boulevard: 8 feet tall.
- Kiefer Boulevard: 6 to 10 feet tall.
- Rancho Cordova Parkway: 6 to 8 feet tall.
- Chrysanthy Road: 6 feet to 8 feet tall.
- Americanos Boulevard: 8 feet to 10 feet tall.
- Crescent Drive: 6 to 8 feet tall.
- Central Park Drive: 6 feet tall.
- North Campus Drive: 6 to 10 feet tall.

It should be noted that multiple-family residential land uses identified along Rancho Cordova Parkway and Americanos Boulevard were identified in TNM as experiencing noise levels that would exceed City standards (65-dBA L_{dn} at outdoor areas when directly adjacent to roadways). However, these multiple family residences were assumed to consist of multiple floors (two-stories or greater) with the common outdoor activity area being located in the center of the proposed complexes. Therefore, it may be possible for the multi-family structures to provide adequate shielding at the common outdoor activity area and such that this construction would comply with City noise standards. Because modeling for the Proposed Project Alternative has demonstrated that noise barriers would be needed in order achieve compliance with City noise standards, this **direct** impact is considered **significant**. **No indirect** impacts would occur.

Interior Traffic Noise Levels

Interior noise levels may exceed the City's interior noise standard of 45-dBA CNEL due to traffic noise. Preliminary interior noise analyses indicate that the first row of houses along Rancho Cordova Parkway, Americanos Boulevard, and Sunrise Boulevard may be exposed to noise levels in excess of 70-dBA CNEL. Typical construction requirements (wood siding or two-coat stucco, STC-26 windows, door weather-stripping, exterior wall insulation, composition plywood roof) provide an exterior-to-interior noise reduction of approximately 25 dBA with windows closed and 15 dBA with windows open. Second and third floor façades would typically be exposed to noise levels of approximately 2-3 dB higher than those at first floor façades.

It is expected that first, second, and third floor façades would require window assembly upgrades to comply with the City's interior traffic noise level standard. Based on the noise levels shown in Table 3.11-10, building façades located along Rancho Cordova Parkway, Americanos Boulevard, and Sunrise Boulevard would require window assemblies to have higher Sound Transmission Class ratings (STC) than typical construction requirements. Thus, on-site interior noise levels of residential dwellings within the 70-dBA CNEL noise contours for adjacent roadways would be considered a **direct, significant** impact. **No indirect** impacts would occur.

Mitigation Measure: Implement Mitigation Measures 3.11-3 and 3.11-5.

Implementation of Mitigation Measure 3.11-3 and 3.11-5 would be effective in reducing the significant interior and exterior noise level impacts of the proposed development to **less-than-significant** levels under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because the installation of noise barriers, inclusion of higher STC-rated window assemblies of second and third floor façades within the 70-dBA L_{dn} traffic noise contour, or other alternatives such as site redesign or setbacks, would reduce traffic noise levels to City standards at affected receptors.

Table 3.11-10 Representative Vibration Source Levels for Construction Equipment		
Equipment	**PPV at 25 feet (in/sec)[1]**	**Approximate L_v (VdB) at 25 feet[2]**
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Notes:
[1] Where PPV is the peak particle velocity.
[2] Where Lv is the root mean square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4.
Source: FTA 2006

IMPACT 3.11-6 **Possible Exposure of Sensitive Receptors to Groundborne Noise and Vibration Levels Caused by Construction Activities.** *Implementation of the project could result in exposure of sensitive noise receptors to groundborne noise and vibration levels that exceed the Federal Transit Administration and Caltrans guidelines.*

NP

Because no new project-related sensitive receptors would be generated under the No Project Alternative, no sensitive receptors would be exposed to groundborne noise and vibration; thus, **no direct** or **indirect** impacts would result. ***[Lesser]***

NCP, PP, BIM, CS, ID

Construction activities have the potential to result in varying degrees of temporary ground vibration depending on the specific construction equipment used and operations involved. Ground vibration levels associated with various types of construction equipment are summarized in Table 3.11-10. Based on the representative vibration levels identified for various construction equipment types, sensitive receptors located near construction activities could be exposed to groundborne vibration levels exceeding the recommended FTA and Caltrans guidelines of 80 VdB and 0.2 in/sec PPV, respectively.

A groundborne noise and vibration-sensitive receptor would need to be located within 100 feet from vibration-induced construction activities in order to perceive noticeable (greater than 80 VdB or 0.2 in/sec PPV) groundborne noise or vibration. Groundborne noise and vibration levels were predicted based on VdB and PPV reference vibration levels shown in Table 3.11-10. Based on the phasing and location of development on the project site, vibration-induced construction activities could exceed recommended Caltrans standard of 0.2 in/sec PPV regarding the prevention of structural damage for normal buildings or FTA's maximum acceptable vibration standard of 78 VdB regarding human response (i.e., annoyance) at nearby vibration-sensitive land uses (i.e., residences and schools). Consequently, this **direct** impact is considered **significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3.11-6: Implement Measures to Prevent Exposure of Sensitive Receptors to Temporary Construction-Generated Groundborne Noise and Vibration.

To reduce impacts associated with groundborne noise and vibration generated during construction activities, the project applicants for all project phases shall conform to the following requirements:

- To the extent feasible, bulldozing operations shall occur greater than 100 feet from occupied vibration-sensitive receptors (e.g., residences, schools).

- All construction equipment and equipment staging areas shall be located as far as feasible from nearby vibration-sensitive land uses.

Implementation: Project applicants of any particular discretionary development application.

Timing: During all phases of project construction.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Mitigation Measure 3.11-6 would reduce potentially significant impacts from temporary construction groundborne noise and vibration to a **less-than-significant** level under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives because construction would be required to occur 100 feet from occupied, vibration-sensitive receptors, to the extent feasible, to ensure Caltrans and FTA standards are met.

3.11.4 RESIDUAL SIGNIFICANT IMPACTS

Impacts associated with increased noise and vibration from construction-related activities and increased noise levels from additional roadway traffic and from operation of stationary noise sources would be reduced to less-than-significant levels with implementation of mitigation recommended in this section. Therefore, there are no residual significant impacts.

3.11.5 CUMULATIVE IMPACTS

When determining whether the overall noise (and vibration) impacts from related projects would be cumulatively significant and whether the project's incremental contribution to any significant cumulative impacts would be cumulatively considerable, it is important to note that noise and vibration are localized occurrences; as such, they decrease rapidly in magnitude as the distance from the source to the receptor increases. Therefore, only those related projects that are in the direct vicinity of the SPA and those that are considered influential in regards to noise and vibration (e.g., not located where ambient conditions are dominated by traffic noise from U.S. 50 and relatively large in size) would have the potential to be considered in a cumulative context with the project's incremental contribution (e.g., Sunrise Douglas Community Plan area, Arboretum, Cordova Hills, Kiefer Landfill Special Planning Area, and the Teichert, Stoneridge, and DeSilva Gates quarries).

Temporary, Short-Term Exposure of Sensitive Receptors to Increased Equipment Noise from Construction

The City's noise regulations limit construction activities to daytime hours. However, it is anticipated that compliance with these regulations alone would not avoid significant construction-noise impacts associated with the related projects because of the anticipated substantial increase in ambient noise levels for existing and future adjacent sensitive receptors to construction areas during daytime hours. Therefore, significant cumulative noise impacts associated with construction activities could occur from continued construction phasing of the SunCreek project and the adjacent related projects. Any of the project within the Sunrise Douglas Community Plan area (labeled as projects 10 through 21 on Exhibit 3.0-1 in Section 3.0, "Approach to the Environmental Analysis and the Cumulative Context), the proposed Arboretum and Cordova Hills projects, and new development in the Kiefer Landfill Special Planning Area, are all close enough to the SPA to have an additive effect from construction noise sources. Although implementation of Mitigation Measure 3.11-1 would reduce project-related construction-noise impacts to a less-than-significant level, it cannot be assumed that the aforementioned projects would include mitigation measures to reduce those related projects' contribution to cumulative construction noise impacts.

Therefore, the project could result in a cumulatively considerable incremental contribution to significant cumulative noise impacts from construction noise.

Temporary, Short-Term Exposure of Sensitive Receptors to Potential Groundborne Noise and Vibration from Construction

As discussed in Impact 3.11-6, construction of the project would result in a significant impact from temporary, short-term groundborne noise and vibration levels in the immediate vicinity and possibly during the same time frame as the related projects. Groundborne noise and vibration levels from construction of the aforementioned related projects would be similar in nature and magnitude to those discussed above in Impact 3.11-6. Specifically, construction activities would result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved (see, for example, Table 3.11-11). Although detailed information is not currently available, construction of the related projects would be anticipated to result in maximum groundborne noise and vibration levels associated with bulldozing activities. According to FTA, levels associated with the use of a large bulldozer is 0.089 in/sec PPV (87 VdB) at 25 feet. With respect to the prevention of structural damage, bulldozing would not exceed the Caltrans-recommended level of 0.2 in/sec PPV even at a distance of 25 feet. However, with respect to prevention of human disturbance, bulldozing could exceed the FTA-recommended level of 78 VdB within 50 feet. The exact locations of bulldozing activities on the SPA have not been determined at this time. The proposed Arboretum and Cordova Hills projects and new development in the Kiefer Landfill Special Planning Area are all close enough to the SPA to have an additive effect. Although implementation of Mitigation Measure 3.11-6 would reduce project-related groundborne noise and vibration impacts to a less-than-significant level, it cannot be assumed that the aforementioned projects would include mitigation measures to reduce those related projects' contribution to cumulative short-term increases in groundborne noise and vibration levels. Nearby sensitive receptors could be located within the distances modeled above that are correlated with the Caltrans- and FTA-recommended exceedance levels; therefore, the related projects could result in a significant impact from short-term exposure of sensitive receptors to potential groundborne noise and vibration. Thus, the incremental contribution of the project to this significant cumulative impact could be cumulatively considerable.

Long-Term Exposure of Sensitive Receptors to Increased Stationary-Source Noise

Stationary-source noise associated with the SunCreek project and the related projects could potentially result in exceedance of the City's noise regulations at sensitive receptors. Implementation of Mitigation Measure 3.11-3 would reduce project-generated stationary-source noise impacts to a less-than-significant level. The noise from any stationary noise sources associated with the related projects could be controlled at the source by means of noise walls, enclosures, and site planning, but there is no guarantee that all the related projects would include such noise controls as part of their proposals. Therefore, significant cumulative noise impacts associated with stationary noise sources at the related projects could occur. Projects within the Sunrise Douglas Community Plan area and the Arboretum project are close enough to the SunCreek project site to have an additive effect from stationary noise sources. Thus, project implementation could result in a cumulatively considerable incremental contribution to significant cumulative stationary-source noise impacts.

Traffic Noise Levels

Construction noise and stationary-source noise can be controlled on-site at the point of origin; however, traffic noise may extend beyond a project site along existing and proposed off-site and on-site roadways, resulting in significant traffic noise impacts on sensitive uses along these roadways. The combined cumulative increase in traffic on area roadways would extend the 60-dBA noise contour distances for these roadway segments, causing the sensitive receptors from the related projects to fall within this contour.

Table 3.11-11
Summary of Modeled Cumulative (Future) Traffic Noise Levels Without Quarry Trucks

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/Ldn) at 50 Feet from Near Travel Lane Centerline									
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
SR 16	Excelsior Road	Eagles Nest Road	73.6	74.1	0.5	74.3	0.7	74.0	0.4	74.0	0.4	74.2	0.6
SR 16	Sunrise Boulevard	Grant Line Road	74.2	74.3	0.1	74.6	0.2	74.3	0.1	74.3	0.1	74.4	0.2
Kiefer Boulevard	Grant Line Road	north of SR 16	63.4	63.7	0.3	64.0	0.6	63.7	0.3	63.7	0.3	63.7	0.3
Mather Boulevard	Femoyer Street	Douglas Road	72.6	73.0	0.4	73.3	0.7	73.0	0.4	73.0	0.4	73.1	0.5
Douglas Road	Mather Boulevard	Sunrise Boulevard	73.3	73.7	0.4	74.0	0.7	73.7	0.4	73.7	0.4	73.8	0.5
International Drive	South White Rock Road	Zinfandel Drive	75.9	75.9	0.0	75.9	0.0	75.9	0.0	75.9	0.0	75.9	0.0
International Drive	Zinfandel Drive	Kilgore Road	76.2	76.3	0.1	76.3	0.1	76.3	0.1	76.3	0.1	76.3	0.1
White Rock Road	Zinfandel Drive	Sunrise Boulevard	74.3	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0
White Rock Road	Sunrise Boulevard	Grant Line Road	75.1	75.1	0.0	75.1	0.0	75.1	0.0	75.1	0.0	75.1	0.0
Folsom Boulevard	Zinfandel Drive	Sunrise Boulevard	72.6	72.6	0.0	72.6	0.0	72.6	0.0	72.6	0.0	72.6	0.0
Folsom Boulevard	Sunrise Boulevard	Hazel Avenue	72.5	72.5	0.0	72.5	0.0	72.5	0.0	72.5	0.0	72.5	0.0
Mather Field Road	Folsom Boulevard	U.S. 50 westbound ramps	75.3	75.3	0.0	75.4	0.1	75.3	0.0	75.3	0.0	75.3	0.0
Mather Field Road	U.S. 50 eastbound ramps	International Drive	77.5	77.5	0.0	77.6	0.1	77.5	0.0	77.5	0.0	77.6	0.1
Zinfandel Drive	Folsom Boulevard	U.S. 50 westbound ramps	72.9	72.9	0.0	73.0	0.1	72.9	0.0	72.9	0.0	72.9	0.0
Zinfandel Drive	U.S. 50 eastbound ramps	White Rock Road	76.9	77.0	0.1	77.0	0.1	77.0	0.1	77.0	0.1	77.0	0.1
Zinfandel Drive	White Rock Road	International Drive	74.3	74.3	0.0	74.4	0.1	74.3	0.0	74.3	0.0	74.3	0.0
Sunrise Boulevard	Gold Country Boulevard	Coloma Road	77.9	78.0	0.1	78.0	0.1	78.0	0.1	78.0	0.1	78.0	0.1
Sunrise Boulevard	Coloma Road	U.S. 50 westbound ramps	77.9	78.0	0.1	78.1	0.2	78.0	0.1	78.0	0.1	78.0	0.1
Sunrise Boulevard	U.S. 50 eastbound ramps	Folsom Boulevard	75.8	76.0	0.2	76.0	0.2	75.9	0.1	76.0	0.2	76.0	0.2
Sunrise Boulevard	Folsom Boulevard	White Rock Road	75.5	75.6	0.1	75.7	0.2	75.6	0.1	75.6	0.1	75.7	0.2
Sunrise Boulevard	White Rock Road	Douglas Road	75.3	75.7	0.4	75.9	0.6	75.7	0.4	75.7	0.4	75.8	0.5
Sunrise Boulevard	SR 16	Grant Line Road	73.4	73.7	0.3	73.9	0.6	73.6	0.2	73.6	0.2	73.8	0.4
Hazel Avenue	Winding Way	U.S. 50 westbound ramps	78.8	78.9	0.1	78.9	0.1	78.9	0.1	78.9	0.1	78.9	0.1
Grant Line Road	White Rock Road	Douglas Road	76.8	77.1	0.3	77.4	0.6	77.1	0.3	77.1	0.3	77.2	0.4
Grant Line Road	Douglas Road	SR 16	74.8	75.2	0.4	75.9	1.1	75.4	0.6	75.3	0.5	75.4	0.6
Grant Line Road	SR 16	Sunrise Boulevard	74.3	74.6	0.3	74.9	0.6	74.6	0.3	74.7	0.4	74.7	0.4
Douglas Road	Sunrise Boulevard	Rancho Cordova Parkway	73.4	74.1	0.7	74.7	1.3	74.0	0.6	74.2	0.8	74.3	0.9

Table 3.11-11
Summary of Modeled Cumulative (Future) Traffic Noise Levels Without Quarry Trucks

Roadway Segment	Between		Predicted Noise Level (dBA CNEL/Ldn) at 50 Feet from Near Travel Lane Centerline									
			NP	NCP	Δ in dB	PP	Δ in dB	BIM	Δ in dB	CS	Δ in dB	ID	Δ in dB
Douglas Road	Americanos Boulevard	Grant Line Road	71.6	71.7	0.1	71.8	0.2	71.8	0.2	71.7	0.1	71.8	0.2
Sunrise Boulevard	Kiefer Boulevard	SR 16	74.7	75.3	0.6	75.4	0.7	75.1	0.4	75.1	0.4	75.3	0.6
Douglas Road	Rancho Cordova Parkway	Americanos Boulevard	70.9	70.9	0.0	71.0	0.1	71.0	0.1	70.9	0.0	71.0	0.1
Chrysanthy Boulevard	Sunrise Boulevard	Rancho Cordova Parkway	63.7	63.8	0.1	64.0	0.3	63.8	0.1	63.8	0.1	63.8	0.1
Chrysanthy Boulevard	Rancho Cordova Parkway	Americanos Boulevard	65.0	65.3	0.3	65.7	0.7	65.3	0.3	65.4	0.4	65.4	0.4
Kiefer Boulevard	Zinfandel Drive	Sunrise Boulevard	61.3	64.7	**3.4**	65.1	**3.8**	64.4	**3.1**	64.5	**3.2**	65.1	**3.8**
Kiefer Boulevard	Sunrise Boulevard	Rancho Cordova Parkway	62.9	67.2	**4.3**	67.4	**4.5**	66.8	**3.9**	67.0	**4.1**	67.3	**4.4**
Zinfandel Drive	Mather Boulevard	Douglas Road	70.1	70.2	0.1	70.5	0.4	70.2	0.1	70.3	0.2	70.3	0.2
Zinfandel Drive	Douglas Road	Kiefer Boulevard	62.9	63.0	0.1	63.0	0.1	63.0	0.1	62.9	0.0	63.0	0.1
Zinfandel Drive	Kiefer Boulevard	SR 16	63.4	63.4	0.0	63.4	0.0	63.4	0.0	63.4	0.0	63.4	0.0
Sunrise Boulevard	Douglas Road	Chrysanthy Boulevard	72.7	73.0	0.3	73.1	0.4	72.9	0.2	72.9	0.2	73.0	0.3
Sunrise Boulevard	Chrysanthy Boulevard	Kiefer Boulevard	71.2	71.6	0.4	71.7	0.5	71.5	0.3	71.5	0.3	71.7	0.5
Rancho Cordova Parkway	U.S. 50	Easton Valley Parkway	75.8	75.9	0.1	76.0	0.2	75.9	0.1	75.9	0.1	75.9	0.1
Rancho Cordova Parkway	Easton Valley Parkway	White Rock Road	75.5	75.6	0.1	75.6	0.1	75.6	0.1	75.6	0.1	75.6	0.1
Rancho Cordova Parkway	White Rock Road	Douglas Road	70.8	71.2	0.4	71.3	0.5	71.2	0.4	71.2	0.4	71.2	0.4
Rancho Cordova Parkway	Douglas Road	Chrysanthy Boulevard	72.3	73.6	1.3	74.2	1.9	73.6	1.3	73.7	1.4	73.8	1.5
Rancho Cordova Parkway	Chrysanthy Boulevard	Kiefer Boulevard	72.6	73.2	0.6	73.4	0.8	73.1	0.5	73.1	0.5	73.3	0.7
Americanos Boulevard	Rancho Cordova Parkway	White Rock Road	72.5	72.9	0.4	73.0	0.5	72.8	0.3	72.9	0.4	72.9	0.4
Americanos Boulevard	White Rock Road	Douglas Road	71.9	72.2	0.3	72.7	0.8	72.1	0.2	72.3	0.4	72.4	0.5
Americanos Boulevard	Douglas Road	Chrysanthy Boulevard	70.3	71.2	0.9	72.1	1.8	70.9	0.6	71.3	1.0	71.3	1.0

Bold = Increase in noise (i.e., 3 dBA or greater) that results in a significant impact.

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; FHWA = Federal Highway Administration; L_{dn} = day-night average noise level; SR = State Route; NP = No Project Alternative; NCP = No USACE Permit Alternative; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative.

Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).

Source: Modeled by AECOM in 2010

Table 3.11-11 summarizes the CNEL/L_{dn} at 50 feet from the centerline of the near travel lane of area roadways for cumulative (future) conditions, with and without buildout of the project. Table 3.11-11 also shows the net difference in roadside noise levels for all the project alternatives analyzed. Modeled roadway noise levels assume no natural or artificial shielding between the roadway and the receptor. A noticeable increase of 3-dBA (CNEL/L_{dn}) (i.e., a significant impact) would typically occur with a doubling of roadway traffic volumes.

As shown in Table 3.11-11, traffic generated by cumulative (future) conditions under the No USACE Permit Alternative would result in traffic noise level increases ranging from 0.0 to 4.3 dBA. Traffic noise level increases under the Proposed Project Alternative in cumulative (future) conditions would range from 0.0 to 4.5 dBA. Traffic noise level increases from the Biological Impact Minimization Alternative under cumulative (future) conditions would range from 0.0 to 3.9 dBA. Traffic noise level increases from the Conceptual Strategy Alternative under cumulative (future) conditions would range from 0.0 to 4.1 dBA. Traffic noise level increases from the Increased Development Alternative under cumulative (future) conditions would range from 0.0 to 4.4 dBA. Therefore, implementation of the No USACE Permit, Proposed Project, Biological Impact Minimization, Agency Conceptual Strategy, and Increased Development Alternatives would result in a noticeable (i.e., 3 dBA) increase in ambient noise levels along Kiefer Boulevard between Zinfandel Drive and Sunrise Boulevard and between Sunrise Boulevard and Rancho Cordova Parkway under cumulative (future) conditions.

In addition, implementation of the Teichert, Stoneridge, and DeSilva Gates quarry projects would result in an increase in heavy-duty truck volumes on affected roadway segments and, consequently, an increase in traffic noise. Traffic noise levels associated with the related projects were predicted for affected roadway segments using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108) (FHWA 1978) and traffic data (e.g., ADT volumes, vehicle speeds, percent distribution of vehicle types) from Fehr & Peers and Caltrans. This model is based on the 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 and does not assume any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings).

Table 3.11-12 summarizes the modeled traffic noise levels at the approximate road corridor boundary under cumulative (future) conditions with regard to the anticipated addition of quarry truck trips. As shown in Table 3.11-12, quarry truck activities would increase the traffic noise levels along Grant Line Road adjacent to the project site. As shown in Table 3.11-12, cumulative quarry truck noise levels, when added to the cumulative non-quarry traffic, would result in traffic noise increases of 2.2 to 3.2 dBA CNEL/L_{dn}. As stated above, a noticeable increase of 3 dBA (CNEL/L_{dn}) (i.e., a significant impact) would typically occur with a doubling of roadway traffic volumes.

Table 3.11-12
Summary of Modeled Cumulative (Future) Traffic Noise Levels
Along Grant Line Road Between Chrysanthy Boulevard and Kiefer Boulevard from Quarry Truck Trips

	Predicted Noise Level (dBA CNEL/L_{dn}) at 50 Feet from Near Travel Lane Centerline					
	NP	**NCP**	**PP**	**BIM**	**CS**	**ID**
With Quarry Trucks	77.5	77.7	78.1	77.8	77.8	77.8
Without Quarry Trucks	74.8	75.2	75.9	75.4	75.3	74.6
Change in dB	**2.7**	**2.5**	**2.2**	**2.4**	**2.5**	**3.2**

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; dB = decibels; L_{dn} = day-night average noise level; NP = No Project Alternative; NCP = No USACE Permit Alternative; PP = Proposed Project Alternative; BIM = Biological Impact Minimization Alternative; CS = Conceptual Strategy Alternative; ID = Increased Development Alternative.
Traffic noise levels were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) based on traffic data obtained from the traffic analysis prepared for this project (see Section 3.15, "Traffic and Transportation"). Modeling assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).
Source: Modeled by AECOM in 2011

Sensitive land uses (i.e., schools, parks, residences) that are proposed adjacent to Grant Line Road under the Increased Development Alternative would be exposed to a noticeable (i.e., 3-dBA) increase in ambient noise levels along Grant Line Road under cumulative combined quarry plus non-quarry traffic conditions.

Under the Proposed Project Alternative, a 60-acre Local Town Center would be constructed adjacent to Grant Line Road. According to the Draft SunCreek Specific Plan Section 1.3, "Land Use" (attached as Appendix C), land uses within the Local Town Center would consist of large retail stores, restaurant, lodging, and entertainment (including indoor and outdoor recreational facilities). Assuming that commercial buildings would be constructed that do not have windows on the side that faces Grant Line Road, the additional traffic generated by quarry truck trips would not result in an exceedance of City noise thresholds under the Proposed Project Alternative.

Because future growth is expected to surround the project site with a mix of traffic-generating development (including aggregate quarries) by 2030, resulting in greater area-wide and on-site noise levels, full buildout of development on the SPA itself would contribute to noticeable (i.e., 3 dBA or greater) increases in ambient traffic noise levels at noise-sensitive land uses that exceed land use compatibility noise criteria. Therefore, the project would result in a **cumulatively considerable** incremental contribution to a significant cumulative impact.

Mitigation Measure CUM Noise-1: Implement Measures to Reduce Exposure of Sensitive Receptors to Project-Generated Increases in Operational Traffic Noise Levels along Kiefer Boulevard (all Action Alternatives).

To meet applicable City noise standards and to reduce increases in traffic-generated noise levels at on-site noise-sensitive uses along Kiefer Boulevard, the project applicant (Shalako) of on-site residential areas adjacent to Kiefer Boulevard between Zinfandel Drive and Sunrise Boulevard and between Sunrise Boulevard and Rancho Cordova Parkway shall implement the following:

- Obtain the services of a consultant (such as a licensed engineer or licensed architect) to develop noise-attenuation measures for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) that will produce a minimum composite Sound Transmission Class (STC) rating for buildings of 30 or greater, individually computed for the walls and the floor/ceiling construction of buildings, for the proposed construction of on-site noise-sensitive land uses (i.e., residential dwellings and school classrooms) adjacent to Kiefer Boulevard.

- Prior to submittal of tentative subdivision maps and improvement plans, the Phase 1 project applicant (Shalako) shall demonstrate that project-generated operational traffic noise levels at on-site sensitive receptors along Kiefer Boulevard have been reduced such that City of Rancho Cordova noise standards are met by implementing one or more of the following:

    - construct exterior sound walls;
    - construct barrier walls and/or berms with vegetation;
    - use "quiet pavement" (e.g., rubberized asphalt) construction methods; or
    - use increased noise-attenuation measures in building construction (e.g., dual-pane, sound-rated windows; thicker exterior wall insulation).

Implementation: Project applicant of development Phase 1 (Shalako parcel).

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for project Phase 1.

Enforcement: City of Rancho Cordova Planning Department.

Mitigation Measure CUM Noise-2: Implement Measures to Reduce Exposure of Sensitive Receptors to Increased Traffic Noise Levels along Grant Line Road (applies to Increased Development Alternative Only)

The following measures shall be implemented under the Increased Development Alternative to reduce exposure of sensitive receptors to increases in traffic noise levels along Grant Line Road. Under the Proposed Project Alternative, this mitigation measure shall only apply if a land use other than a shopping center is constructed on the Local Town Center adjacent to Grant Line Road.

- A site-specific screening analysis shall be performed for all proposed sensitive receptors (e.g., residences, schools, daycares, libraries, etc.) that would be located along Grant Line Road between Chrysanthy Boulevard and Kiefer Boulevard using an approved three-dimensional traffic noise modeling program (i.e., TNM, SoundPlan). Each analysis shall be performed according to the standards set forth by the City of Rancho Cordova. The screening analysis shall account for the location of the receptors relative to the roadway, their distance from the roadway, and the projected future traffic volume for the year 2030. If the incremental increase in traffic noise levels are determined to exceed the threshold of significance recommended by the City of Rancho Cordova, then design mitigation shall be employed, such as the following:

    - Model the benefits of soundwalls (berm/wall combination) along Grant Line Road and the affected receptors not to exceed a total height of 10 feet (2-foot berm and 8-foot concrete masonry wall). If this mitigation measure is determined by the City of Rancho Cordova to be inadequate, additional three-dimensional traffic noise modeling shall be conducted with the inclusion of rubberized asphalt.

    - Implement the installation of rubberized asphalt (quiet pavement) on roadway segments adjacent to sensitive receptors if soundwalls do not provide adequate reduction of traffic noise levels. (The inclusion of rubberized asphalt would provide an additional 3 to 5 dB of traffic noise reduction.)

    - To improve the indoor noise levels at affected receptors on the SunCreek project site, implement the following measures before the occupancy of the affected residences and schools along Grant Line Road:

        – Conduct an interior noise analysis once detailed construction plans of residences adjacent to Grant Line Road to determine the required window package at second and third floor receptors to achieve the interior noise level standard of 45-dB L_{dn}.

        – Determine the interior traffic noise level increases at second and third floor receptors adjacent to Grant Line Road and install window package upgrades (increased sound transmission class rated windows) that would achieve the interior noise level standard of 45-dB L_{dn}.

Implementation: The project applicants of Phase 3 (Grantline 220 parcel).

Timing: During design review and before the approval of all subdivision maps and improvement plans, where applicable for project Phase 3.

Enforcement: City of Rancho Cordova Planning Department.

Implementation of Cumulative Mitigation Measure Noise-1 would reduce impacts from traffic noise on sensitive receptors levels along Kiefer Boulevard between (1) Zinfandel Drive and Sunrise Boulevard, and (2) between Sunrise Boulevard and Rancho Cordova Parkway, under the No USACE Permit, Proposed Project, Biological Impact Minimization, Conceptual Strategy, and Increased Development Alternatives to a level that is less-than-cumulatively considerable because buildings that will house sensitive land uses would be constructed with a

minimum composite STC rating of 30 or greater, and one or more types of sound attentuation would be employed such as construction of exterior sound walls, barrier walls and/or berms, quiet pavement, etc.

Implementation of Cumulative Mitigation Measure Noise-2 would reduce the significant impact related to exposure of on-site sensitive receptors to noise from increased cumulative traffic levels along Grant Line Road under the Increased Development Alternative to a level that is less-than-cumulatively considerable because a site-specific noise assessment would be performed using an approved three-dimensional traffic noise modeling program, and in the event the 3-dBA increase in sound levels (or to increase interior sound levels above 45 dBA) occurs within 400 feet of any project-generated sensitive receptors, either the setback distances of the sensitive receptors from the road would be increased, the sound wall heights would be increased, or additional sound reduction measures such as quiet pavement would be constructed such that a 3-dBA increase would not occur.

(Note that no cumulative mitigation is required under the Proposed Project Alternative, because this analysis assumes that a shopping center [i.e., large retail stores] would be constructed along Grant Line Road according to the Draft SunCreek Specific Plan [Appendix C], and that such commercial buildings would be constructed without windows on the side that faces Grant Line Road.)