APPENDIX H

Environmental Noise Assessment

Environmental Noise Assessment

The Ranch –
Environmental Impact Report

City of Rancho Cordova, California

March 6, 2019

Project # 180804

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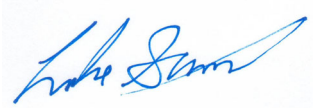

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This section provides a general description of the existing noise sources in the Project vicinity, a discussion of the regulatory setting, and identifies potential noise impacts associated with the proposed Project. Project impacts are evaluated relative to applicable noise level criteria and to the existing ambient noise environment. Mitigation measures have been identified for significant noise-related impacts.

3.7.1 ENVIRONMENTAL SETTING

KEY TERMS

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given area consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, defined as ten times the logarithm of the ratio of the sound pressure squared over the reference pressure squared.
CNEL	Community noise equivalent level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic acoustic signal, expressed in cycles per second or Hertz.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50 percent of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
SEL	Sound exposure levels. A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.

FUNDAMENTALS OF ACOUSTICS

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60-dBA sound.

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 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 descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average,

it tends to disguise short-term variations in the noise environment. CNEL is similar to L_{dn}, but includes a +5-dB penalty for evening noise. Table 3.7-1 lists several examples of the noise levels associated with common situations.

TABLE 3.7-1: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	*NOISE LEVEL (DBA)*	*COMMON INDOOR ACTIVITIES*
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

SOURCE: CALTRANS, TECHNICAL NOISE SUPPLEMENT, TRAFFIC NOISE ANALYSIS PROTOCOL. SEPTEMBER 2013.

EFFECTS OF NOISE ON PEOPLE

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

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

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

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

- Except in carefully controlled laboratory experiments, a 1 dBA change cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;

- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING NOISE LEVELS

Existing and Surrounding Land Uses

North: The Sunridge Park Village residential area is located directly north of the project site, south of Douglas Road and east of Sunrise Boulevard. A mix of industrial uses and additional residential communities are located north of Douglas Road.

East: The land directly to the east of the project site is vacant.

South: The land directly to the south of the project site is vacant.

West: Anatolia and Anatolia Village residential areas are located directly to the west of the project site. Another residential community is also under construction along with Rancho Cordova Parkway, which is being extended from Douglas Road to Chrysanthy Boulevard.

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the Project vicinity, short-term and continuous (24-hour) noise level measurements were conducted on the Project site on August 28th and 29th, 2018. The noise measurement locations are shown on Figure 3.7-4. The noise level measurement survey results are provided in Table 3.7-2. Appendix A of Appendix F shows the complete results of the noise monitoring survey.

The sound level meters were programmed to collect hourly noise level intervals at each site during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

TABLE 3.7-2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

SITE	LOCATION	DATE/TIME	L_{DN}	AVERAGE MEASURED HOURLY NOISE LEVELS, dB					
				DAYTIME (7AM-10PM)			NIGHTTIME (10PM-7AM)		
				L_{EQ}	L_{50}	L_{MAX}	L_{EQ}	L_{50}	L_{MAX}
Continuous (24-hour) Noise Level Measurements									
1	31 ft. from centerline of Rancho Cordova Parkway	08/28/18 - 08/29/18	52	51	40	72	44	34	63
2	North boundary of project site, behind 12368 Pawcatuk Way.	08/28/18 – 08/29/18	45	44	37	61	38	35	50
Short-Term Noise Level Measurements									
1	140 ft. from centerline of Rancho Cordova Parkway.	08/28/18 10:58 AM	NA	53	49	64	Construction at housing development to the west is the primary noise source.		

NOTE: SOURCE: SAXELBY ACOUSTICS, 2019.

Larson Davis Laboratories (LDL) Model 820, Model 812, and Model 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

EXISTING ROADWAY NOISE LEVELS

To predict existing noise levels due to traffic, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon 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 the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Traffic volumes for existing conditions were obtained from the Traffic Data prepared for the Project (Kimley Horn). Truck percentages and vehicle speeds on the local area roadways were estimated from field observations.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each Project-area roadway segment. Where traffic noise barriers are predominately along a roadway segment, a -5 offset was added to the noise prediction model to account for various noise barrier heights. A -5 to dB offset was also applied where outdoor activity areas are shielded by intervening buildings. In some locations, sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers

or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the Project-area roadway segments analyzed in this report.

Table 3.7-3 shows the existing traffic noise levels in terms of L_{dn} at closest sensitive receptors along each roadway segment. A complete listing of the FHWA Model input data is contained in Appendix B of Appendix F.

TABLE 3.7-3: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, DB L_{DN}*
Jackson Rd.	Bradshaw Rd. to Excelsior Rd.	67.4
Jackson Rd.	Excelsior Rd. to Eagles Nest Rd.	67.1
Jackson Rd.	Eagles Nest Rd. to Sunrise Blvd.	66.1
Jackson Rd.	Sunrise Blvd. to Grant Line Rd.	67.1
Excelsior Rd.	Kiefer Blvd. to Jackson Rd.	60.0
Kiefer Blvd.	Grant Line Rd. to Jackson Rd./SR-16	55.1
International Dr.	Zinfandel Dr. to Sunrise Blvd.	65.2
Mather Blvd.	Femoyer St. to Douglas Rd.	58.1
Douglas Rd.	Mather Blvd. to Sunrise Blvd.	66.3
Douglas Rd.	Sunrise Blvd. to Grant Line Rd.	61.0
White Rock Rd.	Zinfandel Dr. to Sunrise Blvd.	65.3
White Rock Rd.	Sunrise Blvd. to Grant Line Rd.	60.9
White Rock Rd.	Grant Line Rd. to Prairie City Rd.	67.3
Mather Field Rd.	Folsom Blvd. to US 50 WB Ramp	65.7
Mather Field Rd.	US 50 WB Ramp to US 50 EB Ramp	68.7
Mather Field Rd.	US 50 to International Dr.	69.5
Zinfandel Dr.	Folsom Blvd. to US 50 WB	57.0
Zinfandel Dr.	US 50 to White Rock Rd.	66.6
Zinfandel Dr.	White Rock Rd. to International Rd.	65.8
Zinfandel Dr.	International Rd. to Douglas Rd.	59.6
Sunrise Blvd.	US 50 WB Ramp to US 50 EB Ramp	64.3
Sunrise Blvd.	US 50 to Folsom Blvd.	67.1
Sunrise Blvd.	Folsom Blvd. to White Rock Rd.	69.4
Sunrise Blvd.	White Rock Rd. to Douglas Rd.	69.3
Sunrise Blvd.	Douglas Rd. to Jackson Rd.	64.6
Sunrise Blvd.	Jackson Rd. to Grant Line Rd.	66.8
Grant Line Rd.	White Rock Rd. to Douglas Rd.	69.8
Grant Line Rd.	Douglas Rd. to Jackson Rd.	64.7
Grant Line Rd.	Jackson Rd. to Sunrise Blvd.	64.3

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KIMLEY HORN AND SAXELBY ACOUSTICS. 2019.

3.7.2 REGULATORY SETTING

FEDERAL

There are no federal regulations related to noise that apply to the proposed Project.

STATE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a project exposes persons to noise or vibration levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels. CEQA standards are discussed more below under the Thresholds of Significance section.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and dwellings other than single-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room.

Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment

City of Rancho Cordova General Plan

The City of Rancho Cordova General Plan Noise Element includes the following goals, policies, and actions regarding noise that are applicable to the proposed Project:

Goal N-1	Ensure that all new development will be free of noise disturbances.
Policy N-1.1	Establish standards and policies consistent with those in Tables N-1 and N-2 to govern maximum sound levels in new development.
Policy N-1.2	Ensure that the indoor and outdoor areas of new projects will be located, constructed, and/or shielded from noise sources in compliance with the City's noise standards to the maximum extent feasible.
Policy N-1.7	To the extent feasible and appropriate, the City shall require the use of temporary construction noise control measures for public and

private projects that may include the use of temporary noise barriers, temporary relocation of noise-sensitive land uses or other appropriate measures.

Noise Compatibility Standards

Table N-1 (Figure 3.7-1) of the General Plan shows the maximum allowable daytime and nighttime noise levels from non-transportation sources. Table N-2 (Figure 3.7-2) gives an overview of maximum interior and exterior traffic noise exposure for land use categories that are applied throughout the City.

TABLE N-1
CITY NOISE STANDARDS
NOISE LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED BY OR INCLUDING NON-TRANSPORTATION NOISE SOURCES

Stationary Noise Source	Noise Level Descriptor	Daytime Maximum (7 a.m. to 10 p.m.)	Nighttime Maximum (10 p.m. to 7 a.m.)
Typical	Hourly L_{eq}, dB	55	45
Tonal, impulsive, repetitive, or consist primarily of speech or music	Hourly Leq, dB	50	40

The City may impose noise level standards which are more or less restrictive than those specified above based upon determination of existing low or high ambient noise levels.

Figure 3.7-1: Table N-1 of the City of Rancho Cordova General Plan Noise Element

TABLE N-2
MAXIMUM TRANSPORTATION NOISE EXPOSURE

Land Use	Outdoor Activity Areas[1] Ldn/CNEL, dB	Interior Spaces	
		Ldn/CNEL, dB	Leq, dB[2]
Residential	60[3]	45	--
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources which produce clearly identifiable, discrete noise events (e.g., the passing of a single train)	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	--	--

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 Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/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.

Figure 3.7-2: Table N-2 of the City of Rancho Cordova General Plan Noise Element

City of Rancho Cordova Municipal Code and Noise Ordinance

Chapter 6.68 of the Municipal Code identifies performance standards for noise. The maximum exterior noise level for Residential Districts is set at 55 dBA. This standard is 5.0 dBA lower between 10:00 P.M and 7:00 A.M. The following table from Section 6.68.070, subsection B (Figure 3.7-3) outlines allowable exterior noise standard exceedances in any one hour. The limits specified in subsection B are reduced by five dBA for noises which are impulsive or consist of speech or music. If the existing ambient noise level exceeds the first four categories in subsection B, then the allowable noise exterior limit shall be increased by five-dBA increments to encompass the ambient noise level.

Cumulative Duration of the Intrusive Sound	Allowance Decibels
1. Cumulative period of 30 minutes per hour	0
2. Cumulative period of 15 minutes per hour	+ 5
3. Cumulative period of 5 minutes per hour	+10
4. Cumulative period of 1 minute per hour	+15
5. Level not to be exceeded for any time per hour	+20

Figure 3.7-3: City of Rancho Cordova Municipal Code. Section 6.68.070, Subsection B

Furthermore, the interior noise level in any residential dwelling unit located in a mixed-use building or development shall not exceed forty-five dBA for a cumulative period of more than five minutes in any hour, fifty dBA for a cumulative period of more than one minute in any hour, or fifty-five dBA for any period of time. There is a slight reprieve in that the allowable noise limit shall be increased by five-dBA increments to encompass the ambient noise level if the existing ambient noise level exceeds the standard.

Exemptions to the interior and exterior noise standards are outlined in Section 6.68.090 of the City's Municipal Code. A list of the exemptions is provided here:

A. School bands, school athletic and school entertainment events;
B. Outdoor gatherings, public dances, shows and sporting and entertainment events, provided said events are conducted pursuant to a license or permit by the city;
C. Activities conducted on parks, public playgrounds and school grounds, provided such parks, playgrounds and school grounds are owned and operated by a public entity or private school;
D. Any mechanical device, apparatus or equipment related to or connected with emergency activities or emergency work;

E. Noise sources associated with construction, repair, remodeling, demolition, paving or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 6:00 a.m. on weekdays and Friday commencing at 8:00 p.m. through and including 7:00 a.m. on Saturday; Saturdays commencing at 8:00 p.m. through and including 7:00 a.m. on the next following Sunday and on each Sunday after the hour of 8:00 p.m.; provided, however, when an unforeseen or unavoidable condition occurs during a construction project and the nature of the project necessitates that work in process be continued until a specific phase is completed, the contractor or owner shall be allowed to continue work after 8:00 p.m. and to operate machinery and equipment necessary until completion of the specific work in progress can be brought to conclusion under conditions which will not jeopardize inspection acceptance or create undue financial hardships for the contractor or owner;
F. Noise sources associated with agricultural operations, provided such operations do not take place between the hours of 8:00 p.m. and 6:00 a.m.;
G. All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of adverse weather conditions or when the use of mobile noise sources is necessary for pest control;
H. Noise sources associated with maintenance of residential area property, provided said activities take place between the hours of 6:00 a.m. and 8:00 p.m. on any day except Saturday or Sunday, or between the hours of 7:00 a.m. and 8:00 p.m. on Saturday or Sunday;
I. Any activity, to the extent provisions of Chapter 65 of Title 42 of the United States Code and Articles 3 and 3.5 of Chapter 4 of Part 1 of Division 9 of the Public Utilities Code of the state of California preempt local control of noise regulations and land use regulations related to noise control of airports and their surrounding geographical areas, any noise source associated with the construction, development, manufacture, maintenance, testing or operation of any aircraft engine, or of any weapons system or subsystems which are owned, operated or under the jurisdiction of the United States, or any other activity to the extent regulation thereof has been preempted by state or federal law or regulation;
J. Any noise sources associated with the maintenance and operation of aircraft or airports which are owned or operated by the United States. [Ord. 38-2007 § 1 (Exh. 1(E)); Ord. 21-2003 §§ 2, 4; Ord. 20-2003 §§ 2, 4; SCC 254 § 1 (part), 1976].

VIBRATION STANDARDS

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City of Rancho Cordova not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities and railroad operations are addressed as potential noise impacts associated with Project implementation.

Human and structural response to different vibration levels is influenced by several factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 3.7-4 indicates that the threshold for damage to structures ranges from 0.2 to 0.6 peak particle velocity in inches per second (in/sec p.p.v). One-half this minimum threshold or 0.1 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage. The general threshold at which human annoyance could occur is noted as 0.1 in/sec p.p.v.

TABLE 3.7-4: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

PEAK PARTICLE VELOCITY		*HUMAN REACTION*	*EFFECT ON BUILDINGS*
MM/SEC.	*IN./SEC.*		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

SOURCE: CALTRANS. TRANSPORTATION RELATED EARTHBORN VIBRATIONS. TAV-02-01-R9601 FEBRUARY 20, 2002.

3.7.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the Project will have a significant impact related to noise if it will result in:

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

The Project site is not located within two miles of a public or private airport or airstrip. Therefore, airport and airport noise is not discussed further in this analysis.

Determination of a Significant Increase in Noise Levels

The noise standards applicable to the project include the relevant portions of the City of Rancho Cordova General Plan, the City of Rancho Cordova Municipal Code described in the Regulatory Framework Section above (Section 3.7.2), and the following standards. Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project-noise conditions. Table 3.7-5 is based upon recommendations made by the

Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

TABLE 3.7-5: SIGNIFICANCE OF CHANGES IN NOISE EXPOSURE

AMBIENT NOISE LEVEL WITHOUT PROJECT, LDN	*INCREASE REQUIRED FOR SIGNIFICANT IMPACT*
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

SOURCE: FEDERAL INTERAGENCY COMMITTEE ON NOISE (FICON)

Based on the Table 3.7-5 data, an increase in the traffic noise level of 5 dB or more would be significant where the pre-project noise levels are less than 60 dB L_{dn}, or 3 dB or more where existing noise levels are between 60 to 65 dB Ldn. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB L_{dn}. The rationale for the Table 3.7-5 criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

IMPACTS AND MITIGATION MEASURES

Impact 3.7-1: The proposed Project has the potential to increase traffic noise levels at existing receptors. (Less than Significant)

PROPOSED PROJECT ANALYSIS

Tables 3.7-6 and 3.7-7 show the predicted traffic noise level increases on the local roadway network for Existing, Existing + Project, Cumulative No Project, and Cumulative + Project conditions. Appendix B of Appendix F provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE 3.7-6: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS*				
		EXISTING	*EXISTING + PROJECT*	*CHANGE*	*CRITERIA*[1]	*SIGNIFICANT?*
Jackson Rd.	Bradshaw Rd. to Excelsior Rd.	67.4	67.4	0.0	+1.5 dB	No
Jackson Rd.	Excelsior Rd. to Eagles Nest Rd.	67.1	67.2	0.1	+1.5 dB	No
Jackson Rd.	Eagles Nest Rd. to Sunrise Blvd.	66.1	66.2	0.1	+1.5 dB	No
Jackson Rd.	Sunrise Blvd. to Grant Line Rd.	67.1	67.2	0.1	+1.5 dB	No
Excelsior Rd.	Kiefer Blvd. to Jackson Rd.	60.0	60.0	0.0	+3 dB	No
Kiefer Blvd.	Grant Line Rd. to Jackson Rd./SR-16	55.1	55.1	0.0	+5 dB or > 60 dB	No
International Dr.	Zinfandel Dr. to Sunrise Blvd.	65.2	66.1	0.9	+1.5 dB	No
Mather Blvd.	Femoyer St. to Douglas Rd.	58.1	58.5	0.4	+5 dB or > 60 dB	No
Douglas Rd.	Mather Blvd. to Sunrise Blvd.	66.3	66.5	0.2	+1.5 dB	No
Douglas Rd.	Sunrise Blvd. to Grant Line Rd.	61.0	61.2	0.2	+3 dB	No
White Rock Rd.	Zinfandel Dr. to Sunrise Blvd.	65.3	65.3	0.0	+1.5 dB	No
White Rock Rd.	Sunrise Blvd. to Grant Line Rd.	60.9	61.0	0.1	+3 dB	No
White Rock Rd.	Grant Line Rd. to Prairie City Rd.	67.3	67.4	0.1	+1.5 dB	No
Mather Field Rd.	Folsom Blvd. to US 50 WB Ramp	65.7	65.7	0.0	+1.5 dB	No
Mather Field Rd.	US 50 WB Ramp to US 50 EB Ramp	68.7	68.7	0.0	+1.5 dB	No
Mather Field Rd.	US 50 to International Dr.	69.5	69.5	0.0	+1.5 dB	No
Zinfandel Dr.	Folsom Blvd. to US 50 WB	57.0	57.1	0.1	+5 dB or > 60 dB	No
Zinfandel Dr.	US 50 to White Rock Rd.	66.6	66.8	0.2	+1.5 dB	No
Zinfandel Dr.	White Rock Rd. to International Rd.	65.8	66.1	0.3	+1.5 dB	No
Zinfandel Dr.	International Rd. to Douglas Rd.	59.6	59.6	0.0	+5 dB or > 60 dB	No
Sunrise Blvd.	US 50 WB Ramp to US 50 EB Ramp	64.3	64.5	0.2	+3 dB	No
Sunrise Blvd.	US 50 to Folsom Blvd.	67.1	67.3	0.2	+1.5 dB	No
Sunrise Blvd.	Folsom Blvd. to White Rock Rd.	69.4	69.8	0.4	+1.5 dB	No

Roadway	Segment	Noise Levels (L_{DN}, dB) at Nearest Sensitive Receptors				
		Existing	Existing + Project	Change	Criteria[1]	Significant?
Sunrise Blvd.	White Rock Rd. to Douglas Rd.	69.3	70.2	0.9	+1.5 dB	No
Sunrise Blvd.	Douglas Rd. to Jackson Rd.	64.6	66.1	1.5	+3 dB	No
Sunrise Blvd.	Jackson Rd. to Grant Line Rd.	66.8	67.1	0.3	+1.5 dB	No
Grant Line Rd.	White Rock Rd. to Douglas Rd.	69.8	69.9	0.1	+1.5 dB	No
Grant Line Rd.	Douglas Rd. to Jackson Rd.	64.7	64.7	0.0	+3 dB	No
Grant Line Rd.	Jackson Rd. to Sunrise Blvd.	64.3	64.3	0.0	+3 dB	No

[1] *Where existing noise levels are less than 60 dB an increase of 5 dB would be a significant increase. Additionally, any increase causing noise levels to exceed the City's Normally Acceptable 60 dB Ldn noise level standard at an existing outdoor activity area of a residential use would also be significant. Where existing noise levels exceed 60 dB but are less than 65 dB, an increase of 3 dB or more would be significant. Where existing noise levels exceed 65 dB, an increase of 1.5 dB or more would be significant.*

Source: FHWA-RD-77-108 with inputs from Kimley Horn and Saxelby Acoustics. 2019.

Table 3.7-7: Cumulative and Cumulative + Project Traffic Noise Levels

Roadway	Segment	Noise Levels (L_{DN}, dB) at Nearest Sensitive Receptors				
		Cumulative	Cumulative + Project	Change	Criteria[1]	Significant?
Jackson Rd.	Bradshaw Rd. to Excelsior Rd.	70.0	70.0	0.0	+1.5 dB	No
Jackson Rd.	Excelsior Rd. to Eagles Nest Rd.	70.0	70.0	0.0	+1.5 dB	No
Jackson Rd.	Eagles Nest Rd. to Sunrise Blvd.	68.7	68.7	0.0	+1.5 dB	No
Jackson Rd.	Sunrise Blvd. to Grant Line Rd.	69.1	69.1	0.0	+1.5 dB	No
Excelsior Rd.	Kiefer Blvd. to Jackson Rd.	62.9	62.9	0.0	+3 dB	No
Kiefer Blvd.	Grant Line Rd. to Jackson Rd./SR-16	58.8	59.0	0.2	+5 dB or > 60 dB	No
International Dr.	Zinfandel Dr. to Sunrise Blvd.	68.8	68.8	0.0	+1.5 dB	No
Mather Blvd.	Femoyer St. to Douglas Rd.	63.9	64.2	0.3	+3 dB	No
Douglas Rd.	Mather Blvd. to Sunrise Blvd.	71.1	71.4	0.3	+1.5 dB	No
Douglas Rd.	Sunrise Blvd. to Grant Line Rd.	66.1	66.8	0.7	+1.5 dB	No
White Rock Rd.	Zinfandel Dr. to Sunrise Blvd.	67.6	67.7	0.1	+1.5 dB	No
White Rock Rd.	Sunrise Blvd. to Grant Line Rd.	67.7	67.7	0.0	+1.5 dB	No
White Rock Rd.	Grant Line Rd. to Prairie City Rd.	71.5	71.7	0.2	+1.5 dB	No
Mather Field Rd.	Folsom Blvd. to US 50 WB Ramp	67.0	67.0	0.0	+1.5 dB	No
Mather Field Rd.	US 50 WB Ramp to US 50 EB Ramp	69.6	69.7	0.1	+1.5 dB	No
Mather Field Rd.	US 50 to International Dr.	70.8	70.8	0.0	+1.5 dB	No
Zinfandel Dr.	Folsom Blvd. to US 50 WB	57.2	57.3	0.1	+5 dB or > 60 dB	No
Zinfandel Dr.	US 50 to White Rock Rd.	68.2	68.2	0.0	+1.5 dB	No

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS				
		CUMULATIVE	CUMULATIVE + PROJECT	CHANGE	CRITERIA[1]	SIGNIFICANT?
Zinfandel Dr.	White Rock Rd. to International Rd.	67.7	67.8	0.1	+1.5 dB	No
Zinfandel Dr.	International Rd. to Douglas Rd.	61.6	61.8	0.2	+3 dB	No
Sunrise Blvd.	US 50 WB Ramp to US 50 EB Ramp	64.6	64.6	0.0	+3 dB	No
Sunrise Blvd.	US 50 to Folsom Blvd.	67.4	67.5	0.1	+1.5 dB	No
Sunrise Blvd.	Folsom Blvd. to White Rock Rd.	69.4	69.5	0.1	+1.5 dB	No
Sunrise Blvd.	White Rock Rd. to Douglas Rd.	71.3	71.5	0.2	+1.5 dB	No
Sunrise Blvd.	Douglas Rd. to Jackson Rd.	67.6	67.7	0.1	+1.5 dB	No
Sunrise Blvd.	Jackson Rd. to Grant Line Rd.	69.1	69.1	0.0	+1.5 dB	No
Grant Line Rd.	White Rock Rd. to Douglas Rd.	73.5	73.7	0.2	+1.5 dB	No
Grant Line Rd.	Douglas Rd. to Jackson Rd.	70.1	70.3	0.2	+1.5 dB	No
Grant Line Rd.	Jackson Rd. to Sunrise Blvd.	66.7	66.8	0.1	+1.5 dB	No
Kiefer Blvd.	Eagles Nest Rd. to Sunrise Blvd.	58.6	58.6	0.0	+5 dB or > 60 dB	No
Kiefer Blvd.	Sunrise Blvd. to Rancho Cordova Pkwy.	62.8	62.8	0.0	+3 dB	No
Chrysanthy Blvd.	Sunrise Blvd. to Rancho Cordova Pkwy.	56.1	57.1	1.0	+5 dB or > 60 dB	No
Rancho Cordova Pkwy.	Chrysanthy Blvd. to Kiefer Blvd.	60.8	61.1	0.3	+3 dB	No

[1] WHERE EXISTING NOISE LEVELS ARE LESS THAN 60 DB AN INCREASE OF 5 DB WOULD BE A SIGNIFICANT INCREASE. ADDITIONALLY, ANY INCREASE CAUSING NOISE LEVELS TO EXCEED THE CITY'S NORMALLY ACCEPTABLE 60 DB LDN NOISE LEVEL STANDARD AT AN EXISTING OUTDOOR ACTIVITY AREA OF A RESIDENTIAL USE WOULD ALSO BE SIGNIFICANT. WHERE EXISTING NOISE LEVELS EXCEED 60 DB BUT ARE LESS THAN 65 DB, AN INCREASE OF 3 DB OR MORE WOULD BE SIGNIFICANT. WHERE EXISTING NOISE LEVELS EXCEED 65 DB, AN INCREASE OF 1.5 DB OR MORE WOULD BE SIGNIFICANT.

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KIMLEY HORN AND SAXELBY ACOUSTICS. 2019.

As shown in Tables 3.7-6 through 3.7-7 some noise-sensitive receptors located along the project-area roadways are currently exposed to exterior traffic noise levels exceeding the City of Rancho Cordova 60 dB L_{dn} exterior noise level standard for residential uses. These receptors would continue to experience elevated exterior noise levels with implementation of the proposed project. For example, sensitive receptors under Existing conditions located adjacent to Sunrise Boulevard between Douglas Road and Jackson Road experience an exterior noise level of 64.6 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 66.1 dB L_{dn}. Exterior noise levels in both scenarios exceed the City's exterior noise level standard of 60 dB L_{dn}. However, the project's contribution of 1.5 dB would not exceed the FICON criteria of 3 dB where existing noise levels exceed 65 dB. Therefore, this would be a **less than significant** impact.

Impact 3.7-2: The proposed Project has the potential to increase noise levels associated with construction activities. (Less than Significant with Mitigation)

During the construction of the Project including roads, water, and sewer lines and related infrastructure, noise from construction activities would add to the noise environment in the Project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 3.7-8, ranging from 76 to 90 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

TABLE 3.7-8: CONSTRUCTION EQUIPMENT NOISE

TYPE OF EQUIPMENT	*MAXIMUM LEVEL, DB*	
	25 FEET	*50 FEET*
Backhoe	84	78
Compactor	89	83
Compressor (air)	84	78
Concrete Saw	96	90
Dozer	88	82
Dump Truck	82	76
Excavator	87	81
Generator	87	81
Jackhammer	94	89
Pneumatic Tools	91	85

SOURCE: ROADWAY CONSTRUCTION NOISE MODEL USER'S GUIDE. FEDERAL HIGHWAY ADMINISTRATION. FHWA-HEP-05-054. JANUARY 2006.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant Project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

Construction activities would be temporary in nature and are exempt from noise regulation during the hours of 7:00 AM to 8:00 PM on weekdays, as outlined in the City's Municipal Code for noise standard exemptions.

Implementation of the following mitigation measures will ensure that these potential impacts are reduced to a **less-than-significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.7-1: *Construction activities shall adhere to the requirements of the City of Rancho Cordova Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure 3.7-2: *All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Impact 3.7-3: The proposed Project has the potential to increase noise vibration associated with construction activities. (Less than Significant with Mitigation)

The primary vibration-generating activities associated with the proposed Project would happen during construction when activities such as grading, utilities placement, and road construction occur. Sensitive receptors which could be impacted by construction-related vibrations, especially vibratory compactors/rollers, are located approximately 25 feet or further from the Project area.

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural damage. Table 3.7-9 shows the typical vibration levels produced by construction equipment.

TABLE 3.7-9: VIBRATION LEVELS FOR VARYING CONSTRUCTION EQUIPMENT

TYPE OF EQUIPMENT	PEAK PARTICLE VELOCITY @ 25 FEET (INCHES/SECOND)	PEAK PARTICLE VELOCITY @ 100 FEET (INCHES/SECOND)
Large Bulldozer	0.089	0.011
Loaded Trucks	0.076	0.010
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.011
Jackhammer	0.035	0.004
Vibratory Hammer	0.070	0.009
Vibratory Compactor/roller	0.210	0.026

SOURCE: FEDERAL TRANSIT ADMINISTRATION, TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT GUIDELINES, MAY 2006

With the exception of vibratory compactors, the Table 3.7-9 data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at a distance of 25 feet. Use of vibratory compactors within 26 feet of the adjacent buildings could cause vibrations in excess of 0.2 in/sec. Therefore, this is a **potentially significant** impact.

Implementation of the following mitigation measures will ensure that these potential impacts are reduced to a **less-than-significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.7-3: *Any compaction required less than 26 feet from the adjacent residential structures to the north should be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

Impact 3.7-4: The proposed Project has the potential to expose new sensitive receptors to excessive transportation noise. (Less than Significant with Mitigation)

The FHWA traffic noise prediction model was used to predict Cumulative + Project traffic noise levels at the proposed residential land uses associated with the project. Table 3.7-10 shows the predicted traffic noise levels at the proposed residential uses adjacent to the major Project-area arterial roadways. Table 3.7-10 also indicates the property line noise barrier heights required to achieve compliance with an exterior noise level standard of 60 dB L_{dn}.

The complete inputs and results to the FHWA traffic noise prediction model and barrier calculations are contained in the Noise Study Appendix B (see Appendix F of this EIR). The modeled noise barriers assume flat site conditions where roadway elevations, base of wall elevations, and building pad elevations are approximately equivalent.

To describe future noise levels due to traffic, FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. Direct inputs into the model included traffic volumes provided by Kimley Horn. The FHWA model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict L_{dn}/CNEL values, it is necessary to determine the day/night distribution of traffic and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

TABLE 3.7-10: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES

SEGMENT	APPROXIMATE RESIDENTIAL SETBACK, FEET[1]	ADT	PREDICTED TRAFFIC NOISE LEVELS, DB L_{DN}[2]					
			NO WALL	6' WALL	7' WALL	8' WALL	9' WALL	10' WALL
CHRYSANTHY BOULEVARD								
Rancho Cordova Pkwy. to Americanos Blvd.	90	14651	64	58	57	56	55	54
Rancho Cordova Parkway								
Douglas Rd. to Chrysanthy Blvd.	100	22140	66	61	60	59	58	57
Chrysanthy Blvd. to Keifer Blvd.	525	8965	52	46	45	44	44	43

NOTES: ADT = AVERAGE DAILY TRIPS

[1] SETBACK DISTANCES ARE MEASURED IN FEET FROM THE CENTERLINES OF THE ROADWAYS TO THE CENTER OF RESIDENTIAL BACKYARDS.

[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND WALL HEIGHT MAY BE ACHIEVE D THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 6-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 8-FOOT TALL WALL).

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KIMLEY HORN AND SAXELBY ACOUSTICS. 2019.

Table 3.7-10 data indicate that noise barriers 6-7 feet in height would generally be sufficient to achieve compliance with the City of Rancho Cordova 60 dB L_{dn} exterior noise level standard for the proposed residential uses.

INTERIOR NOISE IMPACTS

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, will typically comply with the City of Rancho Cordova 45 dB L_{dn} interior noise level standard. Additional noise reduction measures, such as acoustically-rated windows, are generally required for exterior noise levels exceeding 70 dB L_{dn}.

It should be noted that exterior noise levels are typically 2 to 3 dB higher at second floor locations. Additionally, noise barriers do not reduce exterior noise levels at second floor locations. The proposed residential uses are predicted to be exposed to unmitigated first floor exterior transportation noise levels ranging between 52 to 66 dB L_{dn}. Therefore, second floor facades are predicted to be exposed to exterior noise levels of up to 55 to 69 dB L_{dn}.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to range between 30 to 44 dB L_{dn}. Accordingly, predicted interior noise levels along the first row of residential uses closest to Chrysanthy Boulevard and Rancho Cordova Parkway would comply with the City's 45 dB L_{dn} interior noise level standard. Therefore, additional interior noise control measures would not be required for these residential uses.

This analysis assumes that mechanical ventilation will be provided to allow residents to keep doors and windows closed, as desired for acoustical isolation. With implementation of the following interior and exterior mitigation measures, the proposed Project would be a **potentially significant** impact relative to this environmental topic.

Implementation of the following mitigation measures will ensure that these potential impacts are reduced to a **less-than-significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.7-4: *6- to 7-foot tall sound walls and/or landscaped berm combinations shall be constructed along the primary Project-area roadways, adjacent to proposed residential uses, in order to achieve the City's exterior noise standards. See Table 3.7-10 of Section 3.7 of the Draft EIR for specific noise barrier heights along each roadway. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department.*

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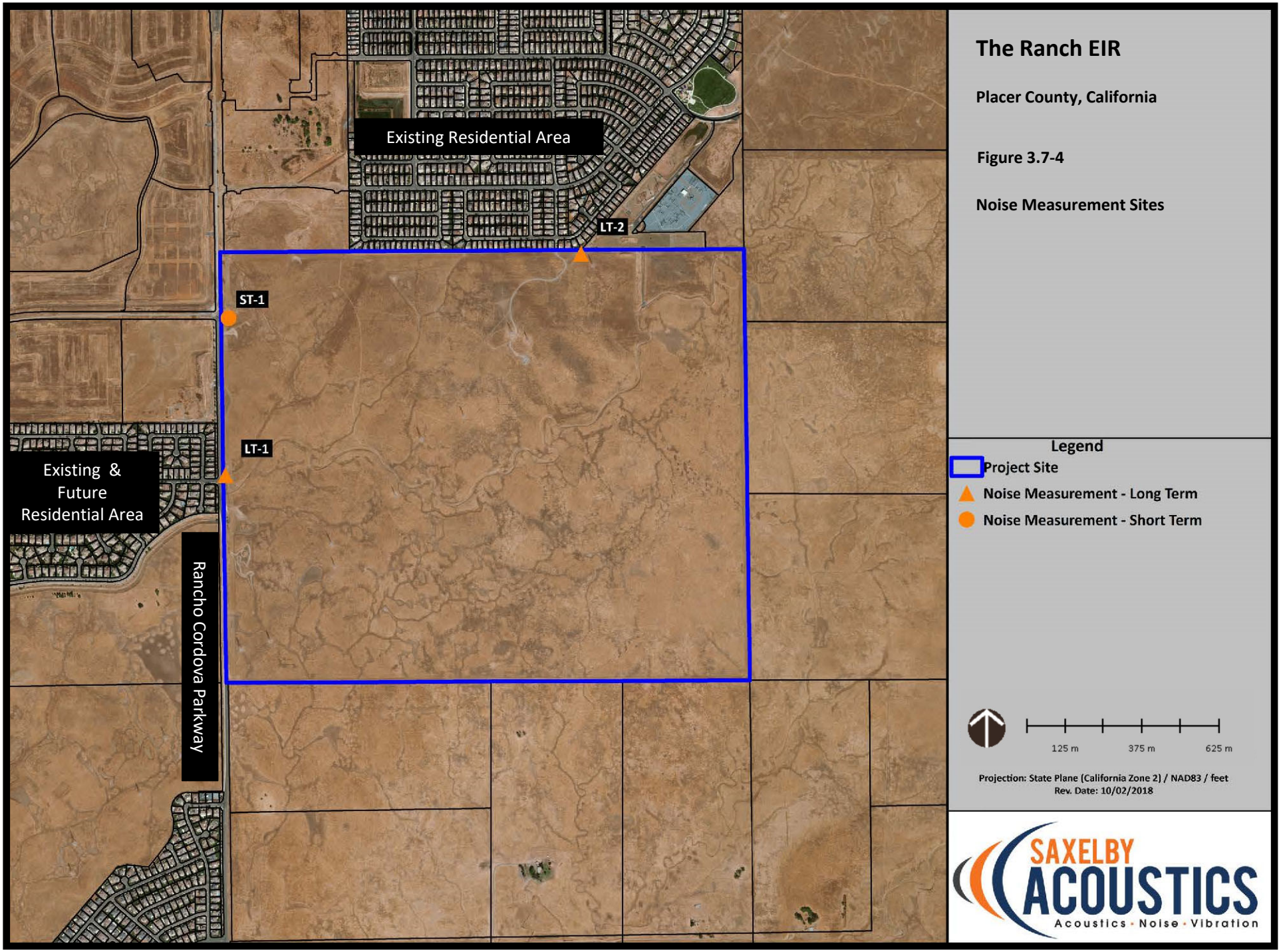

The Ranch EIR

Placer County, California

Figure 3.7-4

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement - Long Term
- Noise Measurement - Short Term

125 m 375 m 625 m

Projection: State Plane (California Zone 2) / NAD83 / feet
Rev. Date: 10/02/2018

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

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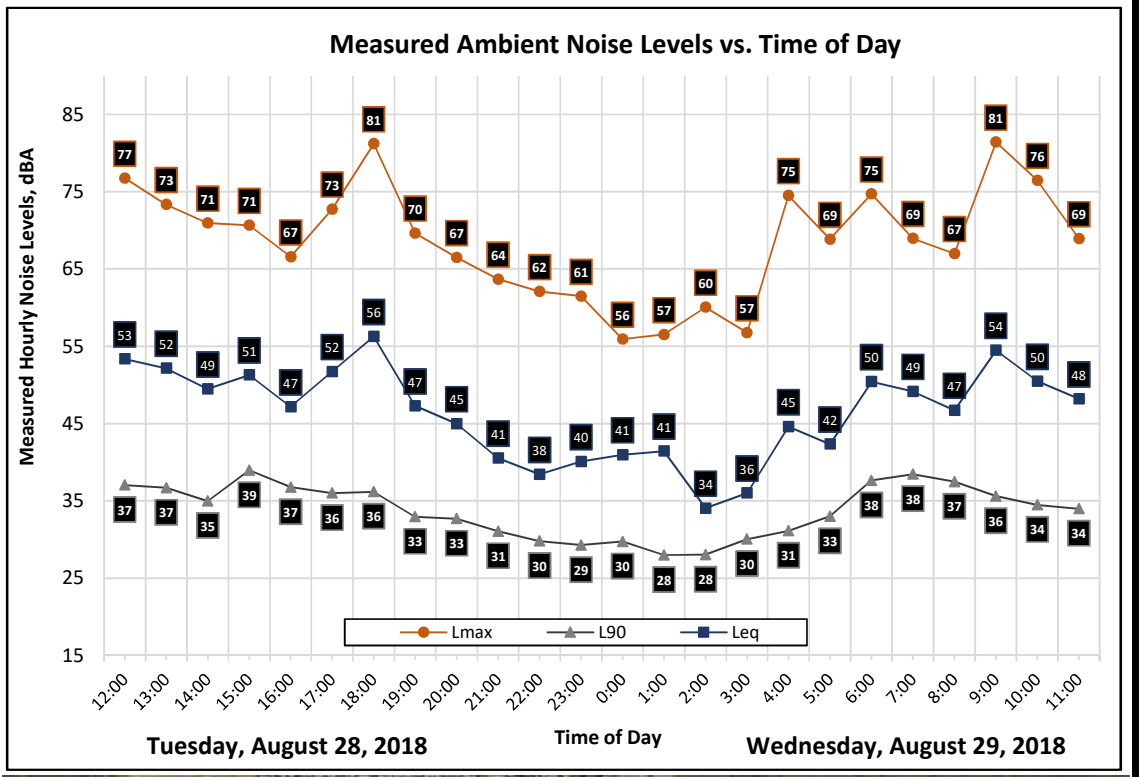
Appendix A: Continuous and Short-Term Ambient Noise Measurement Results

Appendix A-1 : Continuous Noise Monitoring Results

Site: LT-1
Project: The Ranch EIR
Meter: LDL 812-1
Location: West Boundary of Project Site
Calibrator: B&K 4230
Coordinates: 38.5463205°, -121.2241594°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Tuesday, August 28, 2018	12:00	53	77	42	37
Tuesday, August 28, 2018	13:00	52	73	41	37
Tuesday, August 28, 2018	14:00	49	71	40	35
Tuesday, August 28, 2018	15:00	51	71	44	39
Tuesday, August 28, 2018	16:00	47	67	41	37
Tuesday, August 28, 2018	17:00	52	73	41	36
Tuesday, August 28, 2018	18:00	56	81	42	36
Tuesday, August 28, 2018	19:00	47	70	39	33
Tuesday, August 28, 2018	20:00	45	67	37	33
Tuesday, August 28, 2018	21:00	41	64	33	31
Tuesday, August 28, 2018	22:00	38	62	32	30
Tuesday, August 28, 2018	23:00	40	61	32	29
Wednesday, August 29, 2018	0:00	41	56	36	30
Wednesday, August 29, 2018	1:00	41	57	31	28
Wednesday, August 29, 2018	2:00	34	60	30	28
Wednesday, August 29, 2018	3:00	36	57	32	30
Wednesday, August 29, 2018	4:00	45	75	32	31
Wednesday, August 29, 2018	5:00	42	69	36	33
Wednesday, August 29, 2018	6:00	50	75	41	38
Wednesday, August 29, 2018	7:00	49	69	42	38
Wednesday, August 29, 2018	8:00	47	67	42	37
Wednesday, August 29, 2018	9:00	54	81	40	36
Wednesday, August 29, 2018	10:00	50	76	39	34
Wednesday, August 29, 2018	11:00	48	69	38	34

Statistics	Leq	Lmax	L50	L90
Day Average	51	72	40	36
Night Average	44	63	34	31
Day Low	41	64	33	31
Day High	56	81	44	39
Night Low	34	56	30	28
Night High	50	75	41	38
Ldn	52	Day %		90
CNEL	52	Night %		10

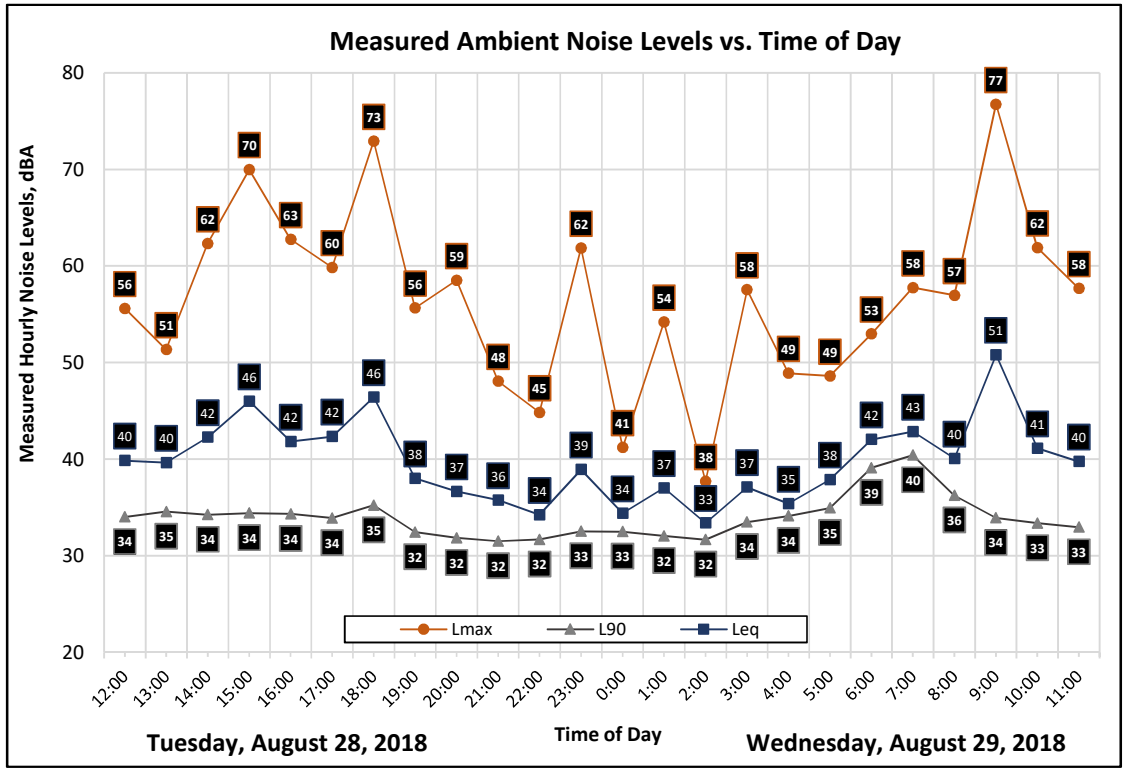


Appendix A-2 : Continuous Noise Monitoring Results

Site: LT-2
Project: The Ranch EIR
Meter: LDL 820-1
Location: North Boundary of Project Site
Calibrator: B&K 4230
Coordinates: 38.5518723°, -121.2114082°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Tuesday, August 28, 2018	12:00	40	56	37	34
Tuesday, August 28, 2018	13:00	40	51	38	35
Tuesday, August 28, 2018	14:00	42	62	38	34
Tuesday, August 28, 2018	15:00	46	70	37	34
Tuesday, August 28, 2018	16:00	42	63	38	34
Tuesday, August 28, 2018	17:00	42	60	37	34
Tuesday, August 28, 2018	18:00	46	73	39	35
Tuesday, August 28, 2018	19:00	38	56	35	32
Tuesday, August 28, 2018	20:00	37	59	35	32
Tuesday, August 28, 2018	21:00	36	48	35	32
Tuesday, August 28, 2018	22:00	34	45	34	32
Tuesday, August 28, 2018	23:00	39	62	34	33
Wednesday, August 29, 2018	0:00	34	41	34	33
Wednesday, August 29, 2018	1:00	37	54	33	32
Wednesday, August 29, 2018	2:00	33	38	33	32
Wednesday, August 29, 2018	3:00	37	58	35	34
Wednesday, August 29, 2018	4:00	35	49	35	34
Wednesday, August 29, 2018	5:00	38	49	37	35
Wednesday, August 29, 2018	6:00	42	53	41	39
Wednesday, August 29, 2018	7:00	43	58	42	40
Wednesday, August 29, 2018	8:00	40	57	39	36
Wednesday, August 29, 2018	9:00	51	77	38	34
Wednesday, August 29, 2018	10:00	41	62	36	33
Wednesday, August 29, 2018	11:00	40	58	36	33

Statistics	Leq	Lmax	L50	L90
Day Average	44	61	37	34
Night Average	38	50	35	34
Day Low	36	48	35	32
Day High	51	77	42	40
Night Low	33	38	33	32
Night High	42	62	41	39
Ldn	45	Day %		87
CNEL	46	Night %		13



Appendix A-3 : Short Term Noise Monitoring Results

Site: ST-1
Project: 180804 The Ranch EIR
Location: West Boundary of Project Site
Coordinates: 35.5503027 -121.2238101°

Meter: LDL 831-1
Calibrator: B&K 4230

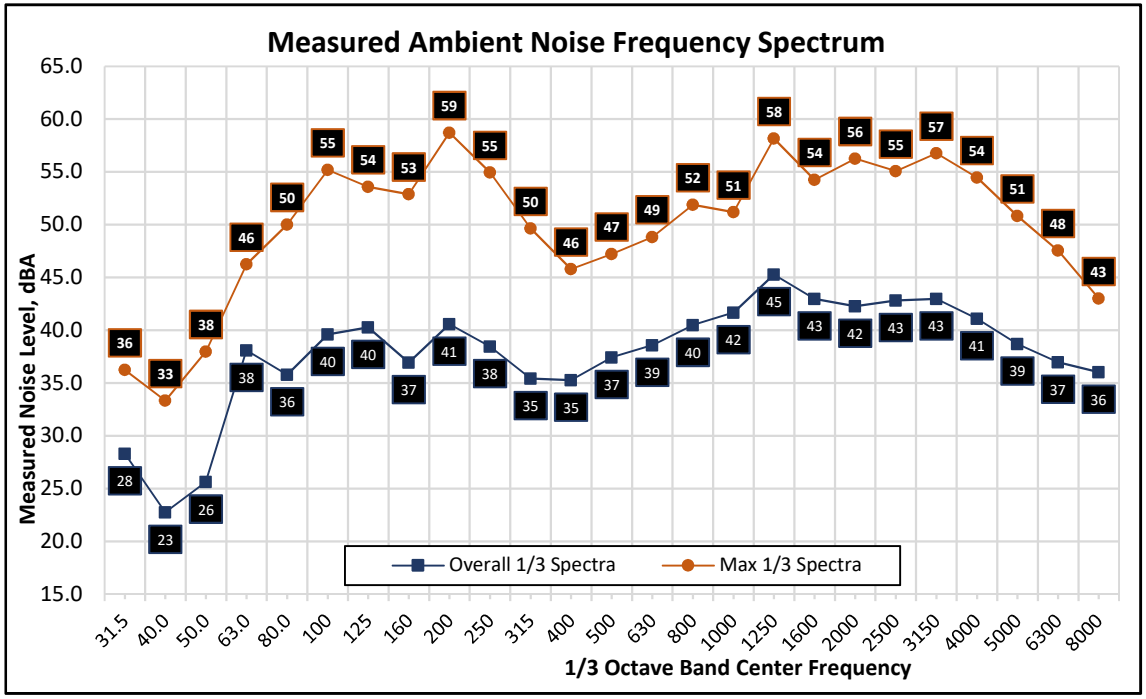
Start: 2018-08-28 10:58:47
Stop: 2018-08-28 11:08:47
SLM: Model 831
Serial: 1800

Measurement Results, dBA

Duration:	0:10
L_{eq}:	53
L_{max}:	64
L_{min}:	45
L_{50}:	49
L_{90}:	47

Notes

Construction at housing development to the west is the primary noise source. Nail gun, hammering, and heavy trucks idling contributed to ambient noise level, with impulsive noise sources measured at approximately 55 dB.



Appendix B: Traffic Noise Modeling Inputs and Results

Appendix B-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804
Description: The Ranch EIR - Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Jackson Rd	12,341	83	0	17	3.0%	1.0%	55	85	0	263	122	57	67.4
2	Jackson Rd	11,760	83	0	17	3.0%	1.0%	55	85	0	254	118	55	67.1
3	Jackson Rd	11,806	83	0	17	3.0%	1.0%	55	100	0	255	118	55	66.1
4	Jackson Rd	14,980	83	0	17	3.0%	1.0%	55	100	0	299	139	64	67.1
5	Excelsior Rd	4,552	83	0	17	3.0%	1.0%	55	135	0	135	63	29	60.0
6	Kiefer Blvd	941	83	0	17	3.0%	1.0%	55	100	0	47	22	10	55.1
7	International Dr	11,246	83	0	17	3.0%	1.0%	45	80	0	178	82	38	65.2
8	Mather Blvd	5,540	83	0	17	3.0%	1.0%	35	100	0	75	35	16	58.1
9	Douglas Rd	12,404	83	0	17	3.0%	1.0%	55	100	0	264	122	57	66.3
10	Douglas Rd	7,510	83	0	17	3.0%	1.0%	55	75	-5	189	88	41	61.0
11	White Rock Rd	15,943	83	0	17	3.0%	1.0%	45	100	0	224	104	48	65.3
12	White Rock Rd	3,533	83	0	17	3.0%	1.0%	55	100	0	114	53	25	60.9
13	White Rock Rd	15,436	83	0	17	3.0%	1.0%	55	100	0	305	142	66	67.3
14	Mather Field Rd	22,543	83	0	17	3.0%	1.0%	45	55	-5	282	131	61	65.7
15	Mather Field Rd	35,028	83	0	17	3.0%	1.0%	45	100	0	379	176	82	68.7
16	Mather Field Rd	42,228	83	0	17	3.0%	1.0%	45	100	0	429	199	92	69.5
17	Zinfandel Dr	22,380	83	0	17	3.0%	1.0%	35	140	-5	190	88	41	57.0
18	Zinfandel Dr	50,515	83	0	17	3.0%	1.0%	40	145	0	401	186	86	66.6
19	Zinfandel Dr	23,685	83	0	17	3.0%	1.0%	40	100	0	242	112	52	65.8
20	Zinfandel Dr	13,705	83	0	17	3.0%	1.0%	45	100	-5	203	94	44	59.6
21	Sunrise Blvd	67,276	83	0	17	3.0%	1.0%	45	140	-5	585	272	126	64.3
22	Sunrise Blvd	53,504	83	0	17	3.0%	1.0%	45	170	0	502	233	108	67.1
23	Sunrise Blvd	41,238	83	0	17	3.0%	1.0%	45	100	0	422	196	91	69.4
24	Sunrise Blvd	30,941	83	0	17	3.0%	1.0%	50	100	0	414	192	89	69.3
25	Sunrise Blvd	22,635	83	0	17	3.0%	1.0%	55	90	-5	394	183	85	64.6
26	Sunrise Blvd	11,748	83	0	17	3.0%	1.0%	55	90	0	254	118	55	66.8
27	Grant Line Rd	12,804	83	0	17	3.0%	1.0%	55	60	0	269	125	58	69.8
28	Grant Line Rd	8,524	83	0	17	3.0%	1.0%	55	100	0	205	95	44	64.7
29	Grant Line Rd	7,745	83	0	17	3.0%	1.0%	55	100	0	193	89	41	64.3

Appendix B-2
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804
Description: The Ranch EIR - Existing + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Jackson Rd	12,443	83	0	17	3.0%	1.0%	55	85	0	264	123	57	67.4
2	Jackson Rd	11,965	83	0	17	3.0%	1.0%	55	85	0	257	119	55	67.2
3	Jackson Rd	12,011	83	0	17	3.0%	1.0%	55	100	0	258	120	56	66.2
4	Jackson Rd	15,082	83	0	17	3.0%	1.0%	55	100	0	300	139	65	67.2
5	Excelsior Rd	4,552	83	0	17	3.0%	1.0%	55	135	0	135	63	29	60.0
6	Kiefer Blvd	941	83	0	17	3.0%	1.0%	55	100	0	47	22	10	55.1
7	International Dr	13,909	83	0	17	3.0%	1.0%	45	80	0	205	95	44	66.1
8	Mather Blvd	6,052	83	0	17	3.0%	1.0%	35	100	0	79	37	17	58.5
9	Douglas Rd	13,019	83	0	17	3.0%	1.0%	55	100	0	272	126	59	66.5
10	Douglas Rd	7,920	83	0	17	3.0%	1.0%	55	75	-5	196	91	42	61.2
11	White Rock Rd	16,148	83	0	17	3.0%	1.0%	45	100	0	226	105	49	65.3
12	White Rock Rd	3,635	83	0	17	3.0%	1.0%	55	100	0	116	54	25	61.0
13	White Rock Rd	15,743	83	0	17	3.0%	1.0%	55	100	0	309	143	67	67.4
14	Mather Field Rd	22,645	83	0	17	3.0%	1.0%	45	55	-5	283	131	61	65.7
15	Mather Field Rd	35,130	83	0	17	3.0%	1.0%	45	100	0	380	176	82	68.7
16	Mather Field Rd	42,433	83	0	17	3.0%	1.0%	45	100	0	430	200	93	69.5
17	Zinfandel Dr	22,687	83	0	17	3.0%	1.0%	35	140	-5	192	89	41	57.1
18	Zinfandel Dr	52,563	83	0	17	3.0%	1.0%	40	145	0	412	191	89	66.8
19	Zinfandel Dr	25,733	83	0	17	3.0%	1.0%	40	100	0	256	119	55	66.1
20	Zinfandel Dr	13,807	83	0	17	3.0%	1.0%	45	100	-5	204	95	44	59.6
21	Sunrise Blvd	70,041	83	0	17	3.0%	1.0%	45	140	-5	601	279	130	64.5
22	Sunrise Blvd	56,986	83	0	17	3.0%	1.0%	45	170	0	524	243	113	67.3
23	Sunrise Blvd	45,540	83	0	17	3.0%	1.0%	45	100	0	451	209	97	69.8
24	Sunrise Blvd	38,725	83	0	17	3.0%	1.0%	50	100	0	481	223	104	70.2
25	Sunrise Blvd	31,546	83	0	17	3.0%	1.0%	55	90	-5	491	228	106	66.1
26	Sunrise Blvd	12,567	83	0	17	3.0%	1.0%	55	90	0	266	123	57	67.1
27	Grant Line Rd	13,111	83	0	17	3.0%	1.0%	55	60	0	274	127	59	69.9
28	Grant Line Rd	8,524	83	0	17	3.0%	1.0%	55	100	0	205	95	44	64.7
29	Grant Line Rd	7,745	83	0	17	3.0%	1.0%	55	100	0	193	89	41	64.3

Appendix B-3
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804
Description: The Ranch EIR - Cumulative No Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Jackson Rd	22,600	83	0	17	3.0%	1.0%	55	85	0	393	183	85	70.0
2	Jackson Rd	22,740	83	0	17	3.0%	1.0%	55	85	0	395	183	85	70.0
3	Jackson Rd	21,500	83	0	17	3.0%	1.0%	55	100	0	380	177	82	68.7
4	Jackson Rd	23,690	83	0	17	3.0%	1.0%	55	100	0	406	188	87	69.1
5	Excelsior Rd	8,950	83	0	17	3.0%	1.0%	55	135	0	212	98	46	62.9
6	Kiefer Blvd	2,180	83	0	17	3.0%	1.0%	55	100	0	83	38	18	58.8
7	International Dr	25,690	83	0	17	3.0%	1.0%	45	80	0	308	143	66	68.8
8	Mather Blvd	20,870	83	0	17	3.0%	1.0%	35	100	0	181	84	39	63.9
9	Douglas Rd	37,150	83	0	17	3.0%	1.0%	55	100	0	548	254	118	71.1
10	Douglas Rd	24,290	83	0	17	3.0%	1.0%	55	75	-5	413	192	89	66.1
11	White Rock Rd	27,540	83	0	17	3.0%	1.0%	45	100	0	323	150	70	67.6
12	White Rock Rd	16,960	83	0	17	3.0%	1.0%	55	100	0	325	151	70	67.7
13	White Rock Rd	41,330	83	0	17	3.0%	1.0%	55	100	0	588	273	127	71.5
14	Mather Field Rd	30,420	83	0	17	3.0%	1.0%	45	55	-5	345	160	74	67.0
15	Mather Field Rd	43,380	83	0	17	3.0%	1.0%	45	100	0	437	203	94	69.6
16	Mather Field Rd	56,560	83	0	17	3.0%	1.0%	45	100	0	521	242	112	70.8
17	Zinfandel Dr	23,730	83	0	17	3.0%	1.0%	35	140	-5	198	92	43	57.2
18	Zinfandel Dr	72,230	83	0	17	3.0%	1.0%	40	145	0	509	236	110	68.2
19	Zinfandel Dr	37,080	83	0	17	3.0%	1.0%	40	100	0	327	152	70	67.7
20	Zinfandel Dr	21,600	83	0	17	3.0%	1.0%	45	100	-5	274	127	59	61.6
21	Sunrise Blvd	71,160	83	0	17	3.0%	1.0%	45	140	-5	608	282	131	64.6
22	Sunrise Blvd	58,150	83	0	17	3.0%	1.0%	45	170	0	531	247	114	67.4
23	Sunrise Blvd	41,350	83	0	17	3.0%	1.0%	45	100	0	423	196	91	69.4
24	Sunrise Blvd	49,190	83	0	17	3.0%	1.0%	50	100	0	564	262	121	71.3
25	Sunrise Blvd	45,470	83	0	17	3.0%	1.0%	55	90	-5	627	291	135	67.6
26	Sunrise Blvd	20,170	83	0	17	3.0%	1.0%	55	90	0	365	169	79	69.1
27	Grant Line Rd	30,330	83	0	17	3.0%	1.0%	55	60	0	479	222	103	73.5
28	Grant Line Rd	29,380	83	0	17	3.0%	1.0%	55	100	0	468	217	101	70.1
29	Grant Line Rd	13,480	83	0	17	3.0%	1.0%	55	100	0	279	129	60	66.7

Appendix B-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804

Description: The Ranch EIR - Cumulative No Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
30	Kiefer Blvd	2,080	83	0	17	3.0%	1.0%	55	100	0	80	37	17	58.6
31	Kiefer Blvd	15,140	83	0	17	3.0%	1.0%	45	65	-5	217	101	47	62.8
32	Kiefer Blvd	7,790	83	0	17	3.0%	1.0%	45	100	0	139	65	30	62.1
33	Kiefer Blvd	4,170	83	0	17	3.0%	1.0%	45	100	0	92	43	20	59.4
34	Chrysanthy Blvd	5,740	83	0	17	3.0%	1.0%	40	80	-5	94	44	20	56.1
35	Chrysanthy Blvd	6,150	83	0	17	3.0%	1.0%	40	90	0	99	46	21	60.6
36	Chrysanthy Blvd	7,070	83	0	17	3.0%	1.0%	40	100	0	108	50	23	60.5
37	Rancho Cordova Pkwy	46,310	83	0	17	3.0%	1.0%	45	100	0	456	212	98	69.9
38	Rancho Cordova Pkwy	42,680	83	0	17	3.0%	1.0%	45	100	0	432	201	93	69.5
39	Rancho Cordova Pkwy	17,310	83	0	17	3.0%	1.0%	45	100	0	237	110	51	65.6
40	Rancho Cordova Pkwy	15,790	83	0	17	3.0%	1.0%	45	100	0	223	103	48	65.2
41	Rancho Cordova Pkwy	8,350	83	0	17	3.0%	1.0%	45	60	-5	146	68	31	60.8
42	Rancho Cordova Pkwy	7,190	83	0	17	3.0%	1.0%	50	100	0	156	73	34	62.9
43	Americanos Blvd	4,850	83	0	17	3.0%	1.0%	50	100	0	120	56	26	61.2
44	Americanos Blvd	1,970	83	0	17	3.0%	1.0%	50	100	0	66	31	14	57.3
45	Americanos Blvd	4,850	83	0	17	3.0%	1.0%	45	100	0	101	47	22	60.1
46	Americanos Blvd	2,800	83	0	17	3.0%	1.0%	45	100	0	70	33	15	57.7

Appendix B-5
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804
Description: The Ranch EIR - Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Jackson Rd	22,702	83	0	17	3.0%	1.0%	55	85	0	394	183	85	70.0
2	Jackson Rd	22,945	83	0	17	3.0%	1.0%	55	85	0	397	184	86	70.0
3	Jackson Rd	21,705	83	0	17	3.0%	1.0%	55	100	0	383	178	82	68.7
4	Jackson Rd	23,690	83	0	17	3.0%	1.0%	55	100	0	406	188	87	69.1
5	Excelsior Rd	8,950	83	0	17	3.0%	1.0%	55	135	0	212	98	46	62.9
6	Kiefer Blvd	2,282	83	0	17	3.0%	1.0%	55	100	0	85	40	18	59.0
7	International Dr	25,997	83	0	17	3.0%	1.0%	45	80	0	311	144	67	68.8
8	Mather Blvd	22,406	83	0	17	3.0%	1.0%	35	100	0	190	88	41	64.2
9	Douglas Rd	39,915	83	0	17	3.0%	1.0%	55	100	0	575	267	124	71.4
10	Douglas Rd	28,694	83	0	17	3.0%	1.0%	55	75	-5	461	214	99	66.8
11	White Rock Rd	27,847	83	0	17	3.0%	1.0%	45	100	0	325	151	70	67.7
12	White Rock Rd	16,960	83	0	17	3.0%	1.0%	55	100	0	325	151	70	67.7
13	White Rock Rd	42,559	83	0	17	3.0%	1.0%	55	100	0	600	278	129	71.7
14	Mather Field Rd	30,522	83	0	17	3.0%	1.0%	45	55	-5	346	160	74	67.0
15	Mather Field Rd	44,199	83	0	17	3.0%	1.0%	45	100	0	442	205	95	69.7
16	Mather Field Rd	57,379	83	0	17	3.0%	1.0%	45	100	0	526	244	113	70.8
17	Zinfandel Dr	23,935	83	0	17	3.0%	1.0%	35	140	-5	199	92	43	57.3
18	Zinfandel Dr	73,152	83	0	17	3.0%	1.0%	40	145	0	514	238	111	68.2
19	Zinfandel Dr	38,002	83	0	17	3.0%	1.0%	40	100	0	332	154	72	67.8
20	Zinfandel Dr	22,829	83	0	17	3.0%	1.0%	45	100	-5	285	132	61	61.8
21	Sunrise Blvd	71,979	83	0	17	3.0%	1.0%	45	140	-5	612	284	132	64.6
22	Sunrise Blvd	58,969	83	0	17	3.0%	1.0%	45	170	0	536	249	115	67.5
23	Sunrise Blvd	42,374	83	0	17	3.0%	1.0%	45	100	0	430	200	93	69.5
24	Sunrise Blvd	51,955	83	0	17	3.0%	1.0%	50	100	0	585	271	126	71.5
25	Sunrise Blvd	46,085	83	0	17	3.0%	1.0%	55	90	-5	632	294	136	67.7
26	Sunrise Blvd	20,272	83	0	17	3.0%	1.0%	55	90	0	366	170	79	69.1
27	Grant Line Rd	31,559	83	0	17	3.0%	1.0%	55	60	0	491	228	106	73.7
28	Grant Line Rd	30,814	83	0	17	3.0%	1.0%	55	100	0	484	224	104	70.3
29	Grant Line Rd	13,890	83	0	17	3.0%	1.0%	55	100	0	284	132	61	66.8

Appendix B-6
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 180804
Description: The Ranch EIR - Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
30	Kiefer Blvd	2,080	83	0	17	3.0%	1.0%	55	100	0	80	37	17	58.6
31	Kiefer Blvd	15,140	83	0	17	3.0%	1.0%	45	65	-5	217	101	47	62.8
32	Kiefer Blvd	7,790	83	0	17	3.0%	1.0%	45	100	0	139	65	30	62.1
33	Kiefer Blvd	4,170	83	0	17	3.0%	1.0%	45	100	0	92	43	20	59.4
34	Chrysanthy Blvd	7,276	83	0	17	3.0%	1.0%	40	80	-5	110	51	24	57.1
35	Chrysanthy Blvd	14,651	83	0	17	3.0%	1.0%	40	90	0	176	82	38	64.4
36	Chrysanthy Blvd	8,606	83	0	17	3.0%	1.0%	40	100	0	123	57	27	61.4
37	Rancho Cordova Pkwy	47,437	83	0	17	3.0%	1.0%	45	100	0	464	215	100	70.0
38	Rancho Cordova Pkwy	44,114	83	0	17	3.0%	1.0%	45	100	0	442	205	95	69.7
39	Rancho Cordova Pkwy	19,154	83	0	17	3.0%	1.0%	45	100	0	253	118	55	66.1
40	Rancho Cordova Pkwy	22,140	83	0	17	3.0%	1.0%	45	100	0	279	129	60	66.7
41	Rancho Cordova Pkwy	8,965	83	0	17	3.0%	1.0%	45	60	-5	153	71	33	61.1
42	Rancho Cordova Pkwy	7,600	83	0	17	3.0%	1.0%	50	100	0	162	75	35	63.2
43	Americanos Blvd	4,850	83	0	17	3.0%	1.0%	50	100	0	120	56	26	61.2
44	Americanos Blvd	1,970	83	0	17	3.0%	1.0%	50	100	0	66	31	14	57.3
45	Americanos Blvd	5,055	83	0	17	3.0%	1.0%	45	100	0	104	48	22	60.3
46	Americanos Blvd	2,800	83	0	17	3.0%	1.0%	45	100	0	70	33	15	57.7

Appendix B-7

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Barrier Calculation: Data Input Sheet

Project #: 180804
Description The Ranch EIR
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Level, dBA
1	Chrysanthy Blvd	Rancho Cordova Pkwy to Americanos Blvd - 1st Flr.	14,651	83	17	3	1	40	90		64
2	Chrysanthy Blvd	Rancho Cordova Pkwy to Americanos Blvd - 2nd Flr.	14,651	83	17	3	1	40	90	3	67
3	Rancho Cordova Pkwy	Douglas Rd to Chrysanthy Blvd - 1st Flr.	22,140	83	17	3	1	45	100		66
4	Rancho Cordova Pkwy	Douglas Rd to Chrysanthy Blvd - 2nd Flr.	22,140	83	17	3	1	45	100	3	69
5	Rancho Cordova Pkwy	Chrysanthy Blvd to Keifer Blvd - 1st Flr.	8,965	83	17	3	1	45	525		52
6	Rancho Cordova Pkwy	Chrysanthy Blvd to Keifer Blvd - 2nd Flr.	8,965	83	17	3	1	45	525	3	55

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Appendix B-8
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 180804
Description The Ranch EIR
Roadway Name: Chrysanthy Blvd
Location(s): 1

Noise Level Data:

Year: 2019
Auto L_{dn}, dB: 63
Medium Truck L_{dn}, dB: 57
Heavy Truck L_{dn}, dB: 54

Site Geometry:

Receiver Description: Rancho Cordova Pkwy to Americanos Blvd - 1st Flr.
Centerline to Barrier Distance (C_1): 35
Barrier to Receiver Distance (C_2): 25
Automobile Elevation: 2
Medium Truck Elevation: 4
Heavy Truck Elevation: 10
Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 6

Barrier Effectiveness:

		---------- L_{dn}, dB ----------				Barrier Breaks Line of Sight to…		
Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
6	6	56	51	49	58	Yes	Yes	No
7	7	55	50	49	57	Yes	Yes	No
8	8	54	49	48	56	Yes	Yes	Yes
9	9	53	47	47	55	Yes	Yes	Yes
10	10	52	46	46	54	Yes	Yes	Yes
11	11	51	46	45	53	Yes	Yes	Yes
12	12	50	45	44	52	Yes	Yes	Yes
13	13	49	44	43	51	Yes	Yes	Yes
14	14	49	43	42	50	Yes	Yes	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

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Appendix B-9
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 180804
Description The Ranch EIR
Roadway Name: Rancho Cordova Pkwy
Location(s): 3

Noise Level Data:

Year: 2019
Auto L_{dn}, dB: 65
Medium Truck L_{dn}, dB: 58
Heavy Truck L_{dn}, dB: 55

Site Geometry:

Receiver Description: Douglas Rd to Chrysanthy Blvd - 1st Flr.
Centerline to Barrier Distance (C_1): 60
Barrier to Receiver Distance (C_2): 40
Automobile Elevation: 2
Medium Truck Elevation: 4
Heavy Truck Elevation: 10
Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 6

Barrier Effectiveness:

		---------- L_{dn}, dB ----------				Barrier Breaks Line of Sight to…		
Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
6	6	59	53	51	61	Yes	Yes	No
7	7	58	52	50	60	Yes	Yes	No
8	8	58	52	50	59	Yes	Yes	Yes
9	9	57	51	49	58	Yes	Yes	Yes
10	10	56	50	48	57	Yes	Yes	Yes
11	11	55	49	48	56	Yes	Yes	Yes
12	12	54	48	47	56	Yes	Yes	Yes
13	13	54	47	46	55	Yes	Yes	Yes
14	14	53	47	45	54	Yes	Yes	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

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Appendix B-10
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 180804
Description The Ranch EIR
Roadway Name: Rancho Cordova Pkwy
Location(s): 5

Noise Level Data:

Year: 2019
Auto L_{dn}, dB: 51
Medium Truck L_{dn}, dB: 44
Heavy Truck L_{dn}, dB: 40

Site Geometry:

Receiver Description: Chrysanthy Blvd to Keifer Blvd - 1st Flr.
Centerline to Barrier Distance (C_1): 45
Barrier to Receiver Distance (C_2): 480
Automobile Elevation: 2
Medium Truck Elevation: 4
Heavy Truck Elevation: 10
Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 6

Barrier Effectiveness:

		L_{dn}, dB				Barrier Breaks Line of Sight to…		
Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
6	6	44	38	38	46	Yes	Yes	No
7	7	43	38	36	45	Yes	Yes	No
8	8	43	37	36	44	Yes	Yes	No
9	9	42	36	35	44	Yes	Yes	No
10	10	41	36	35	43	Yes	Yes	Yes
11	11	41	35	35	43	Yes	Yes	Yes
12	12	40	34	35	42	Yes	Yes	Yes
13	13	40	34	34	41	Yes	Yes	Yes
14	14	39	33	33	41	Yes	Yes	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

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